

# Attitudes and practices of physicians toward law enforcement on dispensing antibiotics without prescription antibiotics: Findings from a cross-sectional survey

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## ABSTRACT

**Background:** The government of Saudi Arabia implemented a law to enforce the law and regulations prohibiting the dispensing of antibiotics without a prescription, and studies have been conducted to assess the impact of such a law in Saudi Arabia. However, the extent to which law enforcement has changed the perceptions and attitudes of health care professionals, mainly physicians, toward antibiotic resistance is unknown in Saudi Arabia. **Material and Methods:** A cross-sectional study was conducted in Riyadh, Saudi Arabia, on 378 physicians. These physicians were mainly working in primary care centers. An online questionnaire was sent to the physicians, and it consisted of 35 items and was divided into four sections: 6 items were on sociodemographic characteristics of participants; 13 items were on the knowledge of physicians about antibiotic resistance; 8 items were on the attitude the physicians toward enforcement law, and the final 8 items were on the attitude the patients toward enforcement law in an outpatient setting. **Results:** Around 90% of the physicians acknowledged that physicians should stop prescribing antibiotics without indication. About 29.1 % of the physicians agreed, and 56.3% showed strong agreement that law enforcement is for the patient's benefit. Similarly, 33.6% agreed, and 50.8% strongly agreed that law enforcement limits the resistance of bacteria. Around 24.3% of the patients disagreed, and 23% strongly disagreed that law enforcement does not affect anything. Around one-third of the physicians (34.4%) agreed, and 23.5% strongly agreed that the new regulation of law enforcement of antibiotic prescription increases public awareness regarding the misuse of antibiotics. **Conclusion:** It seems that law enforcement has impacted the knowledge and attitude of physicians as they agree with law enforcement and its associated benefits for patients. They also acknowledged that law enforcement could limit the resistance to bacteria. However, not all physicians agree that law enforcement has an effect on anything, and new regulation of antibiotic prescription law increases public awareness regarding the misuse of antibiotics.

**Keywords:** A cross-sectional survey, attitudes and practices of physicians, law enforcement on dispensing antibiotics without prescription

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## Introduction

Irrational use of antibiotics and subsequent antimicrobial resistance is a global health problem affecting several countries.<sup>[1,2]</sup> Increasing antimicrobial resistance can adversely influence the health care system and families in developed and developing countries.<sup>[3]</sup> For example, almost 50,000 deaths occur yearly in Europe and the United States of America because of antimicrobial resistance.<sup>[4]</sup> The number of deaths could rise more if data from other countries are included.<sup>[4]</sup> Consequently, antimicrobial resistance can be a leading cause of mortality in 2050.<sup>[4]</sup>

It is well known that the rational use of antibiotics is one of the important steps in fighting against rising antimicrobial resistance.<sup>[5]</sup> Irrational use of antibiotics, self-medication, and obtaining and dispensing antibiotics without prescription are some of the reasons for rising antibiotic resistance worldwide.<sup>[6,7]</sup> In addition, limited adherence to guidelines for prescribing antibiotics can be another potential reason for increasing antibiotic resistance.<sup>[8]</sup> Although dispensing antibiotics without a prescription is illegal,<sup>[9]</sup> this practice still prevails, resulting in a rise in antibiotic use.<sup>[10]</sup> This problem of dispensing antibiotics without a prescription is also prevalent in Middle-East countries such as Saudi Arabia.<sup>[11]</sup>

To enforce the rational use of antibiotics and avoid dispensing antibiotics without prescription, countries have implemented laws.<sup>[12]</sup> In May 2018, the government of Saudi Arabia implemented a law to enforce the law and regulations prohibiting the dispensing of antibiotics without a prescription. Studies have been conducted to assess the impact of such law in Saudi Arabia.<sup>[13,14]</sup> Further, the Ministry of Health also announced on its official website that the law should be followed by all. The government of Saudi Arabia also imposed fines and cancellation of licenses in case of violation of the law.

The extent to which law enforcement has changed the perceptions and attitudes of health care professionals, mainly physicians, toward antibiotic resistance is not known in Saudi Arabia.<sup>[13,14]</sup> Therefore, we conducted this study to assess the impact of law enforcement on dispensing antibiotics without a prescription to primary care physicians, their attitude toward such regulations, and how the law has improved their behavior and practice regarding dispensing antibiotics without a prescription in Saudi Arabia.

