Original Article

Cost-conscious medications-prescribing behavior among physicians working in Saudi Arabia

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Abstract

Background: Pharmaceutical costs are the fastest-growing healthcare expense in most countries, meaning that physicians are required to adopt cost-conscious behavior in their medication prescribing practice. This study aimed to assess the levels of cost-consciousness and the familiarity with cost concepts among physicians working in Saudi Arabia. **Methods:** This was a cross-sectional, questionnaire-based study conducted in the period from May to October 2019. It included physicians employed in Saudi Arabia in different workplaces and settings. **Results:** A total of 239 physicians responded to the survey, about 85% of whom had never received any formal education or training in health economics or pharmacoeconomics. Almost all of them (94%) agreed that physicians need to take a more prominent role in limiting the use of unnecessary medications and three-quarters (75.3%) of them agreed that trying to contain medications cost is the responsibility of every physician. The factors that were found to affect cost-consciousness behavior were gender, as well as knowledge of and familiarity with cost-effectiveness as one of the economic evaluation concepts. Higher cost-consciousness was observed among those who were knowledgeable about the terms cost-containment ($p=0.039$) and cost-effectiveness ($p=0.002$) and who were familiar with the concept of cost-effectiveness ($p<0.001$). **Conclusion:** The physicians agreed that costs should be borne in mind when prescribing medicines. However, it also appears that physicians are not overly confident about their knowledge of healthcare costs. Factors such as medical ethics and patient demand and satisfaction were perceived as the most common barriers for considering cost in physicians' therapeutic decision-making in their daily practice.

Keywords: Cost-consciousness, physicians, behavior, medications, barriers

Introduction

Medications are considered a vital component of modern healthcare as they are essential in improving patients' health conditions and function [1]. However, rising pharmaceutical costs are meaning that even advanced healthcare systems need to rethink how they access them efficiently [2]. The Saudi Arabian pharmaceutical market is one of the largest in the Middle East and it has the largest market for prescription drugs among the member countries of the Gulf Cooperation Council (GCC). From 2018 to 2019, pharmaceutical expenditure in Saudi Arabia rose by almost 5.1% from SAR 29.6 billion (US$ 7.90 billion) to SAR 31.2 billion (US$ 8.32 billion) [3].

In most countries, Saudi Arabia no exception, the demographic shift is toward an aging population; the shift of therapies is toward more costly therapies; there is a growing prevalence of treatable diseases; medication doses per patient are increasing over longer periods; new high-technology therapeutic agents are being introduced; and the inflation-linked price increases of existing therapies are contributing significantly to increased pharmaceutical expenditure [4-7]. While healthcare leaders consider physicians the gatekeepers of pharmaceutical spending, they also see them as the main agents who are accountable for this increase in expenditure [8, 9]. Significant efforts to contain and/or reduce pharmaceutical expenditure are therefore focused on physicians, as their decisions, attitudes, and prescribing habits and behaviors are key determinants of how much payers should spend on medications. Thus, any attempt to influence this behavior needs to be based on a thorough understanding of the way prescribing decisions are made.

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When treating patients, physicians can usually select from a wide range of available medications [10]. The theory of reasoned action (TRA) has, in recent years, evolved into the theory of planned behavior (TPB), which serves as the most common reference frame for research into the evaluations and thought processes behind physicians' prescribing behavior [11]. According to the TPB, three types of evaluation, in combination, determine what action a person chooses to take: assessment of personal outcomes (e.g. overall attitude toward medications prescribing); perceived social pressure for or against a particular action (referred to as the subjective norm); and evaluation of whether or not the action seems feasible (referred to as perceived behavior control) [12].

