Original Article :

Knowledge And Prescribing Patterns Of Benzodiazepines Among Physicians In A Tertiary Medical City In Riyadh

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Abstract

Background & Aims:

Benzodiazepines is a class of medications that are commonly mis-prescribed worldwide, despite their various side effects. This study aimed to assess the knowledge and identify the prescribing patterns of benzodiazepines among physicians working in King Abdulaziz Medical City.

Methods:

A cross-sectional study was conducted at King Abdulaziz Medical City in Riyadh, Saudi Arabia. Self-administered questionnaires were distributed to 350 physicians from different specialties. The participants were sampled using non-probability convenience sampling. The statistical analysis was done using SPSS version 22.

Results:

223 (74%) of the study participants were in the age group < 30 years, 167 (56%) of study participants were males, and 244 (81%) were residents. The most agreed-upon statements regarding benzodiazepines were "patients who use benzodiazepines for long periods tend to escalate their doses over time" 169 (66%), "good clinical practice requires periodic attempts to wean patients from benzodiazepines" 183 (61%), and "benzodiazepines increase the risk of cognitive impairment and falls in elderly" (59%). Among physicians who

الملخص

الخلفية و الاهداف :

البينزوديابزينات من الأدوية التي ينتشر وصفها بطرق غير مناسبة حول العالم بالرغم من تأثيراتها الجانبية المتنوعة. تهدف هذه الدراسة إلى استكشاف مدى معرفة الأطباء من التخصصات المختلفة بالبينزوديازبينات وطرق وصفهم لها.

طريقة البحث :

دراسة استبيانية مقطعية في مدينة الملك عبدالعزيز الطبية بالرياض، المملكة العربية السعودية. تم توزيع الاستبيانات على ٣٥٠ طبيباً من مختلف التخصصات. تم إجراء التحليل الإحصائي باستخدام برنامج SPSS النسخة ٢٢.

النتائج :

٢٢٣ (٧٤٪) من المشاركين في هذه الدراسة كانوا في الفئة العمرية أقل من ٣٠ عامًا، و١٦٧ (٥٦٪) كانوا من الذكور، و٢٤٤ (٨١٪) من الأطباء المقيمين. كانت أكثر العبارات المتفق عليها بخصوص البنزوديازبينات: «المرضى الذين يستخدمون البنزوديازبينات لفترات طويلة يميلون إلى زيادة جرعاتهم بمرور الوقت» ١٦٩ (٦٦٪)، «الممارسة السريرية الجيدة تتطلب محاولات دورية لإيقاف المرضى عن استخدام البنزوديازبينات» ١٨٣ (٦١٪)، و «البنزوديازبينات تزيد من خطر ضعف الإدراك والسقوط عند كبار السن» (٥٩٪). من بين الأطباء الذين وصفوا البينزوديازبينات، الأغلبية ١١٤ (٧٨٪) يقومون بوصفها شهرياً، ١٢٥ (٤٢٪) يصفونها للبالغين، ١٣٠ (٧٧٪) يصفونها بنفس المعدل لكل من المرضى الذكور والإناث. يتم وصف البينزوديازبينات في الغالب

prescribed benzodiazepines, they mostly prescribed them monthly 114 (78%), to adults 125 (42%), and for the same rate for both male and female patients 130 (77%). Benzodiazepines were mostly prescribed for anxiety 94 (59%) and panic disorders 78 (49.4%).

Conclusions:

Physicians showed limited knowledge of benzodiazepines. Our recommendation is that training related to benzodiazepine prescription is needed at both undergraduate and postgraduate levels. Further studies regarding prescribing patterns of benzodiazepines is required to establish a better understanding of the prescribing patterns of these medications in Saudi Arabia.

Keywords:

benzodiazepine; clinical practice patterns; knowledge; Saudi Arabia; substance-related Disorders.

للقلق ٩٤ (٥٩٪) واضطرابات الهلع ٧٨ (٤٩,٤٪).

الخلاصة:

أظهر الأطباء المشاركون في هذه الدراسة معرفة محدودة بما يتعلق بالبينزوديازبينات. هناك حاجة للتدريب على وصف البينزوديازبينات في مرحلة الدراسات الجامعية والعليا. هناك حاجة إلى المزيد من الدراسات لفهم طرق وصف الأطباء للبينزوديازبينات في المملكة العربية السعودية.

