



# Factors Affecting the Cardiologists' Prescribing Attitudes in Dubai and the Northern Emirates: A Cross-sectional Study

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## Abstract

**Background** The growing concern of irrational drug use that leads to adverse events requires attention to investigate the prescription patterns. For cardiovascular drugs, this could increase patients' risk of developing a heart attack or stroke and coronary artery disease. This study particularly examines cardiologist behaviors that influence prescription patterns. The influence of pharmaceutical companies' promotions and other factors affecting their prescriptions in the United Arab Emirates (UAE), mainly in Dubai and the Northern Emirates private hospitals and clinics, were investigated.

**Methods** Online survey questions were undertaken using the structured questionnaire, and the determined sample size of the cardiologists working in Dubai and the Northern Emirates was 59 using randomly generated numbers from the available cardiologists' registry and assuming 95% confident with the 80% response rate. Ratings of the prescribing behavior were done using the original Bloom's cutoff points, which were updated and adjusted to evaluate UAE cardiologists' general prescribing practices.

**Results** The average prescribing behavior score was moderate (76.5%; 95% confidence interval [CI], 75.1–77.8). Better prescribing patterns were observed among the cardiologists from Dubai compared with the Northern Emirates (odds ratio 4.24; 95% CI, 1.06–16.97). Continued medical education sponsored by pharmaceutical companies was the main influential factor (96.6%) affecting the cardiologists in changing their prescription. A total of 40.7% of the cardiologists believed in changing the prescription from brand to generic, while 43% stated that clinical updates, including evidence from new studies, were among the other factors affecting their prescribing behavior pattern.

**Conclusion** The cardiologists' prescribing behaviors in Dubai and the Northern Emirates are above average and the cardiologists are aware of the unethical acceptance of pricey gifts. Cardiologists in Dubai and the Northern Emirates are considered ethical in adopting a new medication in agreement with similar studies conducted regionally, as their primary motivation is the welfare of patients, which will help them rationally select medication.

## Keywords

- ▶ cardiologists
- ▶ prescription pattern
- ▶ attitude
- ▶ pharmaceutical companies
- ▶ clinical updates

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## ملخص المقال باللغة العربية

## العوامل المؤثرة في توجهات الوصف الطبي لأطباء القلب في دبي والإمارات الشمالية: دراسة مقطعية

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**الخلفية:** القلق المتزايد من الاستعمال غير الرشيد للأدوية والذي قد ينتج عنه تأثيرات جانبية سلبية يتطلب الانتباه والتحقيق في أنماط الوصفات الطبية. وينطبق ذلك على أدوية القلب والأوعية الدموية، حيث يسبب الاستعمال غير الرشيد إلى زيادة خطر إصابة المرضى بنوبة قلبية أو سكتة دماغية أو الإصابة بمرض الشريان التاجي.

**الأهداف:** تبحث هذه الدراسة بشكل خاص في سلوكيات أطباء القلب التي تؤثر على أنماط الوصفات الطبية. تم التحقيق في تأثير العروض الترويجية لشركات الأدوية والعوامل الأخرى التي تؤثر على الوصفات الطبية الخاصة بهم في دولة الإمارات العربية المتحدة، وخاصة في المستشفيات والعيادات الخاصة في دبي والإمارات الشمالية.

**المواد والطرق:** تم إجراء أسئلة الاستطلاع عبر الإنترنت باستخدام الاستبيان المنظم، وكان حجم العينة المحددة لأطباء القلب العاملين في دبي والإمارات الشمالية 59 طبيباً وذلك باستخدام أرقام تم إنشاؤها عشوائياً من سجل أطباء القلب المتاحين، وحددت درجة وثوق بنسبة 95٪ مع معدل استجابة المطلوبة 80٪. تم إجراء تقييمات لسلوك الوصفات الطبية باستخدام نقاط التوقف الأصلية الخاصة بـ بلوم (original bloom's cut-off point)، والتي تم تحديثها وتعديلها لتقييم ممارسات الوصفات العامة لأطباء القلب في الإمارات العربية المتحدة.

