



EXPLORING THE FACTORS INFLUENCING PRESCRIBING DECISIONS IN DIFFERENT COUNTRIES

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1- Introduction

Pharmaceutical marketing refers to the marketing of drugs; it designs all the drug promotions activities. The aim of these activities is to inform the physician about the drug, to generate interest, to persuade him to evaluate and try to prescribe this drug in order to obtain a repeated prescription. The marketing strategies adopted the pharmaceutical industry contrast sharply with those used in other markets. The decision maker is the “physicians” who prescribes the drug between alternatives and the end user is the patient who pays for the prescribed drugs so the role of the physician cannot be ignored.(Gonul *et al.*, 2001)

Therefore, to optimize pharmaceutical marketing strategies, prescribing decisions must be understood and all factors that could influence a physician in prescribing a particular drug rather than an alternative must be explored.

This paper explains theories related to the factors that influence the prescribing decision, the role of price in prescribing decision, the role of advertising in prescribing decision, a review of studies on the factors affecting decision-making in different countries, and the proposed model for prescribing decisions.

2- Prescribing decisions

Prescribing decisions are a complex process where a physician chooses one drug over another within the same active ingredient. Different factors influence the prescribing decision, some of these factors are pharmacological factors and others are non-pharmacological factors.

2-1 Theories Relevant of Factors affecting the Prescribing Decisions

In order to study well the factors that influence prescribing decisions, these factors must be linked to theories and models that influence physician behavior.

2-1-1 Agency Theory

The basic concept of agency theory was first established by Jensen and Meckling in the academic literature. Agency theory attempts to explain and resolve disputes about priorities between principals and their agents. When agency theory is applied to the prescribed decision, it focuses on two critical agency relationships, that of the physician (agent) and patient (principal), and the pharmaceutical firm (principal) and physician (agent). On the pharmaceutical -physician relationship, various environmental elements may have little control over the cost and benefit (side effects vs. cure effects) ratio of a drug, and persistence of physicians. On the physician-patient relationship, where the patient is the principal, patients in fact, relies on the expert power of physician for diagnosis and prescription. (Ali Murshid and Mohaidin, 2017)

2-1-2 Theory of persuasion

Persuasion is an exchange between the sender and the receiver. The theory of persuasion is used in the medical literature to determine the best way to enhance the prescribing behavior, such as marketing activities. Elaboration Likelihood Model (ELM) is the most widely used model in the context of persuasion theory. The model proposes that individuals use both cognitive abilities and emotional reaction to interpret data and make decisions. ELM model is composed of two methods of persuasion:

- The focal method comprises a high level of planning and cognitive effort
- The peripheral method includes a lower level of cognitive efforts

Doctors may be affected in the same way as any highly engaged consumer who can absorb information and then perform comprehensive cognitive therapy, an approach described by the ELM model. Effects include:

- Environmental factors(Patient and Pharmacist)
- Personal Relationships with medical representative and pharmacist
- Marketing effect (drug information, branding and promotional tools)
- Physician characteristics (Habit persistence)
- Drug characteristics
- Emotionally impact on the decision-making of physicians during prescribing.

2-1-3 The buyer behavior – stimulus-response theory

The original information deduced from this model is the process of the buyer's (physician) consciousness from external stimuli to the purchase (prescribing) decision. The characteristics of the purchaser (doctor) can be attributed to private variables such as social and psychological factors.

2-1-4 Theory of planned behavior

The TPB theory is one of the most appropriate and frequently considered behavioral theories when attempting to modify or influence physician prescribing. TBP demonstrated a high predictability of physician behavior in the healthcare context. The degree that the doctor is favorable or unfavorable depends on their attitude towards the marketing efforts and other factors such as availability of drug information (prescribing information of medicine such as dosage, indications, side effects, etc.), sales promotion, medical representatives' effectiveness, and brand name of a drug.

2-1-5 Theory of social power

Social power is defined as the ability of a person/ individual or group of individuals to alter the outlook or behavior of someone else or panel in conformity with the course anticipated by the persuasion. The theory of social power is applied to better understand the role of the expertise of pharmacists in prescribing drugs. Doctors may have little knowledge when it comes to the decision to prescribe a new drug (doctors voluntarily adhere to pharmacists 'recommendations because of their expert strength).

2-2 Price and Prescribing Decisions

The price of pharmaceutical products plays a vital role in promoting drugs to doctors. Pharmaceutical prices are heavily regulated with price fluctuations rare and small but there are various factors can increase the price of medicines in the United States;

- Patents and Market exclusivity prevent regular price competition
- The existence of multiple insurers breaks down the power of buyer to negotiate price
- The absence of a national health technology assessment system that limits the ability to set prices.(Rodwin, 2020)

2-2-1 How do doctors and patients react with expensive drugs?

According to publication “Modeling the effects of pharmaceutical marketing”, physicians work in the interest of patients and do not have a financial stimulus to be price sensitive. In addition, Insured patients are likely not price sensitive and have little awareness of the retail price of their prescription. (Leeflang and Wieringa, 2010)

2-2-2 Effect of marketing expenses on price sensitivity

Hurwitz and Caves (1988), Rizzo (1999), and Windmeijer et al. (2005) find that marketing expenses reduce price sensitivity and conclude that marketing expenses have a mainly convincing effect but for Leffler (1981) marketing efforts can increase price sensitivity. The results of the study “Modeling the effects of pharmaceutical marketing” show that the demand for the large majority of the brands is not affected by the price and there is no evidence that marketing expenses reduce price sensitivity. (Leeflang and Wieringa, 2010)

3- DTCA AND REGULATION

DTCA can affect almost all patients in every country, in one way or another, thus raising its share of ethical issues. Consumers will be subject to DTCA in countries that allow the advertisement of drugs but may still be subject to DTCl campaigns sponsored by pharmaceutical companies in countries that do not allow DTCA. DTCC may not have a significant informational purpose, but rather a promotional purpose in relation to a specific product, and motives other than "sponsorship" underlie these messages.(Bélisle-Pipon, 2018)

In addition, DTCA has the ability to educate people about specific situations, encourage the request for professional assistance, and may lead to treatment that would not have been otherwise. But the rapid uptake of new drugs due to DTCA can cause a problem when the new uses are for patients who are not a good match for the drug.