الكلمات المفتاحية:

بينزوديبازبينات، أنماط الممارسة السريرية، معرفة، المملكة العربية السعودية، إدمان.

Introduction:

Benzodiazepines are psychoactive medications that are used to treat many health issues such as anxiety, depression, and sleep disorders [1]. Benzodiazepines were reported to cause impairment in mental and psychomotor performance [2]. They were also associated with several morbidity outcomes like cognitive decline, confusion, fatigue, weakness, and syncope [1]. Benzodiazepines also have been linked to increased risk of falls, especially in elderlies [3]. In a study among people aged 60 and above in Saudi Arabia, it has been found that the risk of falls was two times higher among participants who used benzodiazepines compared to those who did not [4]. Studies also report that benzodiazepine addiction is high in the elderly, probably due to the high prescription and consumption of benzodiazepine in this age group [5]. In Kuwait, it has been suggested that inappropriate prescription habits, along with sociocultural reasons, may have contributed to increased iatrogenic addiction on benzodiazepines [6].

Despite the serious side effects, warnings, and guidelines, benzodiazepines remain frequently prescribed in many countries around the world. Around 5.2% of adults in the age group 18 to 80 years in the US used benzodiazepines in 2008 [7]. Also, benzodiazepine prescriptions in the US has increased significantly from 1996 to 2013, with an annual percentage change of 2.5% [7]. In a Japanese study, benzodiazepines were commonly prescribed to older patients; the rate of prescription was significantly associated with increased age [8]. In France,

a study that examined 51,216 patients showed that there were persistent high rates of benzodiazepine prescription 9. In Saudi Arabia, benzodiazepines were among the most common inappropriately prescribed medications for elderly patients [10]. During 2008, 55% of benzodiazepine prescriptions in the US were written by primary care physicians, 16% were written by psychiatrists, and 29% were written by other specialists [11]. A Lebanese study published in 2016 observed that the prescription of benzodiazepines for more than one year differs significantly by the prescribing physician, with 52% by cardiologists, 43% by psychiatrists, and 34% by general practitioners and other specialties [12]. In Saudi Arabia, there are limited data addressing the prescribing pattern of benzodiazepines in the country, and most of the available studies have investigated the use of benzodiazepines for psychiatric disorders only [13]. The current literature is still lacking information about benzodiazepine knowledge and attitudes among different specialties, especially in the middle east region, including Saudi Arabia. A better understanding of benzodiazepine prescribing behaviors among physicians may help in developing strategies to develop guidelines to regulate their prescription. The current study aimed to assess the knowledge and prescribing patterns of benzodiazepines among physicians working in different specialties in King Abdulaziz Medical City in Riyadh, Saudi Arabia.

Materials and methods

Study design and settings:

A cross-sectional survey-based study was conducted from June 2019 to August 2019 at King Abdulaziz Medical City in Riyadh, Saudi Arabia, which is a tertiary care medical city administered by National Guard Health Affairs (NGHA). King Abdulaziz Medical City in Riyadh has a capacity of 1501 beds. The medical city includes surgical and medical wards, long-term care and rehabilitation wards, antenatal and postpartum wards, intensive care units, a trauma and emergency department, a neurology department, a psychiatric department, an obstetrics and gynecology department, ambulatory clinics, and dental clinics. It also includes a large pediatric hospital and a cardiac center, and 11 primary care centers that are in various neighborhoods in Riyadh.

Study participants and sample size:

All physicians from different specialties were included in this study. The number of physicians currently working in the hospital is 703. Thus, the optimal sample size was calculated with a margin of error of 5%, a confidence level of 95%, and a population size of 703; it was found to be 249.

However, we administered the questionnaires to 350 physicians to ensure a better response. The participants were sampled using non-probability convenience sampling. informed consent was taken from the participants.

Data collection method

Self-administered questionnaires were distributed to 350 physicians from different specialties in King Abdulaziz Medical City. The questionnaire was specifically designed for this study, and its items were designed and modified after a thorough literature review [8, 12, 14, 15, 16]. The questionnaire was validated by content experts and was piloted to assess its reliability. Items were removed from the final questionnaire if they were showing low Cronbach alpha value if the item was present. The final questionnaire had three sections including the demographic section, knowledge, and practice of benzodiazepine prescription, respectively. The practice section was administered to only those who were currently prescribing benzodiazepines. Most of the knowledge items were taken from a previously published study that aimed to assess the prescription of benzodiazepines by general practitioners and psychiatrists[15]. The study was approved by the ethical committee of King Abdullah International Medical Research Centre. The questionnaires were accompanied by an informed consent form, and the physicians completed the questionnaire voluntarily. All participants were informed in advance of the objectives of the study.