**النتائج:** كان متوسط درجة سلوك الوصفات معتدلة (76.5٪)، مع مجال ثقة 95٪ [75.1 إلى 77.8]. لوحظ أنماط وصف أفضل بين أطباء القلب في دبي مقارنة بالإمارات الشمالية (نسبة الأرجحية 4.24؛ ومجال الثقة 95٪، [1.06 - 16.97]). كان التعليم الطبي المستمر برعاية شركات الأدوية العامل المؤثر الرئيسي (96.6٪) الذي أثر على أطباء القلب في تغيير وصفاتهم الطبية. يعتقد 40.7٪ من أطباء القلب في تغيير الوصفة الطبية من اسم الدواء التجاري إلى الاسم الجنييس، بينما ذكر 43٪ أن التحديثات السريرية، بما في ذلك الأدلة من الدراسات الجديدة كانت من بين العوامل الأخرى التي تؤثر على نمط سلوكهم في وصف الأدوية.

**الاستنتاج:** إن سلوكيات أطباء القلب في دبي والإمارات الشمالية أعلى من المتوسط ويدرك أطباء القلب القبول غير الأخلاقي للهدايا باهظة الثمن. ويعتمد أطباء القلب في دبي والإمارات الشمالية النهج الأخلاقي في اعتماد دواء جديد بالاتفاق مع دراسات مماثلة أجريت على المستوى الإقليمي، حيث أن دافعهم الأساسي هو سلامة المريض، مما يساعدهم على اختيار الدواء بطريقة عقلانية وأخلاقية.

**الكلمات المفتاحية:** أطباء القلب، نمط الوصفات الطبية، الموقف، شركات الأدوية، التحديثات السريرية.

## Introduction

The ability to modify the prescription pattern by a physician is considered a major factor in controlling the quality and the cost of medication use.<sup>1</sup> During the period from 1996 to 2016, a massive money spent increased from \$17.7 to \$29.9 billion in the United States, showing a large extent in medical promotions. The most promotional contribution came directly from pharmaceutical industry intervention with the health professionals.<sup>2</sup> A set of regulations and guidelines was organized and managed by the World Health Organization (WHO) Ethical Criteria for Medicinal Drug Promotion 1988 to supervise and regulate the promotional activities to secure a rational prescription and support public health. Unfortunately, the inclusion of these Ethical Criteria into the national regulation remains debatable and flawed. This is problematic, as it can lead to physicians providing substandard care and a lack of oversight of medical practice. For example, in some countries, physicians may be allowed to prescribe treatments or medications that are not in the best interest of the patient or may not follow best practices when providing care. Additionally, physicians may not be held accountable for any harm caused to their patients, as there are no regulations or guidelines in place to govern their conduct. Therefore, it is important for countries to ensure that the ethical criteria established by the WHO are included in their national regulations to ensure that physicians are providing the best possible treatment to their patients. Medical representative visits and pharmaceutical marketing, which are governed by a certain regulatory scheme, differ from one country to another.<sup>3</sup> The Organization of Economic Cooperation and Development (OECD) found that pharmaceutical expenditure was growing at a rate of 4.6% annually, which is greater than the total health care expenditure growth rate, and this was due to the diffusion of new drugs and the aging of populations. The concern was not only on this increase in pharmaceutical expenditure, but also on the irrational and improper prescription of medication.<sup>4</sup> Many observational and experimental studies illustrated that eligible patients were not always given the drug therapy that is intended to treat their condition. In addition, many pharmaceutical drugs and products are misused, leading to a decrease in health and quality of life for patients and the community. As a consequence, this will lead to an increase in health care system expenditure.<sup>5</sup> Therefore, regulations and guidelines should be followed to ensure the optimum drug prescription for both health and economic reasons.