4- Factors influencing prescribing pattern in different countries

Numerous studies have been carried out in different countries to fully understand the factors that influence prescribing decisions. Each country has specific factors and, surprisingly, within a single country we can see different results for various studies regarding the prescribing decision. It is very important to collect these studies in order to know the nature of each country and to understand the marketing of pharmaceuticals and the behavior of doctors.

4-1 France

“Association between gifts from pharmaceutical companies to French general practitioners and their drug prescribing patterns in 2016: retrospective study using the French Transparency in Healthcare and National Health Data System databases” aims to explore the relationship between gifts from pharmaceutical companies and prescribing patterns for general practitioners. 41 257 GPs participated in a study who in 2016 worked exclusively in the private sector and had at least five registered patients.

Half of the participants received gifts in 2016, and more have received gifts since the database was launched in 2013. The mean number of visits and the mean number of registered patients determine the value of the gifts as GPs who did not receive gifts had the fewest visits and the smallest number of registered patients, and GPs who received expensive gifts were the most visited and the largest number of patients. Consequently, GPs who did not receive gifts prescribe much more generic antibiotics, antihypertensive and statins than those who received gifts. They also prescribed fewer benzodiazepines for more than 12 weeks, and vasodilators and angiotensin-converting enzyme inhibitors than GPs who received gifts. As conclusion, this study shows the influence of gifts provided by pharmaceutical company on prescribing pattern. (Goupil *et al.*, 2019) .

4-2 Yemen

Yemen, as a developing country, has a different culture and health care system than developed countries where the Yemeni pharmaceutical market is characterized by a lack of organized anti-drug promotion, lack of a mechanism Clear tracking of promotional activities and little information is available on the dynamics of the relationship between non-commissioned members and doctors.

Various studies have been conducted in Yemen to explore the interaction between medical representatives and physicians and to identify factors that influence the decision to prescribe a drug.

“Perceptions of Yemeni physicians about interactions with medical representative” study was published in 2017 to assess the interaction between the medical representative and the doctors. The sample size is 385 individuals, calculated based on the Equation developed by Cochran. The results of the study revealed that promotional materials such as magazines, textbooks and antibiotic guides were considered appropriate by a large majority of respondents, but more than half of all respondents considered cell phones inappropriate. In addition, Doctors believe that attending a dinner and a lecture given by an academic sponsored by a pharmaceutical company is more acceptable than accepting an invitation to a meal in a restaurant or hotel without a lecture. The majority of respondents confirm that they will continue to see MRs even if they stop giving gifts and drug samples for use in their practice. The majority also considered that MRs were a useful means of identifying new drugs. However, a clear majority of respondents felt that conversations sponsored by the pharmaceutical company were often based in favor of their products (the information provided by MRs is insufficient or, even worse, misleading because they believe that the MRs approach is to sell products and not to spread information), although most respondents disagreed with the statement that MR wasted doctors’ time.(Al-Areefi *et al.*, 2017)

According to other study conducted in 2013, factors affecting the prescribing decision were grouped according to indications, patient context, drug characteristics, pharmaceutical company, information and evidence and physician factors (experience of medication, prefer local company and curious of drugs). In addition, physicians mentioned the reasons for not prescribing a selective medication is the deal with other companies and the obligations to prescribe a particular drug.(Al-Areefi, Hassali and Mohamed Ibrahim, 2013)

The third study conducted in Yemen aims to determine the effect of four marketing efforts (available information on a drug, brand of a drug, medical representatives (MRs) and sales promotion) on the drug prescribing decisions of physicians in Yemen. As results, this study showed a relationship between branding and the prescription decision, but information available on a drug, medical representatives and sales promotion do not influence the prescribing decision. A plausible justification for this phenomenon may be the continuous introduction of new products by the pharmaceutical industry, which makes it more difficult for doctors to join a particular brand. Only branding had a great impact on prescribing pattern, so it is necessary for pharmaceutical companies in Yemen to identify doctors who show their brand description in brand loyalty. On the contrary, since the brand of drug is associated with a prescription, increased safety and insurance can help physicians make better decisions about

potential drugs and the benefits of prescribed drugs. Concerning visits of medical representatives, physicians mentioned several reasons for refusing to meet MRs: bad experience with MRs, differences about some commercial transactions, lack of conviction about the product and lack of integrity of MRs. The unethical behavior of some MRs has also discouraged physicians. In conclusion, it appears that marketing efforts (MRs and sales promotion) are ineffective on prescribing decisions, although it can act as a deterrent and change the prescribing decision. (Murshid and Mohaidin, 2018)

4-3 Morocco

A special study conducted in Morocco (2016) to determine the impact of the use of digital tools by medical representatives during their visits to doctors. Most doctors did not find any added value between digital tools and written support. The pharmaceutical industry has adopted these strategies to reduce the promotional budget and make an effective presentation during the visit. (Adil, 2016)

4-4 Pakistan

One recent study was conducted in 2018 to determine the effect of digital pharmaceutical marketing on prescribing pattern in Pakistan. It is a cross-sectional study that contains questions about the digital tools used to assess medical information, the digital presence of the physicians, and the type and frequency of social media or digital media with social media elements used.