Data management and analysis

The statistical analysis was done using the Statistical package for social science (SPSS) version 22. The questionnaire for this study showed good internal reliability in our sample. The overall Cronbach alpha was 0.68 for the knowledge (12 questions), while it was 0.82 for the practice (12 questions), with a total Cronbach alpha of 0.72 for the 24 questions. The tests of normality using Kolmogorov-Smirnova and Shapiro-Wilk tests for the knowledge variables indicated that the data were normally distributed while the practice items showed non-normal distribution. For measuring the associations, both the mean±SD and the median(Q1-Q3) were reported. The categorical variables were reported as numbers and percentages in a tabular form. The strongly disagree and disagree categories were combined to calculate the percentage of disagreement. While for agreement, the option agree and strongly agree were combined for analysis. For measuring the overall knowledge and the practice, the respective items for the knowledge and the practice were added and a mean score was computed. For measuring the association of mean knowledge and practice scores

with the job level, current specialty, and gender, Man Whitney- U and Kruskal Wallis test were performed. The p-value was set at 0.05 for all the tests applied.

Results

Demographic profile of the participants

A total of 350 questionnaires were distributed among physicians in King Abdulaziz Medical City, of which 300 (85.7%) responded to the survey. 223 (74%) of the study participants were in the age group < 30 years. The mean years of experience were 4±5.3 years. Results showed that 167 (56%) of study participants were males, and 244 (81%) were residents. Most of the participants were from internal medicine 77 (26%) followed by surgery 59 (20%) and pediatrics 38 (13%). Only 36 (12%) of the physicians reported having ever used benzodiazepines themselves. Whereas 41 (14%) reported the use of benzodiazepines by their first-degree family members. (Table 1).

Table 1: Demographic profile of the participants (N=300)

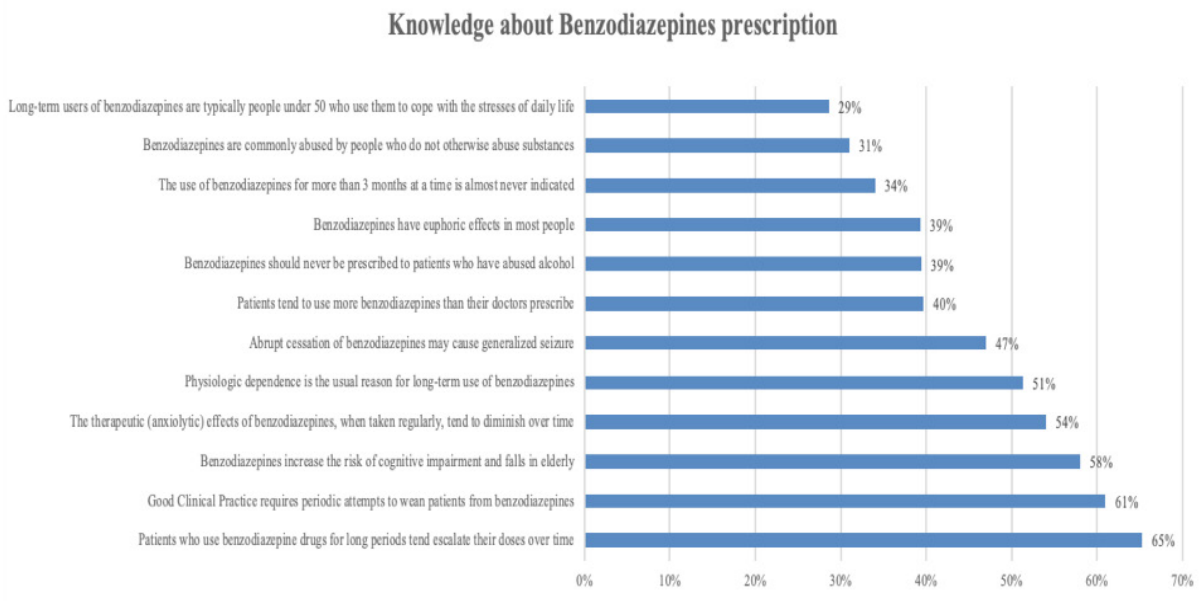
Variables	Categories	Frequency n	Percentage %
Age	< 30 years	223	74%
	> 30 years	77	26%
Gender	Male	167	56%
	Female	133	44%
Years of experience	Mean±SD	4±5.3	
	Median(Q1-Q3)	2(1-18)	
Current level	Residents	244	81%
	Specialists/ consultants	56	19%
Practicing specialty	Internal medicine	77	26%
	Surgery	59	20%
	Pediatrics	38	13%
	Emergency Medicine	33	11%
	Family medicine and GP	26	9%
	Neurology/ psychiatry	38	13%
	All others	29	10%
Have you ever used benzodiazepines yourself?	Yes	36	12%
	No	263	88%
Has anyone of your first-degree relatives ever used benzodiazepines?	Yes	41	14%
	No	158	86%