## Material and Methods

### Study design and setting

A cross-sectional study was conducted in Riyadh, Saudi Arabia. A sample of physicians was obtained using convenience sampling, during the time between Jan and May 2022. The research ethics standing committee at Shaqra University has reviewed the proposal of the research project and it is approved (ERS\_SU\_2021008).

### Study participants and sample size

The sample size of this study was calculated as 378. Study participants were physicians who manage the patients in daily practices in the Riyadh region. These physicians were mainly working in primary care centers and included family physicians in residency training programs, private family medicine clinics, and general practitioners.

### Eligibility criteria

The inclusion criteria were contingent on being a family physician who manages and prescribes medications for the patients, the senior resident of family physicians involved in the residency training program, and a general practitioner who treats the patients in primary care centers. On the other hand, family physicians who do not practice the patients' management daily, junior residents who are not allowed to prescribe the medications without supervision, and intern students who are not involved yet in the residency training program were excluded.

### Data collection

An online cross-sectional survey was undertaken using QuestionPro.com, targeting primary care physicians in the Riyadh region. A link to the online survey was distributed through emails and social media platforms (Facebook, Twitter, WhatsApp, and Snapchat). The link initially leads to an informed consent and eligibility check before being directed to the survey questions. After approaching 378 physicians online, we sent a questionnaire to physicians to assess the awareness and attitude of the primary care physicians toward the law on the prohibition of dispensing antibiotics without prescription and to assess the behaviors of the general public toward such regulations. A panel of researchers examined the content validity of the questionnaire. Before distributing the questionnaire, it was piloted among 30 physicians to assess its feasibility and revise the questions for clarity and interpretability. The questionnaire was refined and finalized based on the feedback. The final questionnaire consists of 35 items and is divided into four sections: 6 items were on sociodemographic characteristics of participants; 13 items were on knowledge of physicians about antibiotic resistance; 8 items were on the attitude of the physicians toward enforcement law; and the final eight items were on the attitude the patients toward enforcement law in an outpatient setting.

### Data management and analysis

Data were collected through an online self-administered questionnaire developed by the authors and underwent multiple revisions for the purpose of clarity and compatibility with the purpose of the study and its objectives. The questions within the questionnaire were multiple-choice questions in addition to a blank choice for participants to fill in for the purpose of inclusiveness.

After importing the data from excel to SPSS, descriptive statistics were used to summarize the data. Frequencies with their corresponding proportions were reported for categorical variables. Data analysis was carried out using SPSS.

## Results

### Sociodemographic characteristics of study participants

Table 1 demonstrates the sociodemographic characteristics of study participants. The results show that a greater proportion of the physicians (48.15%) were 25–34 years older, and 14.81% were 45–54 years old. Further, a little less than half (46.30%) were females, whereas 53.70% were males. About half of the study participants (47.1%) were MBBS or MDs, whereas 12.2% were PhDs. Not surprisingly, more than half of the study participants (61.10%) had graduated from Saudi Arabia and about a similar proportion was working as either general practitioner or residents of family medicine. About two-third (65.60%) had worked for more than 5 years, and 47.35% had worked with a primary care center in the Ministry of health, as shown in Table 1.

Figure 1 shows the medical conditions for which antibiotics are prescribed by physicians. It seems that about a quarter of the physicians (26.98%) prescribed antibiotics for eye infections, wounds, or urinary tract infections (UTI). Also, a third of

physicians (35.19%) prescribed antibiotics for conditions such as colds and flu or earache, eye infection, wound, urinary tract infections, rhinitis, and toothache.

### Perceptions of physicians about antibiotic resistance after law enforcement

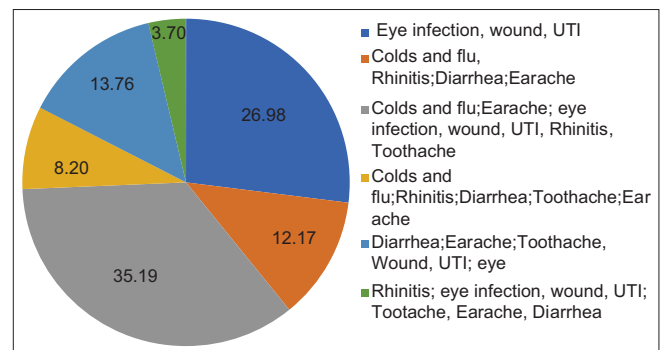
Table 2 shows the study findings related to physicians’ perceptions and attitudes about antibiotic resistance after enforcing the law against dispensing antibiotics without prescription. Surprisingly, the findings reveal that about three-fourths (72.20%) of the physicians think that there are some people that can reach the antibiotic without a prescription. Around 90% of the physicians acknowledged that physicians should stop prescribing antibiotics without indication. However, only 73.5% believed that physicians should be penalized for prescribing antibiotics without indication.