This study demonstrates the importance of webinars have the greatest influence on prescribing pattern compared with other digital media, it is to the focused nature of the discussion on a specific topic, the interactive question and answer sessions, and the one-hour time commitment. Pharmaceutical companies in Pakistan spend very little of their marketing budgets on digital marketing efforts. There is potential for increased usage of digital promotion strategies by Pakistan's pharmaceutical sector. (Jawaid and Ahmed, 2018)

4-5 New Zealand

Pharmaceutical representatives are a vital component of the marketing of pharmaceutical products and an important source of prescribing information for general practitioners.

Multiple interviews were conducted to determine the factors affecting general practitioner attitudes in New Zealand. Concerning the visit of medical representative, the number of visits per month is 3 to 4 visits with an average duration of 15 minutes per contact. The most reason to accept medical representative visits is for personal education about new or existing medication. The other reasons are: get samples, feeling of politeness or in response to

perceived pressure from the representative or pharmaceutical company, get free gifts or a welcome break from the boredom of seeing patients. The decision to see the representative was not related to doctor's age, years in practice, practice size, sex or availability of peer advice.

With regard to the gifts of the drug company, gifts with high relevance to practice were preferred, regardless of cost.

The attitude of physicians appears to be little influenced by the provision of research-based evidence of product superiority, with respondents equally divided between a favorable or unfavorable view of this activity. (Thomson, Craig and Barham, 1994)

4-6 Lebanon

Lebanon is an upper middle-income country, with about 40% of the population having no health insurance coverage. Although only around 20% of drugs consumed are thought to be reimbursed, Lebanon's per capita pharmaceutical spending is considered one of the highest in the Middle East. According to BMI's (Business Monitor International) estimates, pharmaceutical sales in Lebanon are forecast to rise by an annual 4.9% from \$1.82 billion in 2017 to \$1.91 billion in 2018. By 2022, BMI expects total pharmaceutical sales to amount to \$2.32 billion which corresponds to a compound annual growth rate (CAGR) of 5.0 %. The Lebanese pharmaceutical market is characterized by intense competition among pharmaceutical companies, due to the registration of many medicines that contain the same active ingredients (for example: 22 generic medicines registered in Lebanon contain the same active ingredient "atorvastatin 20 mg"). Concerning the Lebanese Code of Ethics (2016), it sets regulatory frameworks that ensure respect of legal, ethical and scientific principles in medicine market to serve patient as well as medical and pharmacy professions in Lebanon. It allows: The Gifts with modest or symbolic value are allowed (10% of monthly minimum wage, Related to drug promoted, It is beneficial to patient care, directly related to professional practices); Sponsoring the participation of healthcare professionals in events outside Lebanon can include travel expenses, accommodation, registration fees, meals and sponsoring educative conferences/congresses/symposia.

According to "Pharmaceutical marketing strategies' influence on physicians' prescribing pattern in Lebanon: ethics, gifts, and samples" study the most influential tools of promotion used by the pharmaceutical companies in Lebanon are visits of medical representatives, drug samples, participation by the company in continuing medical education conferences and sponsorship for travel/ expenses in conferences/ sponsorship for a personal tour. This study demonstrates that Lebanese physicians are aware and are more considering the acceptance of small, low-cost gifts permissible than non-permissible even if the majority of them didn't receive a copy of the 2016 code of ethics for medicinal products. (Khazzaka, 2019)

According to webpage, Guardian has investigated allegations of sexual favors and corruption by employees of an international pharmaceutical company in Jordan and Lebanon. (*GlaxoSmithKline says it is investigating bribery claims in Jordan and Lebanon | Business | The Guardian*, 2014)

In addition, one study found that 40 percent of all prescriptions in seven hospitals in Lebanon contained an error, of which 9 percent were unnecessary medication prescription, 7 percent were non-indicated medication, 6 percent had a deficiency in the prescribed medication dosage, 3.5 percent had an inadequate duration and 2.8 percent had an inadequate rate (Al-Hajje *et al.*, 2012)

4-7 Iraq (2014)

A study was conducted in Iraq to assess the prescribing model and here are some results with statistics;

- 50% of physicians prefer to attend conferences abroad.
- 41% of doctors accept promotional gifts.
- 91% of physicians accept gifts of modest value.
- 41% of physicians accept expensive gifts.
- 59% of samples are used to treat patients.
- 77% of physicians prescribe new drugs
- 95% of these physicians stop prescribing these drugs because of their ineffectiveness or side effects.

The number of visits of medical representatives per day is related to the number of patients of the doctor. The relationship between attendance at conferences and the scientific information received by physicians is not significant, although half of physicians prefer to travel to attend conferences. Surgeons are one of the most common medical specialists who accept gifts.

The most significant finding of this study is the direct positive correlation between physicians' acceptance of low-cost gifts and a change in prescribing behavior from generic to other generic drugs, with the shift from branded drugs. . The generic drugs were more associated with the continued supply of low-cost medical gifts. (Mikhael and Alhilali, 2014)

4-8 Saudi Arabia

663 doctors participated in a study to determine the variability of acceptance of different types of gifts offered by pharmaceutical companies by clinical specialty as well as by job rank. Only 281 participants answered the question of acceptance of gifts and the reasons for taking gifts are human in nature to accept free gifts, to remember the name of the product, small gifts are always accepted, the doctor's salary is insufficient or because gifts are found in all professions.

Free gifts can be free samples, promotional materials, dinners, lectures, promotional cards, or financial resources. According to this study, the most influential tool for prescribing the drug is to obtain free samples. It is also evident that there is no significant difference between the specialties for receiving gifts and neither according to the work position of doctors, but the reasons for accepting gifts differ among them. Psychiatrists are more interested in educational activities than other specialists. (Alosaimi *et al.*, 2013)

4-9.USA

Two studies were conducted in the USA to explore the effect of payments from pharmaceutical companies and sources of information on prescribing decisions in particular.