In literature, various models of prescribing patterns were developed to explain the practices and techniques.<sup>6</sup> While there is an increase in the demand for pharmaceutical products, the consumer is not considered to be the decision-maker in selecting a particular drug product. It is the physician's judgment and selection of whether a medication is to be purchased or not, and which product to be chosen. Due to an increase in both demand and fear of improper drug therapy, studies on the physician's prescription habits were addressed in several published papers.<sup>7-9</sup> Cardiovascular deaths have become the dominant cause of deaths and

disability globally, showing an increase in burden especially in the low- and middle-income countries.<sup>10</sup> Considering the deaths from other causes such as injuries, respiratory problems, and HIV/AIDS, cardiovascular problems are among the leading causes of death globally and in the United Arab Emirates (UAE). The cardiovascular disease consists of four categories: coronary artery disease (CAD), cerebrovascular disease, peripheral artery disease, and aortic atherosclerosis.<sup>10</sup> Based on the prevalence rates both nationally and globally, the incidences of cardiovascular disease in the UAE have drastically increased due to lifestyle changes, with ~50% deaths reported in the country compared with global deaths accounting for 85%. It is well established in a secondary analysis of the Abu Dhabi Screening Program for Cardiovascular Risk Markers (AD-SALAMA) data that the number of deaths from cardiovascular diseases has drastically changed and the prevalence is expected to increase in the future. Based on the data collected in 2015, it was indicated that the number of deaths associated with cardiovascular problems has increased to 1.7 million in 2015, which is expected to increase to ~23.6 million in 2030. In the UAE, the incidences are expected to increase by 40%, especially among young adults, due to the increasing burden of known risk factors, including hypertension, which accounts for 43%, dyslipidemia (74%), diabetes (32.4%), and obesity accounting for 71.5%.<sup>11</sup>

This research study will investigate factors affecting cardiologists' prescription behavior in Dubai and the Northern Emirates.

## Methods

### Design

The cross-sectional study seeks to examine prescription patterns and behaviors among cardiologists and the factors affecting their prescriptions in the UAE, exclusively in Dubai and the Northern Emirates private hospitals and clinics. The research investigated the correlation between patterns of cardiologists' prescriptions with different ages, gender, work experience, and title grade, as discussed by Karimi et al.<sup>12</sup>

Ethical approval was obtained from the Ajman University Ethics Committee (ethical approval code: P-H-S-Jun-26; see ► **Supplementary Appendices**, available in the online version only).

### Development of the Online Survey

Online survey questions were subsequently undertaken using the structured questionnaire developed based on the pilot study among those who agreed to participate. The pilot study was developed in a structured manner after performing several literature reviews to have a better understanding of the type of questions to be asked to suit the current study purpose.<sup>4,12</sup> The developed survey is attached in the ► **Supplementary Appendices** (available in the online version only).

### Response Scoring

The cardiologists' prescribing pattern and behavior were assessed by seven items using a 5-point Likert scale

(0 = "Strongly disagree," 1 = "Disagree," 2 = "Neutral," 3 = "Agree," and 4 = "Strongly agree"). The grading of the seven items was achieved by summing the raw Likert scale scores for each respondent. This means that the minimum and the maximum scores will have values of 0 and 28. This means that the scores on Likert scale were summed to achieve a value between 0 and 28. Based on this, the percentages were calculated ranging from 0 to 100% to reflect general prescribing practices among UAE cardiologists. Based on this, the percentages were calculated ranging from 0 to 100% (example) to reflect general prescribing practices among UAE cardiologists.

Classification and judgment of the ratings of the prescribing behavior were done using the original Bloom's cutoff points, which were updated and adjusted to evaluate UAE cardiologists' general prescribing practices. The overall prescribing practice was classified as good if the score was between 80 and 100%, moderate if the score was between 60 and 79%, and poor if the score was less than 60%.<sup>13</sup>

**Sample Size**

A simple random design was used to determine the consultant and specialist cardiologists to be surveyed. For this, a randomly generated number from Excel (Microsoft Corporation, Redmond, WA, United States) was used to assign each cardiologist (from 0 to 1). The studied sample was based on the highest 59 numbers generated by Excel (licensed specialist/consultant cardiologists practicing in Dubai and Northern Emirates, UAE) taking into consideration that at least 80% will respond to the structured survey. One of the study investigators, who is different from the investigator doing the randomization, contacted the cardiologists by phone and followed up with them through phone calls, emails, and visits to increase the response rate. The chosen sample for the pilot study was based on randomization as the primary sample of the study, but their results were not combined with the primary sample.