Knowledge about benzodiazepines

A total of twelve items were asked from the physician related to knowledge about the benzodiazepines. The most agreed-upon statements were "patients who use benzodiazepines for long periods tend to escalate their doses over time" 169 (66%) and "good clinical practice requires periodic

attempts to wean patients from benzodiazepines" 183 (61%). On the other hand, the least agreed-upon statements were "long-term users of benzodiazepines are typically people under 50 who use them to cope with the stresses of daily life" 86 (29%) and "benzodiazepines are commonly abused by people who do not otherwise abuse substances" 93 (31%). (Figure 1).

Figure 1: Descriptive statistics of Knowledge (N=300)



Prescribing patterns of benzodiazepines

Among those who prescribed benzodiazepines, they mostly prescribed them monthly 114 (78%), to adults 125 (42%), and for the same rate for both male and female patients 130 (77%). Moreover, the most prescribed benzodiazepine was Lorazepam (Ativan) 91 (71%). More than half of the physicians 109 (59%) reported that they did not get enough training regarding benzodiazepine prescription. (Table 2).

Table 2: Prescribing patterns of benzodiazepines (N= 300)

Items	Frequency	Percentage
On average, I prescribe benzodiazepines (n=146)		
Daily	11	8%
Weekly	21	14%
Monthly	114	78%
Mostly, I prescribe benzodiazepines for the following age groups (more than one answer can be chosen)		
Infants (n=300)	8	3%
Pediatrics (n=300)	26	9%

Items	Frequency	Percentage
Adolescents (n=300)	14	5%
Adults (n=300)	125	42%
Elderlies (n=300)	38	13%
I usually prescribe benzodiazepines more for (n=168)		
Males	21	13%
Females	17	10%
The same rate for both	130	77%
The benzodiazepine that I most commonly prescribe (n=128)		
Alprazolam (Xanax)	2	2%
Clonazepam (Rivotril)	5	4%
Bromazepam (Lexotanil)	2	2%
Lorazepam (Ativan)	91	71%
Diazepam (Valium)	15	12%
Midazolam (Dormicum)	13	9%
Do you consider your training on benzodiazepine prescribing to be sufficient (n=164)		
Yes	75	41%
No	109	59%

Conditions, reasons, and courses of treatment for benzodiazepines prescription

Among physicians who prescribed benzodiazepines, they mostly prescribed them for clinically significant anxiety 94 (59%) and panic disorders 78 (49.4%). Physicians disagreed with the prescription of benzodiazepines for depression 102 (64%), essential hypertension 133 (84%), or uncomplicated low back pain in the elderly 130 (82%). Moreover, the most likely reason for benzodiazepine prescription in our study was past positive clinical experience 52 (33%). The most agreed-upon course of treatment was 1 week to 1 month 52 (33%); however, 72 (46%) of physicians disagreed on this course. Also, most physicians disagreed on the use of benzodiazepines for periods longer than 3 months 124 (80%) or more than 6 months 130 (82%) (Table 3).