First study “Payments from drug companies to physicians are associated with higher volume and more expensive opioid analgesic prescribing” was published in 2018 to explore the relationship between opioid-related payments and prescribing.

Two groups of physicians were studied

- 1) Those who received opioid-related payments in 2014 and 2015, but not in 2013
- 2) Those who received opioid-related payments in 2015, but not in 2013 or 2014

As a result, both groups of physicians had a significant increase in the expenditures for opiates, daily doses to be dispensed and daily dose expenses. Obviously, clinicians who received higher payments had greater changes in average expenditures for opioids, daily doses, and expenditures per daily dose. In addition, the relationship between opioid-related payments and physicians varied by specialty. Surprisingly, while there was a relatively large increase in prescribing opioid medications to recipient physicians under than \$ 45, the estimated size of the increases was much higher for physicians who received the most money. Physicians, who received opioid-related payments in 2014 and 2015, but not in 2013, received higher opioid-related payments on average than doctors who received opioid-related payments in 2015, but not in 2013 or 2014. The increases in opioid prescribing were generally higher for the group that received payments related to opioids in 2014 and 2015, but not in 2013. Opioid payments may have indirect effects in two ways;

First, opioid-related payments may lead clinicians to recommend increasing opioid prescribing among their professional networks.

Second, payments related to opioids may increase branded prescribing, or increase prescribing in general.(Zezza and Bachhuber, 2018)

The second study “Association between payments from manufacturers of pharmaceuticals to physicians and regional prescribing: cross sectional ecological study” was published also in 2018

to determine the relation between payment and prescribing pattern. Two classes of drugs were studied oral anticoagulants and non-insulin diabetes drugs. It is evident that one additional payment in a hospital referral region was related to additional days filled of the marketed drug for oral anticoagulants and non-insulin diabetes drugs. In addition, for two drug classes, the number of payments was associated with greater increase of the marketed drugs prescription compared to the equivalent dollar increase in the average value of these payments. Also, for two drug classes, payments to specialists were associated with greater prescribing of marketed drugs than payments to non-specialists. Moreover, while the overall payment types were similar between drug classes, endocrinologists received significantly more speaking and counseling fees than cardiologists and hematologists. Concerning Type of Payments; For non-insulin diabetes drugs but not for oral anticoagulants, payments for speaker fees, consulting fees, honorariums, travel costs, and non-research grants were associated with greater regional prescribing of marketed drugs than payments for food and beverage gifts or educational materials. Payments generally intended for physicians who provide “key opinion leadership” by speaking to educating the clinical community, have significantly greater effects on the prescribing of marketed drugs within hospital referral regions among all physicians.

Payments to doctors are not necessarily harmful to patients, and they can benefit from educating doctors about effective, newly approved treatments that may have fewer negative effects, reduce the need to monitor tests, or improve adherence. However, a small payment can negatively affect patients through inappropriate prescribing, or likely prescribing more expensive branded drugs when cheaper generic alternatives are available. (Sharma *et al.*, 2018)

Another study conducted in USA was “Longitudinal Study on the Performance of U.S. Pharmaceutical Firms: The Increasing Role of Marketing”. It shows significant implications for advertising and product differentiation on the market value of companies. The financial reason for the pharmaceutical market is due to the frequent release of additional drugs, the effective use of advertising and the escalation of research and development. It’s clear that incorporating product differentiation can give a more complete picture of the core values of publicly traded drug companies.(Pattikawa, 2007)

“Factors that Influence Prescribing Decisions” published in 2004, to determine the degree of influence of drug-related factors, direct or administrative and indirect, on the use of drugs in community hospitals as seen by doctors, clinical pharmacists, and prescribing committee members, and compare the perceptions of physicians, clinical pharmacists, and P&T committee members regarding these factors.

150 physicians, clinical pharmacists, and formulary committee members at community hospitals that were members of Mercy Resource Management Inc. (MRMI) participated in this study. All physicians considered safety, effectiveness, formulary status, the presence of policies restricting drug use and personal experience significantly influence their prescribing decisions.

Pharmacists and formulary committee members considered recommendations made by clinical pharmacists, prescribing guidelines, and drug cost highly influence the prescribing decision.

It is clear that drug related factors and direct factors such as formulary restrictions greatly affect all the participants and indirect factors such as visual reminders offered by pharmaceutical company affect lowly the prescribing decisions of all participants.

Concerning personal experience, it affects the prescribing decisions of physicians while not affecting prescribing decisions of pharmacists and formulary committee members. On the contrary, drug cost affects pharmacists and prescribing committee members greatly, while physicians are slightly affected by drug cost factors.

All participants confirmed that the pharmaceutical marketing having low influence on their prescribing decisions with the exception free drugs provision program and the availability of drug samples. But, physicians evaluated these factors much higher than clinical pharmacists or formulary committee members. (Schumock *et al.*, 2004)

New York study: A total of 590 physicians and medical students completed a survey. The questionnaire has 7 demographic questions and 14 questions about acceptance of gifts. Demographic questions are about gender, ethnicity, affiliation (hospital), level of training, date of graduation and collaboration with a pharmaceutical company. As result, most physicians find medical lectures and educational materials to be beneficial and 72, 2% of them accepted gifts of modest value. Where surgeons interact positively with drug companies, accept gifts, lectures, and dinners, pediatricians are the least active with drug companies. Academics and interns have demonstrated positive interaction with pharmaceutical companies. The relationship between surgeons and medical instrument companies is more complex than that with pharmaceutical companies. In addition, the application of drug promotion regulations differs among physicians according to their specialties. The regulations aimed at internal doctors are very strict so the accepting a small gift can negatively affect the attitude of prescribing. Regulations geared towards surgeons are less strict. Physicians with information about medical product promotion, corporate influences and regulations are less engaging with businesses. US Medical Schools has put strict regulations on the interaction between pharmaceutical companies and physicians. (Korenstein, 2010)