**Table 1** Demographic characteristics of cardiologist participants from Dubai and the Northern Emirates presented as frequency and percentage (n = 59)

Demographic	Group	Frequency	Percentage
Gender	Male	57	96.6%
	Female	2	3.4%
Age group	31–50	22	37.3%
	51–60	28	47.5%
	More than 60	9	15.3%
Area of expertise	Consultant	28	47.5%
	Specialist	31	52.5%
Practice location	Northern Emirates	23	39%
	Dubai	36	61%
Experience years	6–15 y	11	18.6%
	16–20 y	17	28.8%
	More than 20 years	31	52.5%

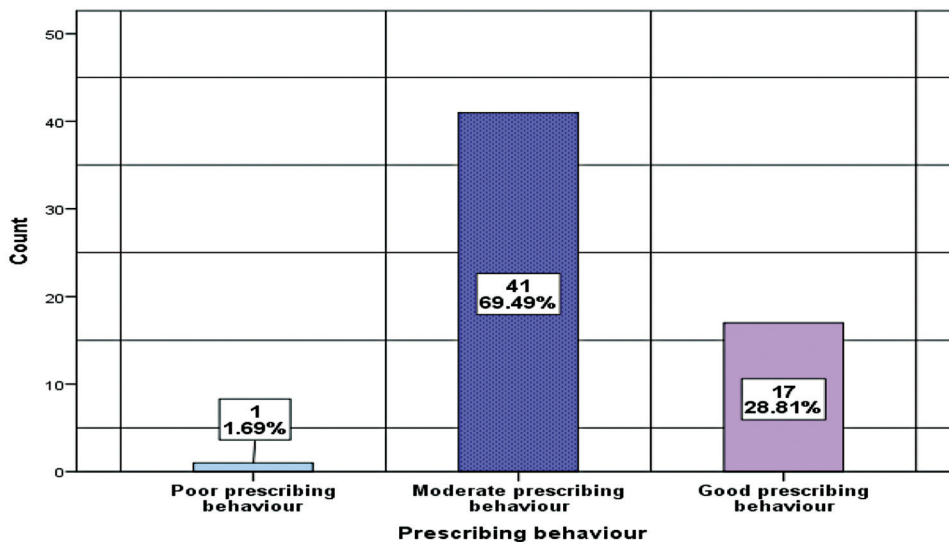
**Statistical Analysis**

The data were analyzed using the SPSS version 26 (Chicago, IL, USA). Qualitative variables were summarized using frequencies and percentages. Chi-square, Fisher's exact tests, and simple logistic regression analysis were used to investigate the factors that influence the cardiologists' prescribing patterns and behavior. A p-value < 0.05 was chosen as the criterion to make decisions regarding statistical significance.

**Results**

**Demographic Information**

► **Table 1** presents the demographic information. All of the approached cardiologists (59) participated in the study.



**Fig. 1** Rating of the cardiologists' prescribing pattern and behavior adequacy in Dubai and the Northern Emirates.



Among the participants, 47.5% ( $n=28$ ) were consultants. Among the total participants, 23 (39%) were from the Northern Emirates and 36 (61%) from Dubai.

The average prescribing behavior score was 76.5% with a 95% confidence interval (CI) of 75.1 to 77.8%. In this study, we used the mean (average) to present the overall prescribing practice, although the Likert scale is considered as ordinal data. We used the median and other statistics to display the results and found them consistent. Of the total participants, 1 participant (1.7%) had poor prescribing behavior, 41 (69.5%) had moderate prescribing behavior, and 17 (28.8%) had good prescribing behavior (► **Fig. 1**). Better prescribing patterns and behavior were observed among the cardiologists from Dubai compared with Northern Emirates (odds ratio, 4.24; 95% CI, 1.06–16.97). However, there was no statistically significant difference in prescribing patterns and behavior according to other demographic variables. Continued medical education (CME) sponsored by company (96.6%), subscription to journals (94.9%), drug samples (86.4%), and promotional drug brochures (71.2%) were the most commonly identified promotional tools used by pharmaceutical companies and preferred by the cardiologists.