Table 3: Conditions, reasons, and courses of treatment for benzodiazepines prescription (N= 159)

Prescribing practices for	Categories*	Agreement No. (%)	Neutral No. (%)	Disagreement No. (%)
Conditions	For clinically significant anxiety.	94 (59%)	30 (19%)	35 (22%)
	For clinically significant depression.	17 (11%)	40 (25%)	102 (64%)
	For panic disorders.	78 (49.4%)	37 (23.4%)	43 (27.2)
	For a stressful life event.	37 (23%)	46 (29%)	76 (48%)
	For essential hypertension.	4 (2%)	22 (14%)	133 (84%)

Prescribing practices for	Categories*	Agreement No. (%)	Neutral No. (%)	Disagreement No. (%)
Conditions	For uncomplicated low back pain in the elderly.	5 (3%)	24 (15%)	130 (82%)
Reasons	Their effectiveness on different health conditions.	46 (29.3%)	60 (38.2%)	51 (32.5%)
	Their low ability to induce dependence.	27 (17%)	45 (9%)	86 (54%)
	They are unlikely to be abused.	16 (10%)	36 (23%)	105 (67%)
	Their minimal side effects.	34 (22%)	40 (25%)	83 (56%)
	Past positive clinical experience.	52 (33%)	63 (40%)	42 (27%)
	Patients' limited access to mental health services.	33 (21%)	59 (38%)	65 (41%)
	Patients' limited acceptance to mental health services.	35 (22%)	60 (38%)	62 (40%)
	Patients' preference.	18 (12%)	40 (26%)	97 (63%)
Course of treatment	1 week - 1 month.	52 (33%)	32 (21%)	72(46%)
	>1 month to 3 months.	9 (6%)	32 (21%)	113 (73%)
	>3 months to 6 months.	5 (3%)	26 (17%)	124 (80%)
	> 6 months.	4 (3%)	24 (15%)	130 (82%)

Each item in the categories was asked as an individual question*

Association of the profile of the participants with their knowledge and practice

There was a statistically significant association between the physicians' knowledge of benzodiazepines and their age, gender, and specialty. Physicians who were > 30 years (MW= 6892.5, p-value = 0.01), males (MW= 9233.5, p-value = 0.028), and family physicians or general practitioners (KW= 21.566, p-value <0.001) were significantly better in terms of knowledge than those who are <30 years, females, or specializing in other fields. The level of the physicians was not significantly associated with the knowledge. Moreover, no significant association was found between the practice of benzodiazepine prescription and any of the study variables (Table 4).

Table 4: Association of the profile of the participants with the knowledge and practice

		Knowledge		Practice	
		Mean ± SD	Median(Q1-Q2)	Mean ± SD	Median(Q1-Q2)
Age	< 30 years	3.3 ± 0.43	3.33 (3-3.92)	2.44 ± 0.52	2.51(2.11-3.12)
	> 30 years	3.45 ± 0.46	3.5 (3.09-4.08)	2.46 ± 0.55	2.5 (2.22-3.28)
	tests value*	MW=6892.5		MW=2665.5	
	p-value	<0.01		<0.773	
Gender	Male	3.38 ± 0.45	3.45 (3.08-4)	2.44 ± 0.52	2.5 (2.11-3.17)
	Female	3.31 ± 0.41	3.25 (3-4)	2.45 ± 0.51	2.56 (2.11-3.22)
	tests value*	MW=9233.5		MW=3011.5	
	p-value	<0.028		<0.926	

		Knowledge		Practice	
		Mean ± SD	Median(Q1-Q2)	Mean ± SD	Median(Q1-Q2)
Level	Resident	3.33 ± 0.43	3.33 (3-3.92)	2.44 ± 0.52	2.5 (2.11-3.22)
	Specialists/ consultants	3.41 ± 0.49	3.44 (3.09-4.08)	2.5±0.51	2.56 (2.25-3.17)
	tests value*	MW=5950		MW=1903.5	
	p-value	<0.131		<0.496	
Speciality	Internal medicine	3.47 ± 0.4	3.5 (3.17-4.08)	2.48 ± 0.48	2.53 (2.11-3.12)
	Surgery	3.29 ± 0.42	3.25 (3-4)	2.26 ± 0.56	2.22 (1.89-3)
	Paediatrics	3.18 ± 0.48	3.21 (2.83-4.08)	2.57 ± 0.53	2.61 (2.11-3.33)
	Family medicine/ GP	3.49 ± 0.4	3.48 (3.17-4.17)	2.49±0.36	2.5 (2.39-2.89)
	Neurology/ psychiatry	3.36 ± 0.36	3.42 (3.08-3.92)	2.44±0.42	2.49 (2.11-3.22)
	All others	3.17 ± 0.46	3.17 (3-3.92)	2.55±0.73	2.58 (2.17-3.56)
	tests value**	KW= 21.566		KW= 4.693	
	p-value	<0.001		<0.584	