Columbia study: A study conducted in Columbia to assess the influence of pharmaceutical marketing on Medicare prescriptions. It has been clear that physicians who receive gifts from pharmaceutical company prescribe more claims per patient and had a greater average cost per claim than physicians who do not receive gifts. In addition, physicians who receive gifts prescribe more branded drug compared to physicians who do not receive gifts. This study also shows the impact of gifts on physicians among various specialties; Internal Medicine, Family

Medicine, Obstetrics, Gynecology, Urology, Ophthalmology, and Dermatology who accept gift from pharmaceutical company significantly increase the average cost per claim as Internal Medicine, Family Medicine, and Ophthalmology also prescribe more branded drug than other specialties. In eleven other specialties, gift acceptance was not associated with a higher average cost per claim or proportion of branded claims. These included Emergency Medicine, Nephrology, other Internal Medicine subspecialties (Cardiology, Endocrinology, Gastroenterology, Infectious Disease, and Pulmonary Disease), Neurology, Pediatrics, Psychiatric subspecialties, Radiation Oncology, Diagnostic Radiology, General Surgery, Orthopedic Surgery, and Other Surgical specialties. Gifts of small or high value have a big influence on prescribing pattern but it is clear that the expensive gifts increase more the claim cost and the prescriptions for branded drug compared to the effect of a small gift. As conclusion, gifts provided by pharmaceutical company are associated with more prescriptions per prescriber, more prescriptions per patient, more costly prescriptions, and more branded prescriptions.(Wood *et al.*, 2017)

4-10 Japan

In Japan, a study was conducted to examine the effect of free webinars twice-weekly on primary care physicians on June 13, 2015. It is a qualitative study, in which physicians answer why they participate in webinars, the strengths and weaknesses of webinars, useful episodes and advantages and disadvantages of webinars on the internet. As a result, participants like webinars for a several of reasons; it is a technological revolution that creates learning opportunities, it has become part of the weekly routine of the participants, it has maintained a comfortable learning climate and created virtual fellowship among the participants. In webinars, local topics from many regions are presented at different times to provide a good balance with topics of greater national scope and no commercial bias, doctors can participate in webinars as long as they have access to the internet despite their location, they don't need to pay for equipment, they directly apply the knowledge and skills gained in the webinar to real life situations, they can share experiential knowledge, and they can acquire learning skills when they become a speaker. In addition, the chat offers a sense of connection, it makes the webinars interactive and the doctors learn from the questions and comments posted on the chat system. However, there were drawbacks; Due to the psychological pressure of speaking to a larger audience, speakers tend to become more nervous. In addition, concerns were raised about the costs and the increasing burden on the organizers, which had always been an issue in keeping the webinars online.(Kimura, Onishi and Kawamata, 2018)

4-11 Turkey

152 GPs working in the primary health centers and hospitals in Erzurum province of Eastern Turkey participated in 2006 on study titled "Impact of pharmaceutical promotion on prescribing

decisions of general practitioners” in order to determine the self-reported impact of pharmaceutical promotion on the decision-making process of prescription of GPs in Eastern Turkey. The questionnaire includes questions about socio-demographics, number of patients per day, time per patient, frequency of sales representative visits to GPs, participation of GPs in training courses on prescribing (in-service training, drug companies), factors affecting prescribing decision, reference sources concerning prescribing, self-reported and self-rated effect of the activities of sales representatives on GPs prescribing decisions. Diverse factors have tested in this study such as work site, numbers of patients examined per day, year of practice, quality and content of formal pharmacology education during medical faculties and promotional activities. Concerning the visits of MRs, 72.3% of the physicians were visited by MRs more than once a month and 61.2% of physicians reported that their prescribing decisions were always affected by MRs activities. About training programs, 75.6% of the GPs participated in training programs of pharmaceutical companies and 28.2% had gone into in-service training provided by public sector on prescribing due the impact of promotional activities on physicians who participated in training courses of pharmaceutical companies was significantly higher on general practitioners who did not participate in any training of companies. About work site, year of practice, number of patients examined per day and frequency of medical representative visit the results of this study demonstrate that the impact of promotional activities is high on physicians working at primary health care centers, on physicians whose year of practice was 5 years and under, on physicians who examined 60 or more patients per day and on physicians who were visited by MRs more than once a month. Furthermore, the physicians who examined 60 and more patients a day participated in training courses of pharmaceutical companies more frequently than the physicians who examined fewer than 60 patients a day. In addition, the quality and content of formal pharmacology education during medical faculties affected directly the prescribing decision and the attitudes of GPs towards the relations between doctors and pharmaceutical companies. As reference resources in case of any problems in prescribing are drug guides of pharmaceutical companies (73,7%), medical books, and the documents of pharmaceutical companies. So all these results indicate a lack of formal continuing medical education and an adequate monitoring of prescribing behaviors provided by public sector.(Vancelik *et al.*, 2007)