In some countries, physicians are prepared and trained to apply the principles of value-based prescribing, meaning that they favor the simplest treatment course that carries the least physical and financial risk for the patient [13]. However, to achieve this, first physicians must be cost-conscious in their medications prescribing. Cost-consciousness was the first factor considered to influence physicians' use of resources, based on a review of physicians' decision-making with the conceptual medical care model [14, 15]. To promote a cost-conscious prescribing environment, physicians and healthcare systems must take into account important enablers such as knowledge of medications cost, application of pharmacoeconomics/health economics principles, implementation of prescribing feedback, enforcing of administrative policies, and use of a reward system for those who comply with system policies. In the literature, several studies of physicians' awareness and knowledge of medications costs have been conducted in different parts of the world, in different practice settings [16-23]. All of these studies share one common conclusion, namely, that the majority of physicians, whether specialized or not, are either ignorant or have poor knowledge of medication costs. One interesting finding from some of these studies is that the majority of physicians are concerned about the need to contain costs related to the medications that they prescribe, acknowledge the importance of considering medications cost when prescribing, and feel a major sense of responsibility for reducing healthcare costs through cost-conscious prescribing. Encouraging physicians to practice cost-conscious prescribing has the potential to lead to value-based prescribing [24], decrease pharmaceutical expenditures, and preserve the quality of care [25]. One study found that less-cost-conscious physicians tend to prescribe around three times more than cost-conscious physicians and that, eventually, this increased prescribing is reflected in the overall healthcare spending [12].

It is increasingly important for physicians to consider cost implications when prescribing medications, although many physicians believe that focusing on keeping medications costs down can only affect negatively the quality and efficacy of treatments prescribed and, thus, do not agree [26]. Many physicians consider that opting for cheaper medications might not be in the patients' best interests and therefore goes against and violates traditional ethical standards [27]. As a further thought, some physicians are irked by the idea of non-physician healthcare leaders implementing new medical practices instead of leaving such matters to the physicians themselves as a part of their professional autonomy [28].

While physicians' behavior is undoubtedly an interesting field of study, knowledge of their perceptions and motivations is vital for optimizing medical practice to accommodate resource constraints. So far, no published studies have explored whether physicians consider medication costs when prescribing in Saudi Arabia. This study was designed to assess the level of cost-consciousness of physicians working in Saudi Arabia, to assess those physicians' familiarity with different cost concepts, to identify the sociodemographic factors that might affect physicians' cost-consciousness, and to identify any barriers that prevent physicians from considering cost in their daily practice.

Materials and Methods

Study design and setting

A cross-sectional study of physicians working in Saudi Arabia was conducted using a questionnaire for data collection over six months from May to October 2019. The physicians included came from different practice types and workplace settings. The questionnaire was based on those used in the previous literature [14, 21, 22, 29] and was pre-tested in a small pilot before being distributed electronically to the physicians using Google Forms. The distributed electronic version included the title of the study, the aim, and the objectives in addition to the study's IRB approval number and the author's contact details. Physicians were requested to fill in the questionnaire and then to submit it within two weeks. Several reminders were sent to encourage the physicians to take part and submit their questionnaire on time.

Study questionnaire

The questionnaire consisted of a wide range of questions focusing on demographic factors, attitudes, and behaviors. It was organized into four sections. The first section addressed basic demographic and workplace information for participating physicians, including age, gender, current position, workplace role, number of years in the profession, employment status, and number of patients seen per day. The second section consisted of a series of statements to assess physicians' familiarity with different cost concepts, namely cost-consciousness, cost-containment, and cost-effectiveness. The third section consisted of six statements to measure physicians' attitudes toward costs using a cost-consciousness instrument where physicians were asked to agree or disagree with different statements on a 5-point Likert scale (1 = strongly disagree, 2 = somewhat disagree, 3 = neither agree nor disagree, 4 = somewhat agree, and 5 = strongly agree). The fourth section included statements

related to physicians' perceived barriers to medication cost consideration in practice.

Ethical approval

The study was approved by the King Saud University Medical City (KSUMC) Institutional Review Board (IRB) with IRB number E-18-3285, before any data were collected.