Mann-Whitney U test, **Kruskal Wallis Test*

Discussion:

When assessing the physicians' knowledge about benzodiazepines, most physicians in our study did not answer correctly to statements related to the ability of benzodiazepines to induce dependence and/ or addiction (statements 1-6). The most agreed-upon statement was "Patients who use benzodiazepines for long periods tend to escalate their doses over time" (66%). This finding is like that in another study that was conducted in Spain, in which 77.4% of the physicians believed that this statement is true [15]. Physicians agreement to this statement could be attributed to their beliefs that "The therapeutic (anxiolytic) effects of benzodiazepines, when taken regularly, tend to diminish over time" (54%), or "Physiologic dependence is the usual reason for long-term use of benzodiazepines" (52%), or "Benzodiazepines have euphoric effects in most people" (40%), or "Benzodiazepines are commonly abused by people who do not otherwise abuse substances"(31%). However, these statements are also incorrect. Previous literature has shown that benzodiazepines are rarely associated with dosage escalation when taken for medical indications in prober therapeutic doses [17]. Moreover, their intentional abusers are usually people who abuse other substances 18. They abuse benzodiazepines to enhance the euphoria or diminish the side effects of another drug[18, 19].

In addition, previous research has shown that the proper use of benzodiazepines rarely results in addiction [15, 20], and iatro-

genic addiction on benzodiazepines is a result of inappropriate prescription [5, 21].

Statements related to the side effects of benzodiazepines were answered correctly by most of the physicians (statements 7,8). 58% of the physicians agreed that "Benzodiazepines increase the risk of cognitive impairment and falls in elderly", which is proven by previous studies [2, 22]. 47% of the physicians agreed on the correct statement that "Abrupt cessation of benzodiazepines may cause generalized seizure". Generalized seizures and status epilepticus due to the discontinuation of benzodiazepines were reported in the literature [23].

Similarly, 61% of the physicians answered correctly on the statement that "Good clinical practice requires periodic attempts to wean patients from benzodiazepines". This statement is supported by a literature review published in 2015; it was concluded that benzodiazepines should be prescribed only for limited periods under therapeutic indications [24]. Moreover, the prolonged use of benzodiazepines is linked with a higher possibility of developing various side effects, including physical dependence and cognitive decline [2, 5, 22]. Also, only 29% of physicians agreed with the incorrect statement that "Long-term users of benzodiazepines are typically people under 50 who use them to cope with the stresses of daily life". Similarly, long-term users of benzodiazepines were described by the literature as geriatric patients with medical or psychiatric complaints [25].

In contrast to previous studies [8, 12, 14, 26, 27, 28], 77% of physicians who prescribed benzodiazepines in our study reported that they prescribe them at the same rate for both female and male patients, 13% reported that they prescribe them more for males, and only 10% prescribed them more for females. According to previously published studies, women are more likely to be prescribed benzodiazepines in a range from approximately 1.2 times to 2 times more than men [8, 12, 14, 26, 27, 28]. The reason behind this was suggested to be a higher prevalence of psychological symptoms and anxiety among women [8, 12]. Previous studies also reported that benzodiazepines were also more likely to be prescribed to the elderly [8, 26], which contradicts our study in which physicians prescribed benzodiazepines more to adults. Although prescribing benzodiazepines to adults and in the same ratio for females and males in our study could reflect a true prescribing pattern among our physicians, self-report bias cannot be ruled out.

The benzodiazepines that were most prescribed as answered by the physicians were Lorazepam (71%), Diazepam (12%), and Midazolam (9%). Data from previous studies were not consistent about the most

prescribed benzodiazepines. Alprazolam was the most commonly prescribed benzodiazepines in Lebanon (34.6%) [12] and Pakistan (9%) 28, while lorazepam (51%) followed by clonazepam (20%) and diazepam (14%) was frequently prescribed in a study in the USA 29. This could be due to availability reasons or individualized hospitals' regulations. For example, alprazolam is not available as formulary medication, and it can be given only by anesthesiologists in the hospital in which the study was conducted, which could explain its low prescription rate.