While assessing physicians’ attitudes while prescribing antibiotics, we found that 73.0% always ask about allergies to drugs before prescribing antibiotics. Similarly, only 60.6% of the physicians admitted that they always ask for any kidney problems before prescribing antibiotics. Likewise, we found that, unfortunately, only 51.6% of the physicians always warn about the potential side effects of the medicines. Moreover, about three-fourths (72.8%) of the physicians mentioned that they educate patients to be compliant with the medications and also inform patients about the importance of medication adherence. Around two-third of the physicians (68.3%) acknowledged that when prescribing antibiotics, they always ask patients if they are taking any other medicines for the same complaint. Also, about three-fourths (78.31%) of physicians always avoid prescribing antibiotics without a clear indication for children.

### The attitudes of the physicians toward enforcement law on dispensing antibiotics without a prescription

Table 3 shows the results on the attitudes of the physicians toward enforcement law on dispensing antibiotics without a prescription. About 29.1 % of the physicians agreed, and 56.3% showed strong agreement that law enforcement is for the patient’s benefit. Similarly, 33.6% agreed, and 50.8% strongly agreed that law enforcement limits the resistance of bacteria. Around 24.3% of the patients disagreed, and 23% strongly disagreed that law

Characteristics	Frequency	%
Age group		
25-34	182	48.15
35-44	105	27.78
45-54	56	14.81
55-64	31	8.20
65+	4	1.06
Gender		
Male	203	53.70
Female	175	46.30
Education		
Bachelor/Diploma/Masters	43	11.4
Board (local or international)	111	29.4
MBBS or MD	178	47.1
PhD	46	12.2
Country of Graduation		
Saudi Arabia	231	61.10
Egypt	66	17.50
India/Pakistan	21	5.60
Other Arab countries	60	15.90
Occupation		
Consultant in family medicine	78	20.60
General Practitioner	119	31.50
A resident of family medicine	125	33.10
Senior Registrar of family medicine	56	14.80
Years of experience (years)		
<5	130	34.40
>5	248	65.60
Field of work or practice		
Primary care center (Ministry of health)	179	47.35
Private clinic	55	14.55
Secondary, Tertiary hospital, or medical city	110	29.10
University clinic	34	8.99



**Figure 1:** Common medical conditions for which antibiotics are prescribed by physicians

**Table 2: Perceptions of physicians about antibiotic resistance**

Questions asked to assess practice and perceptions	Frequency	%
Do you think, still some people can reach the antibiotic without prescription		
Yes	273	72.20
No	63	16.70
I do not know	42	11.10
Physicians should stop prescribing an antibiotic without indication		
Yes	343	90.70
No	20	5.30
I do not know	15	4.00
Physicians should be penalized for prescribing antibiotics without indication		
Yes	278	73.50
No	51	13.50
I do not know	49	13.00
<b>Attitudes of physicians while prescribing the antibiotics</b>		
When prescribing antibiotics, I ask patients about drug allergies		
Always	276	73.00
Never	24	6.30
Sometimes	78	20.60
When prescribing antibiotics, I ask patients if they have any kidney problem		
Always	229	60.6
Never	19	5
Sometimes	130	34.4
When prescribing antibiotics, I warn patients about the potential side effects of the medicines		
Always	195	51.6
Never	28	7.4
Sometimes	155	41
When prescribing antibiotics, I educate patients about the importance of adherence and completing the full course of antibiotics		
Always	275	72.8
Never	14	3.7
Sometimes	89	23.5
When prescribing antibiotics, I ask patients if they are taking any other medication for the same complaint		
Always	258	68.3
Never	24	6.3
Sometimes	96	25.4
I do not prescribe antibiotics without a clear indication for children		
Always	296	78.31
Never	14	3.70
Sometimes	68	17.99