Statistical analysis

Descriptive statistics were calculated for the demographic and workplace characteristics of the physicians, and each item of the cost-consciousness measure (frequencies, percentages, means, and standard deviations). Negatively worded statements were reversed and then summary scores were derived by averaging the responses to the relevant items. The author explored the relationship between cost-consciousness and physicians' demographic and workplace characteristics using univariate analysis including analysis of variance (ANOVA) and tests for linear trends to test these associations. The author categorized the continuous predictors into quartiles following the previous literature to ease the comparison [29], because quartiles are more intuitive than correlation or regression coefficients, which can be difficult to interpret, and because this approach shows clearly whether the association is linear or not. The final step was to construct multivariate models to adjust for confounders, to identify the factors that lead to higher cost-consciousness, and to calculate predicted means. All statistical tests were two-tailed, with a significance level of 0.05, and all elements of the analysis were conducted using IBM® SPSS® for Windows®, version 24 (Armonk, NY: IBM Corp, 2016).

Results

Physicians' demographic and workplace characteristics

In total, 239 (95.6%) physicians responded to the survey out of the 250 who were invited to participate. Respondents included consultants (n = 123; 51%), residents (n = 77; 32 %), registrars (n =23; 10%), and other physicians (n = 16; 7%). Of the respondents, 56% were male and 199 (83%) were Saudi nationals. About two-thirds (61%) of the respondents were aged between 22 and 40 and most were working in government settings (73%), performing clinical tasks (54%) and visiting on average 15 patients a day. The physicians' characteristics are summarized in Table 1.

Familiarity with different cost concepts

To explore this objective, the survey's physicians were asked whether they were familiar with different cost concepts. Supplement 1 summarizes their responses, revealing that most of the physicians (85%) had never received any formal education or training in health economics or pharmacoeconomics. However, 79% considered that they were familiar with the term cost-effectiveness, but not with the terms cost-consciousness (68%) or cost-containment (81%). Only 10% of the responding physicians indicated that they understood the purpose of cost-effectiveness as a concept and could recall its indications, interpretation, and calculation.

Table 1: Physicians' demographic and workplace characteristics

Demographic and workplace characteristics	N	%
Age		
22–30	70	29
31–40	76	32
41–50	42	18
51–60	41	17
61 and above	10	4
Gender		
Female	104	44
Male	135	56
Nationality		
Saudi	199	83
Non-Saudi	40	17
Current position		
Consultant	123	51
Resident	77	32
Registrar	23	10
Fellow	12	5
GPs†	4	2
Number of years in the profession		
Less than 6 years	84	35
6 to 10	56	23
11 to 15	24	10
16 to 20	18	8
21 to 25	29	12
26 and over	28	12
Status of employment		
Government	174	73
Private	14	6
Both	51	21
Roles at your workplace		
Clinical	129	54
Academic	12	5
Administrative	3	1
Mixed	95	40
Number of patients seen per day		
Lowest quantile (0-9)	52	22
2nd quantile (10-13)	66	28
3rd quantile (14-19)	48	20
Highest quantile (20-45)	73	31
Number of patients seen per day (continuous)	14.8	8.6

†Responded as general practitioners

Physicians' cost-conscious behavior

The physicians were presented with a series of statements regarding various aspects and implications of cost-consciousness. The answer distributions were mostly skewed toward more cost-conscious behavior (Table 2). Almost all of the physicians (94%) agreed that they need to take a more prominent role in limiting the use of unnecessary medications and three-quarters of the physicians (75.3%) agreed that trying to contain medications cost is the responsibility of every physician. Slightly more than half of the physicians

agreed that the only time the cost medication should be considered is when the patient must pay all or most of it (52%). Slightly more than half of the physicians disagreed that physicians are too busy to worry about the cost of medications (52%), that there is currently too much emphasis on medication costs (73%), and that it is unfair to ask physicians to be cost-conscious and still keep the welfare of their patients foremost in their minds (43%). The mean ±SD cost-consciousness score for the 239 physicians was 21.5 ± 3.3.