4-12 Egypt

Egypt, as the largest Arab middle-income country, with a population of about 85 million people and central to modern Middle Eastern politics, plays an influential role for pharmaceutical companies’ promotional strategies. 47 pharmaceutical producers active in Egypt; 37 belonging to the public sector, 4 producers for the local private sector and 6 multinationals. Multinational and local private companies own more than half of the total market share. The Egyptian Medicines Authority (EDA) is the regulatory body for safety and quality of pharmaceutical

products, conducting pharmaceutical practices and providing high-quality medicines at reasonable prices. In 2011, EDA established the Marketing and Media Control Department with the aim of reviewing and ensuring the safety of promotional materials and regulating the activities of the scientific offices of pharmaceutical companies. A qualitative study was conducted in 2014, to analyze the perceptions and attitudes of Egyptian physicians and pharmacists towards Pharmaceutical Marketing. The gifts offered by pharmaceutical company to physicians are drug samples, office supplies, cash and invitations to conferences or sponsored continuing medical education (CME) events. Some of doctors considered promotional gifts bearing the name of a drug useful as a reminder of that name, which actually seemed to match the intentions of the pharmaceutical industry. Doctors who admitted accepting gifts probably did this because receiving gifts from drug companies was considered a common and accepted practice in Egypt and elsewhere. About CME, The physicians considered the continued medical education (CME) events to be of high quality, but considered that juxtaposition of information and promotion was inconvenient. Sources of information used during prescribing decisions: medical studies, scientific conferences, textbooks, scientific journals, individual experiences with pharmacological treatment, university staff prescription habits and available information on the Internet. As results of this study, physicians did not feel influenced by pharmaceutical promotion in their prescription habits and it was mentioned that adjuvants and non-prescription medicines were more easily overprescribed than prescription medicines. Concerning samples, while the physicians give free medical samples to patients with poor social and economic conditions, it was demonstrating that availability of samples increases prescribing of the same brands, makes physicians adopt new drugs faster and shifts prescribing decisions towards less appropriate choices. Pharmacists had various attitudes towards pharmaceutical promotion. "In Egypt, promotion is about financial promotion, not ethical promotion. So it is about how much profit you make, not whether this is an effective medicine" says one pharmacist. In addition, pharmacists noted that they are aware of the incentives given to doctors to influence their prescribing pattern. This appears when doctors prescribe unnecessary medications.(Kamal *et al.*, 2015)

4-13 Nigeria

In 2017, a cross sectional study was conducted in Abia State to describe the effect of medical representative on the prescribing behavior for physicians. 185 private and public medical practitioners participated in this study. The questionnaire includes questions about socio demographic data, practice and attitude to drug promotion, frequency of visits by medical representatives in the previous 12 months, types of incentives received, drug promotion methods, drug promotion information, sources of drug information, and awareness of code of regulation on drug promotion. All respondents were visited by medical representatives; 47, 6%

of physicians are influenced by medical representatives and 66, 5% of respondents had positive attitude to drug promotion.

In addition, all respondents accepted the gifts and the most common incentive received by the medical practitioners was branded office stationeries (pens, jotters, diaries, calendars). The predominant drug information provided by MRs was both brand name of the drugs and drug indications. None of the respondents was informed on the boxed warnings for specific medications which are available in Nigeria. The most common source of drug information is to ask or contact a colleague or pharmacist especially when they have drug information problems. As noted, 84.9% of doctors were aware by the code of ethics and regulation of promotion so this awareness should be translated to appropriate prescribing practice and positive attitude towards drug promotion. In the Chi-square bivariate analyzes, work in public health facilities was significantly related to the position and prescribing practices of study participants. This may be a reflection of the accessibility and frequency of visits by medical practitioners working in public health facilities among other epidemiological variables. This study showed the high level of drug promotion induced prescription practice could be reflection of the frequency of visits and enthusiastic gifts by the medical representatives to medical practitioners in Nigeria. (Pascal Iloh and Chukwuonye, 2017)

4-14 Ethiopia

To assess the influence of MRs on prescribing practice, a study titled “Influence of Medical Representatives on Prescribing Practices in Mekelle, Northern Ethiopia” was conducted enrolling all physicians working in public and private health facilities from February to March 2015. A questionnaire was prepared in this cross sectional study comprising two types of questions; Questions on the socio-demographic characteristics of the physician: age, gender, religion, average monthly income, year of experience, qualification and practice site and Questions about drug promotion and prescribing practice. Out of 90 questionnaires distributed to respondents, 83 were filled completely with response rate of 92%. The results of this study showed that 97, 6% of physicians were visited by medical representatives (MRs) and 48.2% of physicians believed that MRs influenced their prescribing pattern. The information provided by MRs concerns the brand name of a product (84,3%) and drug indication (30,1%) while 63,9% of physicians declared that MRs never had informed the made-quietly and accurately. The medical representatives use a variety of promotional methods including face to face (54,2%), using medical samples (25,2%), using brochures and stickers (3,6%), using other electronic materials (3,6%), referring to articles (9,6%), participating during new product launching (3,6%) and participating during company cycle meeting (4,8%). Half of the respondents accept gifts from pharmaceutical company and most of the accepted gifts are drug samples and stationery.

Two important factors influence prescribing decisions; acceptance of gifts and the practice site. The acceptance of gifts by physicians has 6 times more influence on their prescribing pattern than physicians who do not accept gifts provided by medical representative. In addition, doctors working in private health facilities were almost 13 times more likely to be influenced to change their prescribing practices by MRs than those in public facilities.(Workneh *et al.*, 2016)

4-15 Peru

In 2014, a study was conducted at a public hospital in Lima, Peru; to explore the interaction and attitudes of doctors with the pharmaceutical company. It is clear the active relationship between physicians and pharmaceutical company. 95% of attending and 85, 7% of residents have at least one monthly interaction with medical representatives. And when we asking about reasons to accept medical representative 81, 8% of physicians accepted them for respecting the another's job and 55,2% of physicians to receive drug samples.