### Assessment of Cardiologists' Prescribing Pattern and Behavior

Prescribing patterns and behavior were assessed by seven items. Among these items, 63.5% of the cardiologists agreed that conferences sponsored by pharmaceutical companies could change the cardiologist prescription pattern after attending the conference. Moreover, all the cardiologists identified that insurance plays a role in changing prescription patterns. In addition, only ~40.7% of the cardiologists believed in changing the prescription from brand product to

generic if they were therapeutically equivalent and of the same molecule (► **Table 2**).

► **Table 3** displays the results of univariate regression logistic analysis to assess the influence of demographic variables on the cardiologists' prescribing patterns and behavior. Accordingly, better prescribing patterns and behavior were observed among the cardiologists from Dubai compared with those from the Northern Emirates. However, there was no statistically significant difference in prescribing patterns and behavior according to other demographic variables.

According to the cardiologists, the most effective tools used by pharmaceutical companies to influence the prescription pattern were as follows: visits of medical representative (44.1%), drug samples (86.4%), promotional drug brochures (71.2%), gifts (13.6%), brand reminders (57.6%), subscription for journals (94.9%), CME sponsored by a company (96.6%), sponsorship for travel/expenses in conferences/sponsorship for a personal tour (39%), and emails and SMS reminders (30.5%) (► **Table 4**). CME sponsored by the company, subscription for journals, drug samples, and promotional drug brochures were the most commonly identified promotional tools used by pharmaceutical companies to motivate a cardiologist to select or prescribe a specific product.

The last question in the survey consisted of an open-ended question concentrating on what other factors might influence the cardiologists' prescribing behavior. All cardiologists (95%) responded to the open-ended question of what other factors other than the ones mentioned in the survey they believe could influence the prescription pattern. Forty-three percent of the total participant cardiologists (56 responses) stated that clinical updates, including evidence and new studies, affected their prescribing behavior pattern. In

**Table 2** Results from the seven-item assessments of cardiologists' prescribing patterns and behavior

Prescribing pattern and behavior evaluation	Mean $\pm$ SD	Median	Correct response	
			F	(%)
1. Product B with better efficacy and safety motivates the cardiologist to prescribe it rather than current product A	4.74 (0.54)	5	58	98.3%
2. Drug regimen can affect cardiologist prescription habit (easy regimen vs complex regimen)	3.89 (0.51)	4	48	81.35%
3. Insurance plays a role in changing cardiologist prescription pattern (if a drug is covered in insurance or no) (reversed score)	1.89 (0.54)	2	0	0
4. Updated clinical practice guidelines motivate the cardiologist to change prescription habit	4.72 (0.44)	5	59	100%
5. Cardiologists believe in changing the prescription from brand product to generic if they were therapeutically equivalent and of the same molecule	3.59 (0.61)	4	35	59.3%
6. Conference sponsored by pharmaceutical companies can change the cardiologist prescription pattern after attending the conference (reversed score)	3.38 (0.80)	3	21	35.6%
7. Gifts can change cardiologist prescription behavior even if the product is not superior in comparison to other similar product in the market (reversed score)	4.50 (0.59)	5	58	98.3%

Abbreviations: F, frequency; SD, standard deviation.

**Table 3** Univariate analysis of the factors influencing the prescribing pattern and behavior

Variable	Groups	Good prescribing behavior				
		Estimate	OR	95% CI		p-Value
				Lower	Upper	
	All	17 (28.8%)				
Gender	Male	16 (28.1%)	Ref	–	–	–
	Female	1 (50%)	2.56	0.151	43.48	0.515
Age group	31–50	5 (22.7%)	Ref	–	–	–
	51–60	11 (39.3%)	2.20	0.63	7.70	0.217
	More than 60	1 (11.1%)	0.43	0.042	4.26	0.467
Area of expertise	Consultant	8 (28.6%)	Ref	–	–	–
	Specialist	9 (29%)	1.02	0.33	3.16	0.969
Practice location	Northern Emirates	3 (13%)	Ref	–	–	–
	Dubai	14 (38.9%)	4.24	1.06	16.97	0.041*
Experience years	6–15 y	1 (9.1%)	Ref	–	–	–
	16–20 y	3 (17.6%)	2.14	0.19	23.72	0.534
	More than 20 y	13 (41.9%)	7.22	0.82	63.62	0.075

Abbreviations: CI, confidence interval; OR, odds ratio.