Table 2: Physicians responses to cost-consciousness statements

Statement	Strongly disagree		Somewhat disagree		Neither agree nor disagree		Somewhat agree		Strongly agree		Mean	SD
	N	%	N	%	N	%	N	%	N	%		
Trying to contain medication costs is the responsibility of every physician	5	2.1%	18	7.5%	36	15.1%	89	37.2%	91	38.1%	4.0	1.0
There is currently too much emphasis on medications costs	67	28.0%	107	44.8%	41	17.2%	17	7.1%	7	2.9%	2.1	1.0
Physicians need to take a more prominent role in limiting use of unnecessary medications	1	0.4%	2	0.8%	11	4.6%	62	25.9%	163	68.2%	4.6	0.7
Physicians are too busy to worry about the costs of medications	27	11.3%	97	40.6%	39	16.3%	54	22.6%	22	9.2%	2.8	1.2
The only time the cost of medication should be considered is when the patient must pay all or most of the cost	30	12.6%	56	23.4%	29	12.1%	53	22.2%	71	29.7%	3.3	1.4
It is unfair to ask physicians to be cost-conscious and still keep the welfare of their patients foremost in their minds	30	12.6%	72	30.1%	52	21.8%	59	24.7%	26	10.9%	2.9	1.2

Relationship of cost-consciousness to demographic and workplace-related characteristics

Cost-consciousness was higher for males (p=0.003) and physicians working for the government and in the public sector (p=0.014). Physicians working in a mixed or administrative role also had slightly higher cost-consciousness scores compared to those working in a clinical or academic role (p=0.032). Higher cost-consciousness was observed among those who were familiar with the terms cost-containment (p=0.039) and cost-effectiveness (p=0.002) and were familiar with the concept of cost-effectiveness for medications (p<0.001) (Table 3).

Table 3: Relationships of cost-consciousness to physicians' characteristics

Physicians Characteristics	N	%	T-score	*p*-value
Age				0.11
22–30	70	29	3.2	
31–40	76	32	3.4	
41–50	42	18	3.3	
51–60	41	17	3.3	
61 and above	10	4	3.1	
Gender				0.003
Female	104	44	3.2	
Male	135	56	3.4	
Nationality				0.76
Non-Saudi	40	17	3.3	
Saudi	199	83	3.3	
Current position				0.31
Consultant	123	51	3.3	

Resident	77	32	3.2	
Registrar	23	10	3.3	
Fellow	12	5	3.5	
GPs[†]	4	2	3.0	
Number of years in the profession				0.30
Less than 6 years	84	35	3.2	
6 to 10	56	23	3.4	
11 to 15	24	10	3.4	
16 to 20	18	8	3.2	
21 to 25	29	12	3.3	
26 and over	28	12	3.4	
Status of employment				0.014
Government	174	73	3.2	
Both	51	21	3.5	
Private	14	6	3.3	
Roles at your workplace				0.032
Clinical	129	54	3.2	
Mix	95	40	3.4	
Academic	12	5	3.3	
Administrative	3	1	3.4	
Number of patients seen per day				0.30
Lowest quantile (0-9)	52	22	3.2	
2nd quantile (10-13)	66	28	3.4	
3rd quantile (14-19)	48	20	3.2	
Highest quantile (20-45)	73	31	3.3	
Received training in health economics or pharmacoeconomics before?				0.50
Yes	35	15	3.4	
No	204	85	3.3	
Heard about the term cost-consciousness before?				0.46
Yes	76	32	3.3	
No	163	68	3.3	
Heard about the term cost-containment before?				0.039
Yes	46	19	3.5	
No	193	81	3.3	
Heard about the term cost-effectiveness before?				0.002
Yes	189	79	3.4	
No	50	21	3.1	
Familiarity with the concept of cost-effectiveness for medications				<0.001
I do not know anything about the concept	30	13	3.2	
I have a vague idea about the concept	34	14	3.2	
I only know the term	21	9	2.9	
I understand the purpose of the concept and can recall its indications and interpretation	61	26	3.4	
I understand the purpose of the concept and can recall its indications, interpretation, and calculation	24	10	3.8	
I understand the purpose of the concept, but I do not recall its indications and interpretation	69	29	3.3	