About gifts offered by pharmaceutical company, most of the physicians received samples and promotional materials and they accepted invitations to dinners with frequency of at least once every four months. 31,8% of physicians received materials or equipment for professional use ,27,8% of physicians received personal gifts, 15,5% of physicians received travel expenses to Congress. 88,5% of physicians believe that acceptance of gifts and dinner has no impact on prescribing decisions and 35,2% of physicians believe that those gifts affect their colleagues' prescriptions. Concerning gifts offered by Pharmaceutical company; 31,8% of physicians received materials or equipment for professional use, 7,8% of physicians received personal gifts and 15,5% of physicians received travel expenses to Congress. Concerning detailing activities: 75% of physicians considered that the information brought up by pharmaceutical representatives is "not trustworthy" and 80.3% of physicians stated that reps "prioritize the promotion of their products over patients' benefit". But, 47.6% of participants stated that the information provided by pharmaceutical representatives helps them "learn about new products" and "stay up to date". Taking into consideration the specialty of physicians, Anesthesiologists reported few numbers of encounters with medical representatives and more than half of them believe that most promotional activities and gifts affected the prescribing behavior. In contrast, pediatricians reported large number of encounters with medical representatives and likewise more than half of them didn't believe that promotional activities influence prescribing behavior. As conclusion, this study shows a close and active relationship between physicians and medical representatives.(De Ferrari *et al.*, 2014)

4-16 Iran

The study "Main factors affecting physicians' prescribing decisions: The Iranian experience" aims to determine the factors that influence prescribing decisions. 385 physicians were

answered in a questionnaire based on 63 questions in which 9 demographic questions were a nominal and ordinal scale and the other 54 questions were worded on a Likert scale, ranging from 1 to 5, number one is for strong agreement and number 5 for strong disagreement.

Diverse factors were examined in this study:

- Patients' influence (profile such as age, race, gender; co-morbidity and treatment history)
- Physicians' experience and product valuation
- Products' influence (safety, efficacy, side effect, cost)
- Marketing activity of pharmaceutical strategies (samples, details, advertising)
- Payers' influence (insurance, managed care)
- Environmental factors (relationships with pharmacists and coworkers, seminars and

As results, the factors that influence prescribing decisions in Iran are pharmaceutical products' characteristics, the patients' conditions and the insurances coverage. Pharmaceutical Marketing and environmental factors have no effect on prescribing pattern. (Sharifnia et al. 2018)

4-17 England

"The prescribing of specialist medicines: what factors influence GPs' decision making?" study are published by Oxford University Press in 2009 to explore the factors which influence GPs' decision-making process.

A qualitative approach was used to explore the perspectives of a wide range of practice-, primary care trust-, strategic health authority-level staff and other relevant stakeholders in the North-West of England. All semi-structured interviews (n = 47) were analysed comprehensively using the five-stage 'framework' approach.

It demonstrated six factors that Influence general practitioners to prescribe specialist drugs;

1. The special is medicine
2. The quality and quantity of information
3. The shared care arrangement
4. The financial arrangement
5. The patient

6. The Practice Decision and GPs' Specific Areas of Interest (Crowe, Tully and Cantrill, 2009)

4-18 Spain

The study "Pharmaceutical companies information and antibiotic prescription patterns: A follow-up study in Spanish primary care" was published in 2019 to explore the impact of sources of drug information on antibiotic prescribing patterns among primary care physicians. This is a cohort study covering all primary care physicians working for the NHS in Galicia was conducted in 2010 (n = 3675). Questionnaire KAAR-11 (Knowledge and Attitudes Regarding Antibiotics and Resistance) was used.

As results, the sources of information on antibiotics are an important determinant of the quantity and quality of antibiotic prescribing in primary care. Whereas commercial sources of information influence prescribing negatively, clinical guidelines are the sole resource associated with better indicators, albeit with lower effect magnitudes. Majority of primary care physicians regularly receive pharmaceutical sales representatives and accept their gifts. Regulations governing the relations between the pharmaceutical industry and the healthcare system are frequently infringed.

Similar to other study, physicians display contradictions in their relationship with the industry, justifying it and considering that it does not affect them on an individual basis, while at the same time regarding it as affecting their colleagues. Also, Clinical guidelines can be biased because of the authors' conflicts of interests with pharmaceutical companies. Something to also bear in mind is that public concern about antimicrobial resistance tends to favor more control over the rational use of antibiotics, which is reflected in more independent guidelines. The need to reduce the impact of the industry and encourage the use of more independent resources, such as the appropriate implementation of independent clinical guidelines, was recommended in order to rationalize antibiotic prescribing. (Fernández-Alvarez et al. 2019)

4-19 China

China has witnessed rapid economic development and social changes, as well as changes in the effectiveness of medical services and a public health epidemic. Drug expenditure represents a high percentage of total healthcare expenditures, up to 42, 7% in 2008. A number of causes contribute to the drug expenditure; one of the main causes is the "drug wastage" behavior of physicians. A study titled "Is the prescribing behavior of Chinese physicians driven by financial incentives?" examined prescribing pattern of two types of antibiotics; penicillins and cephalosporins for the purpose of exploring potential financial drug wastage during healthcare delivery in China. The weighted average price of cephalosporins in the study period was higher than that of penicillins, and the volume of cephalosporins was greater than that of penicillins, so by combining price and volume, the revenues of cephalosporins were higher than those of

penicillins. Within penicillin, more expensive drugs have larger volumes than less expensive drugs. Similar trends in cephalosporins, higher priced drugs have larger volumes than low-price drugs. The drivers of financial incentive-driven prescribing behaviors are;

1 - Hospital revenues directly affect medical allowances. This is the root cause of the drug waste problem.

2- The government has increased financial support to public hospitals since the implementation of the new medical reform in 2009, with funding reaching only 14% of total expenditure in 2012.