enforcement has no effect on anything. However, about one-third agreed with this statement, and 22.5% of the physicians were neutral about this question. Similarly, 26.2% of the physicians agreed with the law preventing dispensing antibiotics without a prescription, and 28.3% strongly agreed with the same. While asking the question of whether patients understand and accept the law that prohibits antibiotics without prescription, 33.9% agreed, and 20.4% showed strong agreement. About 37% of the physicians agreed, and 16.9% strongly agreed that most of the time, the patients insist the physician prescribe antibiotics, even if the medical condition is not indicated. Similarly, 35% of the physicians agreed, and 24.3% strongly agreed that when patients feel that they need an antibiotic, if not dispensed, they will try to obtain it from another clinic. Around one-third of the physicians (34.4%) agreed, and 23.5% strongly agreed that the new regulation of law enforcement of antibiotic prescription increases public awareness regarding the misuse of antibiotics.

## Discussion

This cross-sectional study was undertaken to assess the attitude and perceptions of physicians about antibiotic resistance after law enforcement. The study findings show that about three-fourths of the physicians think that there are some people that can reach the antibiotic without a prescription. This suggests that law enforcement may not have a significant impact on the change in behavior of individuals.

While assessing physicians' attitudes while prescribing antibiotics, we found that 73.0% of the physicians always ask about drug allergies before prescribing antibiotics. The findings suggest that a quarter of physicians may need to be trained to assess allergies before prescribing antibiotics. These findings call for action to train physicians and remind them to check for potential allergies before prescribing any drug. It may be practically challenging to

**Table 3: Attitude of the physicians toward enforcement law on dispensing of antibiotics without a prescription**

Questions asked to assess attitudes toward law enforcement	Agree		Disagree		Neutral		Strongly agree		Strongly disagree	
	n	%	n	%	n	%	n	%	n	%
Law enforcement is for patient benefit	110	29.1	5	1.3	46	12.2	213	56.3	4	1.1
Law enforcement limits bacterial resistance	127	33.6	9	2.4	48	12.7	192	50.8	2	0.5
Law enforcement leads to the consumption of patient time to visit the doctor	113	29.9	39	10.3	93	24.6	102	27	31	8.2
Law enforcement causes delayed treatment	49	13	109	28.8	99	26.2	18	4.8	103	27.2
Law enforcement may cause accumulation and remaining the antibiotic in warehouses and pharmacies	92	24.3	62	16.4	114	30.2	66	17.5	44	11.6
Law enforcement leads to the consumption of patient money to visit a private doctor	121	32	60	15.9	91	24.1	73	19.3	33	8.7
Law enforcement has no effect on anything	74	19.6	92	24.3	85	22.5	40	10.6	87	23
I agree with the law of preventing the dispensing of antibiotics without a prescription	99	26.2	30	7.9	80	21.2	107	28.3	62	16.4
The patient understands and accepts the law that prohibits antibiotics without prescription	128	33.9	49	13	105	27.8	77	20.4	19	5
There are a lot of patients who visits the clinic, only seeking antibiotic prescription after law enforcement	118	31.2	61	16.1	100	26.5	56	14.8	43	11.4
Most of the time, the patients insist the physician prescribe an antibiotic, even if the medical condition is not indicated	140	37	43	11.4	102	27	64	16.9	29	7.7
Most of the time, the physicians just prescribe the antibiotic responding to demanding patients without a clear indication	91	24.1	91	24.1	100	26.5	35	9.3	61	16.1
When patients feel that they need an antibiotic, if not dispensed, they will try to obtain it from another clinic (private or governmental)	133	35.2	29	7.7	111	29.4	92	24.3	13	3.4
The proper way to prescribe antibiotics is physician judgment rather than international criteria	106	28	69	18.3	106	28	46	12.2	51	13.5
Most of the patients prefer to contact with telemedicine facility (Sehha application or 937) to prescribe an antibiotic rather than go to the clinic:	81	21.4	64	16.9	169	44.7	13	3.4	51	13.5
I face many complaints because I refused to prescribe antibiotics to some patients	113	29.9	70	18.5	111	29.4	46	12.2	38	10.1
The new regulation of law enforcement of antibiotic prescription increases the public awareness regarding the misuse of antibiotics	130	34.4	39	10.3	94	24.9	89	23.5	26	6.9

ensure that 100% of the physicians should ask questions about allergies at least after law enforcement. However, our findings show that a reasonable proportion of the physicians check for allergies as opposed to studies conducted in Spain and Jordan, where only 16.9% and 17.3% of the pharmacists explored allergies before the prescription of antibiotics, respectively.<sup>[15,16]</sup>