[†]Responded as general practitioners

Table 4: Multivariate predictors of cost-consciousness

Variable	Adjusted Mean	95% CI		*p*-value
Gender				
Female	3.1	3.0	3.3	0.048
Male	3.3	3.2	3.4	
Heard about the term cost-effectiveness before?				
Yes	3.3	3.2	3.4	0.037
No	3.1	2.9	3.3	
Familiarity with the concept of cost-effectiveness for medications				<0.001
I do not know anything about the concept	3.3	3.1	3.5	
I have a vague idea about the concept	3.1	2.9	3.3	
I only know the term	2.8	2.6	3.1	
I understand the purpose of the concept and can recall its indications and interpretation	3.2	3.0	3.4	
I understand the purpose of the concept and can recall its indications, interpretation, and calculation	3.6	3.3	3.9	
I understand the purpose of the concept, but I do not recall its indications and interpretation	3.2	3.0	3.3	

Table 5: Barriers preventing physicians from considering medications cost while prescribing

Barriers	N	%
Conflict with medical ethics	155	64.9
Patient's demand and satisfaction	122	51
Physicians' beliefs and perceptions	79	33.1
Interfere with professional autonomy	69	28.7
Physician-patient relationship	65	27.2
Fear of legal suits or actions	57	23.8
Workload and lack of time	51	21.3
Lack of knowledge and resources about cost	22	16.9
Lack of incentives	39	16.3
Alternative availability	21	16.2
Drug safety and efficacy	16	12.3
Patient condition and disease outcomes	10	7.7
System policy	9	6.9
Working in governmental hospitals	9	6.9
Lack of knowledge about the patient's economic status	7	5.4

Supplement 1: Physicians familiarity with different cost concepts terms

Concept	N	%
Received training in health-economics or pharmacoeconomics before?		
Yes	35	15
No	204	85
Heard about the term cost-consciousness before?		
Yes	76	32
No	163	68
Heard about the term cost-containment before?		

Yes	46	19
No	193	81
Heard about the term cost-effectiveness before?		
Yes	189	79
No	50	21
Does cost-effectiveness consider as an appropriate criterion in clinical decision-making?		
Agree	187	78.2
Disagree	18	8.8
Neither agree nor disagree	31	13
Familiarity with the concept of cost-effectiveness for medications?		
I do not know anything about the concept	30	13
I have a vague idea about the concept	34	14
I only know the term	21	9
I understand the purpose of the concept and can recall its indications and interpretation	61	26
I understand the purpose of the concept and can recall its indications, interpretation, and calculation	24	10
I understand the purpose of the concept, but I do not recall its indications and interpretation	69	29

Multivariate analyses

The factors that multivariately affected cost-consciousness were gender, familiarity with cost-effectiveness as a term, and familiarity with the concept of cost-effectiveness relative to medications. Higher scores of cost-consciousness, on average, were for male physicians, those familiar with cost-effectiveness as a term, and those familiar with the concept of cost-effectiveness relative to medications (Table 4). Other factors that were statistically significant when examined univariately in Table 3 ceased to reach statistical significance after adjusting for each other.

Barriers to implementing cost-conscious behavior and considering medication costs in practice

Conflict with medical ethics (64.9%), patients' demand and satisfaction (51%), physicians' beliefs and perceptions (33.1%), interference of cost with professional autonomy (28.7%), and fear of creating a credibility gap in the physician-patient relationship (27.2%) are shown to be prominent barriers preventing physicians from implementing cost-consciousness in their daily prescribing practice (Table 5).