3- The government's pricing system unintentionally encourages prescribing behavior motivated by monetary incentives

4- Collusion between healthcare providers and the pharmaceutical industry exacerbates unwanted financially paid prescribing behaviors.

Therefore, financial incentives may be the main reason for over-prescribing of expensive drugs.(Chen, 2014).

5- Proposed Model

Ali Morshed and Mohieddin proposed a new model (figure 1) to describe prescribing decisions that integrate marketing efforts, patient characteristics, pharmaceutical factors, and contextual factors as well as the impact of trustworthiness on the relationship between physicians and pharmacists. (Ali Murshid and Mohaidin, 2017)

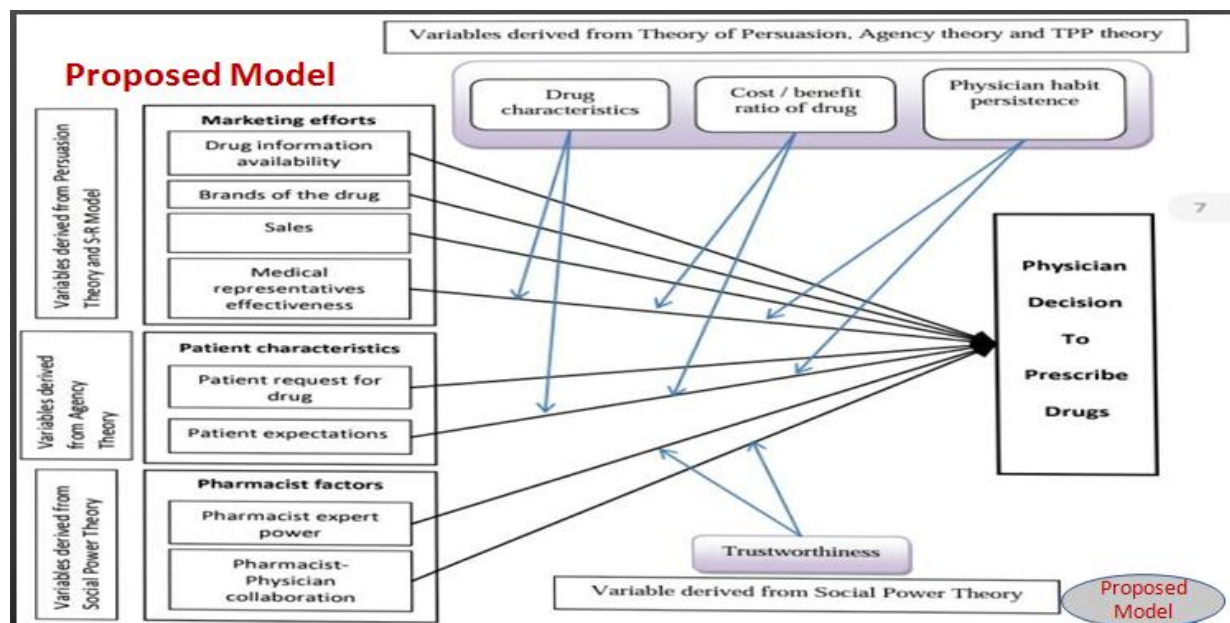


Figure 1: Proposed model of physician prescribing decision

A recent study “Social and Behavioral Theories and Physician’s Prescription Behavior” was published in 2020 to verify the direct impact of marketing efforts, patient characteristics and pharmacist factors on the prescribing decision, also to validate the relationships between the moderate variable (Drug characteristics, Cost/benefit ratio of drug and Physician’s habit persistence) and prescribing decisions. This study demonstrated the effect of direct factors (marketing efforts, patient characteristics, and pharmacist factors) on the prescription pattern. Regarding the moderate variables, the persistence of the physician’s habits and the cost and benefit ratio of the drug had a significant moderating effect between the effectiveness of the medical representative and the doctor’s decision to prescribe a particular drug. But it turned out that the characteristics of the drug had no moderating effect between patients' expectations and the doctors' decision to prescribe the drug. In terms of trustworthiness, it has a significant moderating effect between the collaboration between pharmacist-physician, and expert power of pharmacists and the decision of physician to prescribe a medicine. (Ahmed *et al.*, 2020)

6- Conclusion

To prioritize pharmaceutical marketing strategies, the prescribing decisions model must be carefully understood and all factors affecting prescribing decisions must be identified. It was clear that the factors influencing prescribing decisions differ from country to country; the manager must understand the environment in which the doctor works.

Although drug promotion may play a role in raising health care costs and an unnecessary effect on prescribing the habits of more expensive and less cost-effective drugs. (Pattikawa, 2007)

All factors related to pricing, detailing, sampling, branding, pharmacists factors, patient characteristics and physician characteristics have all received much attention in studies, but the impact of digital pharmaceutical marketing on prescribing decisions is still less in research.

According to the article “Digital Marketing: A Road Ahead To Pharmaceutical Selling,” e-marketing reduces the overhead costs of a pharmaceutical company and can centrally serve doctors. In addition, due to the limited face-to-face interactions between a medical representative and a physician, other modes of interaction have to be established. Medical representative meetings can be supplemented with advance electronic details and social media ads so that physicians are informed of new products and updated even before they meet with the medical representative, and this paves the way for more effective and informed communication between the medical representative and the physician. (Bhole, Pharm and Verma, 2018)

Digital marketing is applied in pharmaceutical marketing in various forms:

- Website of pharmaceutical company
- Emails
- Online shopping
- Pharma application
- Advertising
- Use of iPad during medical representatives visits
- Webinars and Webcasts
- Social Media

New research should evaluate prescription patterns and explore the degree to which digital marketing has affected prescription pattern.

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