In addition, the study findings revealed that only 60.6% of the physicians admitted that they always ask about any kidney problems before prescribing antibiotics. This finding is alarming because several antibiotics are excreted through the kidneys. Therefore, renal function needs to be evaluated before prescribing antibiotics.<sup>[17]</sup> Without assessing renal function, patients may develop serious side effects.<sup>[18]</sup> Hence, continuous medical education may help physicians in adapting this practice to check for kidney function before prescribing antibiotics. Unfortunately, only half of the physicians always warn about the potential side effects of the medicines. This is an alarming finding too because antibiotics have the potential to damage many organs and most antibiotics produce side effects.<sup>[19]</sup> Therefore, patients need to be aware of those side effects, so they should report to physicians in a timely manner and should be mindful of the side effects they experience.

The finding illustrated that about three-fourths of the physicians mentioned that they educate patients to be compliant with the medications, and they also inform patients about the importance

of adherence to the medications. Compliance with antibiotics is vital for a cure of disease.<sup>[20]</sup> Very often, patients develop antibiotic resistance because they are not compliant with the antibiotics.<sup>[20]</sup> Therefore, all physicians should remind patients about the importance of compliance with antibiotics to avoid developing resistance.

Also, nearly three-fourths of physicians always avoid prescribing antibiotics without a clear indication for children. This is important and should be practiced by 100% of the physicians because children’s organs are delicate, and prescribing irrational antibiotics to children may harm them in the longer run.<sup>[21,22]</sup> Therefore, all physicians should avoid prescribing antibiotics to children without a clear indication. About one-third of the physicians agreed, and more than half showed strong agreement that law enforcement is for the patient’s benefit and law enforcement limits the resistance of bacteria. This reveals that physicians value the enforcement of the law and its benefit for the patients. This also shows that physicians value the importance of the law against spreading antibiotic resistance.

However, only a quarter of the physicians agreed with the law preventing the dispensing of antibiotics without a prescription, and another quarter strongly agreed. This also reveals that not 100% of physicians agree with the law preventing dispensing antibiotics without a prescription, and the reasons for this need

to be evaluated in the future. Similarly, 35% of the physicians agreed, and 24.3% strongly agreed that when patients feel that they need an antibiotic, if not dispensed, they will try to obtain it from another clinic. These findings are consistent with a study conducted in a similar setting, where the authors found that most physicians feel pressure to prescribe antibiotics; otherwise, the patients feel that their disease is not taken seriously.<sup>[20]</sup>

Around one-third of the physicians agreed, and more than a quarter strongly agreed that the new regulation of law enforcement of antibiotic prescription increases public awareness regarding the misuse of antibiotics. These findings reveal that there is a benefit of law enforcement, and it may have the potential to change the behavior of patients in the future. This reveals that education and awareness of patients by such law enforcement may be beneficial for patients in the long run. The importance of educating patients about the rational use of antibiotics by different means is also highlighted by other studies.<sup>[20]</sup>

### Strengths and limitations

To the best of our knowledge, this was the first study of its kind that assessed the attitudes and practices of physicians toward law enforcement on dispensing antibiotics without prescription antibiotics. We used a structured questionnaire to collect the data that have been developed after continuous feedback and input from experts. The findings can generate hypotheses to conduct future studies and assess the impact of pre- and post-law enforcement on physicians' attitudes and practices.

However, we had a convenient sample in our study, and important perceptions of physicians may have been missed by not including the potential participants. Also, the study was conducted in one region of Saudi Arabia. Therefore, findings may not be generalizable to other settings. Finally, this study was cross-sectional; therefore, firm conclusions regarding the impact of law against dispensing antibiotics without prescription may not be made.

### Conclusion and Recommendation

This study shed light and provided novel insights into the attitudes and practices of physicians toward law enforcement on dispensing antibiotics without prescription antibiotics. The study revealed that most physicians agreed that law enforcement is for the patient's benefit and law enforcement limits the resistance of bacteria. This may imply that physicians value the importance of the law against spreading antibiotic resistance. However, not all physicians agree with the idea that law will prevent dispensing antibiotics without a prescription, and the reasons for this need to be evaluated in the future. However, majority of physicians agreed that the new regulation of law enforcement of antibiotic prescription increases public awareness regarding the misuse of antibiotics.

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### Conflicts of interest

There are no conflicts of interest.

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