\*Significantly different.

**Table 4** The number/percentages of promotional tools that influence cardiologists' prescribing patterns

Promotional tools used by pharmaceutical companies	Never/rarely		Sometimes		Always/often	
	F	%	F	%	F	%
1. Visits of medical representative	33	55.9	26	44.1	0	0
2. Drug samples	8	13.6	44	74.6	7	11.9
3. Promotional drug brochures	17	28.8	38	64.4	4	6.8
4. Gifts (medical equipment, vouchers, mouse pads, etc.)	51	86.4	8	13.6	0	0
5. Brand reminders (branded pen, calendar, etc.)	25	42.4	33	55.9	1	1.7
6. Subscription for journals	3	5.1	31	52.5	25	42.4
7. CME sponsored by company	2	3.4	43	72.9	14	23.7
8. Sponsorship for travel/expenses in conferences/ sponsorships for a personal tour	36	61	21	35.6	2	3.4
9. Emails and SMS reminders	41	69.5	14	23.7	4	6.8

Abbreviations: CI, confidence interval; CME, continued medical education; F, frequency; OR, odds ratio.

comparison, 41% mentioned that updates in guidelines and protocols encouraged them to change their behavior. Twenty-nine percent of the cardiologists relied on their own clinical practice and experience with the medication. Moreover, 19% of them explained that the patient's preferences, profile, feedback, and experience with the medication played an important role in their prescription pattern. Eighteen percent of the cardiologists stated that safety and efficacy were other factors affecting their prescription behavior, while 12% depended on recommendations from peers and real-world evidence. Lastly, 11% mentioned other factors that affected their behavior, such as medical activities (lectures and seminars), scientific support, cost of medication, unmet needs of patients, and prescription habits.

## Discussion

This study's primary goal was to investigate the factors affecting cardiologists' prescription behavior in Dubai and the Northern Emirates. Although the calculated sample size was based on 80% response rate, 100% of the randomized cardiologists participated in the survey. This was because one of the study investigators had a job as a medical representative and was aware of the cardiologists in the area.

Findings revealed that only 1 out of 59 (1.7%) cardiologists had poor prescribing behavior, while the majority, 42 out of 59 (69.5%) cardiologists, had a moderate prescribing behavior. The remaining 17 out of 59 (28.8%) cardiologists had good prescribing behavior. Based on these findings, it can be

inferred that cardiologists' prescribing behaviors in Dubai and the Northern Emirates are above average. This can be explained by the fact that both drug prescribing and prescription dispensing are strictly regulated by health regulations in the UAE.<sup>14</sup>

Based on the seven items that were used to assess the cardiologists' prescribing patterns and behavior, findings revealed that conferences sponsored by pharmaceutical companies changed the cardiologists' prescription patterns after attending the conference. This can be explained by the fact that attending conferences improves prescribers' knowledge.<sup>15</sup> These findings were supported by other studies, which considered attending pharmaceutical companies-sponsored conferences as one of the leading factors that influence physicians to change their prescribing behaviors and patterns.<sup>4,15</sup>

Findings also revealed that insurance plays a role in changing cardiologists' prescription patterns. Based on the study findings, coverage of a drug by insurance changes the cardiologist's prescription patterns. Usually, the cost of drugs is considered a key consideration in a prescription selection, and this is especially more important when patients are uninsured.<sup>4</sup> These findings are supported by Sharifnia and his colleagues, who identified insurance as a significant factor influencing prescribing of drugs.<sup>16</sup> Usually, physicians' prescribing decisions are influenced by the level of pharmaceutical reimbursement. Insured patients use more health care services and spend less money than uninsured patients.<sup>17</sup> Also, findings revealed that cardiologists believed in changing the prescription from brand product to generic if they were therapeutically equivalent and of the same molecule. These findings are supported by Lundin, who established that when patients have to pay out of pocket up to a certain amount, physicians distinguish between the costs the patient has to pay and the costs for the insurance provider when prescribing medications. As such, those physicians are more likely to prescribe less expensive generic versions. Therefore, pharmaceutical marketing methods exert further pressure on physicians to prescribe onerous, expensive medications even when a less priced generic prescription would suffice.<sup>18</sup>