Discussion

The present study revealed that physicians working in Saudi Arabia have good cost-conscious behavior—almost 75% of surveyed physicians agreed that trying to contain medication cost is part of every physician's responsibility. Although only a minority of physicians in this study had some education and training about costs, a significant association was observed between cost-consciousness and physicians who had knowledge of cost-effectiveness as a concept and were able to understand it and recall its indications, interpretation, and calculation. Moreover, the results demonstrated variability among physicians in terms of familiarity with different cost concepts.

In this study, the extent of familiarity with health economics or pharmacoeconomics appeared to be limited. Only 15% of physicians reported that they had received any formal education or training in the field of health economics or pharmacoeconomics and the majority of them were not aware of the concepts of cost-containment and cost-consciousness. Although 79% (n = 189) of the physicians had heard about the term cost-effectiveness in theory and that 78.2% regarded cost-effectiveness as an appropriate criterion when making treatment decisions for their patients, they appeared inconsistent in how they applied it in practice, as it was reported by only 24 physicians (10%). Although prescribing a cost-effective treatment is only one element of clinical decision-making, further efforts are needed to help physicians in applying and integrating the concept in their day-to-day practice and prescribing decisions. This finding was consistent with other studies from Canada and the United States (U.S.), which reported little familiarity in how cost-effectiveness decisions are implemented among physicians when making decisions that include treatment [30, 31].

The results demonstrated that the participating physicians showed positive behavior toward cost-consciousness, as demonstrated by the overwhelming tendency of the majority of them to agree that trying to contain costs is their responsibility. This supports the idea that physicians are keen to maximize the use of healthcare resources although they appear to feel limited in how far they can contain medication costs. Further, although some physicians still favor the traditional view and associated lower-cost medications with suboptimal treatment, the issue has become more complex and many physicians seek value- and evidence-based medications that are not only perfectly suited to patients' needs but also cost-effective. However, the growing need to consider costs when developing medications nowadays may prove difficult, with several publications that already have demonstrated that the public still has faith in physicians to champion their medical needs over financial constraints [8, 32-

[34]. What this means is that if physicians fail to take cost implications into account when prescribing medications, it will lead to more expensive treatments being created on both the macro and the micro levels, which will damage physicians' role as a patient advocate and undermine people's trust in them. Overall, the physicians' scores in this study are in line with similar cost-consciousness studies using the same measurement scale, such as those by Swiss [29], U.S. [14], and Dutch physicians [22].

This study revealed higher cost-consciousness among male physicians, while a Swiss study found no significant relationship between cost-consciousness and gender [29]. Moreover, this study found higher cost-consciousness among physicians working in both government and private sectors, which could be because these organizations are more focused on cost strategies and linking pay to performance [29, 35]. However, this is not necessarily the case; other studies have found higher cost-consciousness in the public/academic sector [29, 36] or in private practice settings [23]. Although most physicians that were surveyed here expressed willingness to take cost considerations into account when prescribing medications, it might be that those in administrative roles will have a better grasp of cost-related matters and so could set policies, rules, and restrictions for non-administrative physicians.

In the current study, the idea that prescribing medications according to cost goes against traditional medical ethics is a major barrier preventing physicians from considering the cost of the treatment in their decisions. Ethics are an inevitable part of health care and their inherent moral principles can serve as a useful problem-solving standard, especially when dealing with issues related to health care delivery and therapeutic practice [37]. Building cost-containment into the ethical considerations that physicians must balance is a complex business, but the tensions between seeking the most cost-effective treatment while ensuring the optimal outcome for the patient must be resolved. Physicians need to look for options that combine patients' best interests with the cost-saving needs of the healthcare system. Any solution that favors one side of the equation over the other is likely to fail, although there is undoubtedly room for physicians to review and eliminate unnecessary care treatment and to prescribe medications responsibly. While some physicians might feel overwhelmed by such a responsibility, it is part of their role and they must undertake it if only to preserve their patients' trust and their professional autonomy.