Most of the participants (59%) in this study considered their training on benzodiazepine perception to be insufficient. This is like a previous study in Dakar in which 100% of general practitioners and 62.1% of psychiatrists and neurologists reported that their training was insufficient[30]. In contrast, trainees for psychiatry residency programs in the USA reported that their training on benzodiazepines was adequate, and they felt comfortable prescribing them. 74.6% of those trainees reported having lectures on benzodiazepines as part of their residency training [31]. Physicians in our study feeling that their training is insufficient might be attributed to them belonging to various specialties, some of which may not teach/ train on benzodiazepines because of the lack of need to use them. To the limit of our knowledge, there are no studies that addressed the training of benzodiazepine prescription in Saudi Arabia. Future studies should investigate the quality of training on benzodiazepines in Saudi Arabia and make recommendations on possible areas for improvement.

Prescribing physicians in this study appear to be aware of the proper indications for prescribing benzodiazepines. Most of them agreed on the prescription of these medications for anxiety (59%) and panic disorders (49.4%), which are evidence-based indications [1]. Similarly, the majority disagreed on the prescription of benzodiazepines for non-approved indications like essential hypertension (84%) or low back pain in the elderly (82%) 1. Interestingly, only 11% of the physicians agreed with the prescription of benzodiazepines for clinically significant depression (64%), although they are known to be effective for it[32, 33]. This may be attributed to them having knowledge about the ability of benzodiazepines to induce depressive symptoms and emotional blunting if used in high doses or long periods [34].

Likewise, physicians in this study seemed to be aware of the appropriate duration of benzodiazepine prescription and the risks of prescribing benzodiazepines for long periods [24]. This suggestion is supported by them mostly disagreeing on the prescrip-

tion of benzodiazepines for > 1 month 113 (73%), > 3 months 124 (80%), or > 6 months 130 (82%). However, a large number of physicians disagreed even on the prescription of benzodiazepines even for 1-week – 1-month duration 72 (46%), which could mean that these physicians may be prescribing benzodiazepines for shorter periods. However, previous guidelines recommend that benzodiazepines are recommended to be used in short periods, typically 4-6 weeks [35, 36].

In this study, physicians who were males, >30 years, and family physicians/ general practitioners were found to be significantly better in terms of knowledge than others. This finding contradicts a previous study in which psychiatrists were more knowledgeable about benzodiazepine prescription than general practitioners [15], however, the low number of family physicians and general practitioners in our study (9%) might have influenced this finding. Although no previous studies have discussed the training on benzodiazepine prescription in Saudi Arabia, previous Saudi studies on the prescription of other medications concluded that there is a need for medical education on appropriate prescribing patterns [37,38, 39].

The better knowledge of physicians who were older than 30 years could be explained by the longer training and experience that they have. Gender effect on the knowledge could be attributed to reasons like older physicians – who have a longer experience- being men, or physicians from specialties who frequently prescribe benzodiazepines being men. However, these are only possible explanations and not facts, as we did not do a detailed analysis that associates the gender with age or specialties. In addition, we could not describe the association between physicians' personal experience with benzodiazepines and their knowledge or prescribing patterns due to the low number of physicians that reported using benzodiazepines before (12%) or reported the use of benzodiazepines among their first-degree family members (14%).

Our study has multiple limitations. One of which is being a self-reported questionnaire which subjects the results to self-reported bias; this bias could be eliminated if future studies acquired data about benzodiazepine prescriptions from patients' medical records. Another limitation is that physicians in this study were not evenly distributed in terms of specialties, which resulted from the random distribution of the questionnaire and did not allow for a comparison of the physicians in terms of who prescribed more benzodiazepines. In addition, this study was conducted in one hospital only (King Abdulaziz Medical

City), which is also a limitation.

Conclusions:

In conclusion, physicians in this study showed limited knowledge and practice regarding benzodiazepines. Benzodiazepines were prescribed more to adults and equally for both genders. Lorazepam was the most commonly prescribed benzodiazepine. The most common conditions for prescribing benzodiazepines were anxiety followed by panic disorder. Training related to benzodiazepine prescription is needed at both undergraduate and postgraduate levels. Further studies regarding prescribing patterns of benzodiazepines are required to establish a better understanding of the prescribing patterns of these medications in Saudi Arabia.

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