Al Zahrani's study findings were consistent with those of the current study. According to his study findings, drug representatives had the most negligible influence on physicians' prescribing patterns and behavior. Similarly, the current study established that most cardiologists revealed that visits of medical representatives never influenced their prescribing patterns. Also, Al Zahrani's findings that other physicians' prescribing patterns influenced physicians' prescribing patterns were consistent with the results of the current study, where recommendations from their peers influenced cardiologists' patterns and behaviors of prescribing drugs. The influence of specialist physicians on prescribing decisions is predicted to be significant since most general practitioners, especially in the area of new medicine prescribing, rely on what specialists have to say. Also, Al Zahrani supported the findings of the current study that gifts do not influence prescribing behaviors and patterns.<sup>19</sup> From the

findings of this study, it can be inferred that cardiologists in Dubai and the Northern Emirates are aware of the unethical acceptance of pricey gifts.

One of the study's strengths is the response rate which was 100%, so non-response bias was avoided in our study. This is achieved due to the nature of one of the investigators' work; being a medical representative, she had good working relationships with the cardiologists. However, to avoid any bias or influence on the results, the investigator did not explain the survey to the cardiologists or analyze the data collected.

Physicians may answer according to what they think is correct rather than their actual practices. However, to reduce such response bias in answering the questions, the questions were stated to obtain feedback on the cardiologists' practice in UAE rather than the individual respondent practice. Also, the respondent's identity is kept anonymous by coding the names of the participants and only being accessible by the principle investigator.

The only Emirate that was not included in the study was Abu Dhabi, which has 30% of the UAE population. This may limit the generalizability of the study results to all UAE. Accessibility, resources, and time constraints were among the factors for not including Abu Dhabi. A more comprehensive survey across the whole of UAE or including countries from other regions such as Africa and Europe will be useful in this regard.

Also, to assess the impact of pharmaceutical companies' marketing tools on cardiologists' prescription behaviors and patterns, respondents were required to answer Likert-type questions, whereby they were to answer by choosing an appropriate response on a scale from a list of activities used in pharmaceutical companies' marketing mix strategies. This made it impossible to determine the relationship between specific pharmaceutical marketing mix techniques and physician prescription behavior.

## Conclusion

The study concluded that the cardiologists' prescription patterns and behavior in Dubai and the Northern Emirates are affected mostly by clinical updates, including evidence from new studies. Guidelines and protocols were the second factors affecting the cardiologists' behavior, while other factors such as patients' preferences, profiles, feedback, experience with the medication medical activities, scientific support, cost of medication, unmet needs of patients, and prescription habits were the least to affect the prescription pattern of the cardiologist. Also, CME sponsored by the company, subscriptions to journals, drug samples, and promotional drug brochures were the most effective marketing tools used by pharmaceutical companies to motivate cardiologists to select a specific product.

As a result, the cardiologists are considered to be ethical in regard to adopting a new medication, as their main motivation was clinical updates and guidelines, which will help them in the rational selection of medication. To ensure continuous good practice, medical practitioners should be

updated in seminars, conferences, and developmental programs. The study supports that rational use of medicine should be part of the curriculum using the WHO manual, which offers guidance to good prescription among graduate and undergraduate students. Among the study recommendations are to create an interdisciplinary team of health care professionals to review prescribing practices, discuss the risks and benefits of different medications, and provide feedback on how to reduce risk. The use of decision support tools, such as drug interaction checkers, ensures that medications are safe and appropriate for the patient. There is also a need to increase education and training on the latest evidence-based guidelines and best practices for prescribing medications. The adoption of electronic health records will help track and monitor prescribing practices and medication use. It is necessary to encourage cardiologists to consult with pharmacists and other health care professionals to ensure that medications are taken safely and appropriately. Finally, incorporating patient feedback into the decision-making process when prescribing medications will be beneficial in ensuring better compliance.

#### Ethical Approval

None.

#### Conflict of Interest

One of the investigators was a medical representative who knew some of the participating cardiologists in the study but had not interfered in explaining the survey or the data analysis but merely followed up with the cardiologists to enhance the response rate.

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