Another important barrier identified by this study is patient demand and satisfaction. Some physicians felt that they would be unable to fully satisfy their patients' treatment demand if they were compelled to weigh cost implications in the prescribing practice and that this would damage their patients' trust in them as physicians. To avoid this and to ensure that their patients are fully satisfied with the medications prescribed for them, some physicians insisted on prescribing medications that are neither clinically indicated nor cost-effective, if pressed by their patients. Giving this sort of power to patients will make it even more difficult for physicians to bear cost implications in mind, or to set financial priorities through the use of economic evaluations, as reported by several other quantitative [30, 38, 39] or qualitative studies [9, 40]. All these studies and more have warned about the catastrophic consequences of this prescribing behavior both for patients' health and for pharmaceutical expenditure and healthcare financial resources overall, meaning that physicians must be trained in how to deal effectively with patients' requests, to avoid this dilemma.

To ensure the sustainability of the healthcare system, physicians need to modify their prescribing practice toward cost-consciousness. Physicians can become cost-conscious prescribers if they are willing and able to change their prescribing behavior positively to change their course of action as per TPB theory and to accept interventions that enable them to understand, apply, and integrate cost-consciousness as a concept into their daily prescribing decisions. Of course, the best way to achieve this is to make the cost-consciousness part of the organizational culture. While effecting such a substantial seed change can be challenging, particularly when so many factors are involved, it can be made much easier by securing senior management buy-in. Medical students in Saudi Arabia are generally not educated in cost-effective practice, despite studies that have shown that teaching them to be aware of cost implications can reduce medications cost due to physicians being less likely to prescribe treatment that is unnecessary or inappropriate [25, 41, 42]. While medical training at all levels covers a vast amount of information about medications, most of it relates to their safety and efficacy; cost is rarely even mentioned. Previous research shows that physicians who are trained to be cost-conscious tend to prescribe cost-effective medications [43], and that teaching medical students and residents about medications costs and the basics of pharmacoeconomics/health economics and resource utilization is shown to significantly improve their cost-consciousness [27, 44, 45] and thus increase the quality and efficiency of their prescribing. It is suggested that implementing interventions to encourage physicians to make value-based cost-consciousness prescribing decisions can reduce healthcare waste while maintaining the quality of treatments provided. Such interventions may include patient-specific physician–pharmacist discussions, clinical practice guidelines and prescribing indicators, telephone reminders, peer discussions, expert reflection, educational sessions on evidence-based medicine and cost-containment approaches, and utilization audit and feedback [46-51].

As this is potentially the first study exploring physicians' familiarity with various cost concepts and the use of cost-conscious behavior in their medications prescribing that focuses specifically on physicians working in Saudi Arabia, it is unsurprising that it has some limitations. First, as this study is quantitative rather than qualitative, the researcher was unable to dig too deeply into physicians' perceptions

about cost-consciousness prescribing behavior; second, the sample was small and so may not be representative of all physicians practicing in Saudi Arabia; and third, the self-reported nature of the questionnaire may have affected the validity of the results.

Conclusion

Although a majority of the physicians surveyed in this study agreed that costs should be borne in mind when prescribing medicines, it also appears that they are not overly confident about their knowledge of medication costs. This study highlights the need for cultural and system changes to make cost-consciousness a cornerstone of physicians' education and practice, to increase the likelihood that medications are prescribed with maximum efficacy and minimum cost, in line with the Saudi Vision 2030 and its National Transformation Program. Hence, strategies and interventions are required to illuminate and modify physicians' behavior relative to medication costs, which are a key part of total healthcare costs, and to provide them with reliable and easily accessible cost information in real-world practice.

Disclosure statement

The author declares that he has no conflicts of interest concerning the publication of this article.

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