

Prevalence of medication misuse among females in Riyadh, Saudi Arabia; A cross-sectional study

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ABSTRACT

Prescription and non-prescription medication misuse is a significant global health issue around the world. This study aims to understand the prevalence of medication misuse among females in Saudi Arabia and to investigate the impact of different information resources in improving the safe use of medication. This observational cross-sectional study was conducted using an online self-reported questionnaire between August and September 2021. It was carried out as a multicentre study in Riyadh city. Inclusion criteria: Female with age range between 16 and 60 years old. Data were collected using Research Electronic Data Capture (REDCap) software and analyzed with Statistical Packages for the Social Sciences (SPSS) software version 20. A total of 659 responses were collected. 406 participants' responses were included. The mean of good knowledge of medication use was 56.76%. The mean percentage for good knowledge was 51% (more than one resource), 50% (Pharmacist), 49% (Internet), and 48% for both (physician) and (Family/friends). There was no statistically significant difference between the information resources and good knowledge (p -value = 0.984). The mean attitude score was 29.6, which shows a good attitude to medication safety use. Participants showed a good knowledge of acetaminophen (88.7%), followed by Isotretinoin (71.2%), vitamins (67.5%), ibuprofen (60.6%), and Antibiotics (59.8%). The study showed a good attitude toward medication safety use among females in Riyadh-Saudi Arabia with a lack of knowledge for medication use among females in Saudi Arabia. There is a need to enhance patient education programs in the healthcare system and community.

Keywords: Prevalence, Medication misuse, Female, Knowledge, Attitude

Introduction

Prescription and non-prescription medication misuse is a major worldwide issue [1]. The use of pharmaceutical medications has to be an important standard of our daily life, The safe use of drugs requires avoiding pharmaceutical mistakes [2, 3]. Inappropriate

use of medicine may be categorized as either misuse or abuse. Drug misuse was defined According to the National Institute on Drug Abuse (NIDA): "prescription drug misuse and abuse is when someone takes a medication inappropriately or without a prescription that can lead to addiction or other major health risks" [4].

While drug abuse is using a substance for illegal and unethical purposes, although the terms "abuse" and "misuse" are used interchangeably, the terms have to be differentiated in regards to unlawful reasons, to prescription or over-the-counter (OTC) medications [5].

The central question in this study asks, How can medication misuse among the female population be prevented? The objectives of this study are; to understand the prevalence of medication misuse among females in Saudi Arabia, to investigate

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the impact of different information resources in improving the safe use of medication, to elaborate on different types of prescription and non-prescription drugs that are commonly misused locally among Saudi females and to increase the level of knowledge and awareness on the proper use of medications and propose future recommendations and preventive measures for common non-medical or cosmetic misuse of these medications. Up to this date, research tended to focus on an individual area of medication misuse such as antibiotic abuse rather than finding out the main causes behind the major issue. Additionally, minimal literature has been published on medication misuse/abuse, and yet little is known about the sex differences in the prevalence of medication misuse used for non-medical reasons related to the Saudi population, especially among females [6, 7].

Due to limited data in this matter, this study aimed to investigate more to help in educating the health care system and female community on the proper use of these medications and their lifetime risks. These medications include; antibiotics, painkillers, stimulants, Central Nervous System (CNS), anti-depressants, and others. Even in some recent cases, supplements, insulin shots for weight reduction, and corticosteroids for cosmetic reasons [4].

Numerous studies have reported misuse of medication, It's considered as minimal literature, these studies and research tended to focus on individual areas of medication misuse such as; antibiotics abuse rather than finding out the main causes behind the major issue. Add to that, it's also focused on the prevalence of misuse of medication in individual areas. This study aims to measure the level of knowledge and attitude in three main areas, which are prescription and non-prescription and lastly drugs and herbs used for cosmetics and obesity reasons, and to measure the prevalence of misuse of medication, especially among females in Saudi society. Medication errors are dangerous for both individual patients and the general public's health since they are associated with serious patient safety issues [8-10].

In a systematic literature review article that was done in the Middle East on Self-medication misuse, a total of 72 studies were included. Even though there is a lack of material on self-medication usage in the Middle East, self-medication overuse of pharmaceuticals seems to be widespread. Medications that have been involved in the misuse include codeine-containing products, tramadol, topical ocular anesthetics, topical corticosteroids, antimalarial, and antibiotics. They were described as misused medicines in most developing countries. Commonly among children and pregnant women. Topical ocular anesthetic misuse was found to be associated with many harmful adverse effects [11, 12] The major goal of Alkhomees *et al.*'s descriptive study was to determine the top ten most widely prescribed medications in Saudi Arabia from 2010 to 2015, with an emphasis on over-the-counter drugs, according to statistics from large companies in the field. Antibiotics and analgesics were the most commonly prescribed medications, followed by proton pump inhibitors and antidiabetics, antihyperlipidemic medications, and erectile dysfunction treatments. According to this study, the causes of this misuse vary between self-medication and over-prescription due to misdiagnosis. Results showed that

analgesics were the highest class of drugs used in Saudi Arabia followed by antibiotics as the second largest group, in particular, the potent non-steroidal anti-inflammatory drug (NSAID) diclofenac. Over-utilization of diclofenac is worrisome since this drug has been linked to risk of cardiovascular disease especially when used with high doses and for long duration. Other studies indicate a widespread misuse of Proton Pump Inhibitors across all Saudi hospital practices [3, 13].

Another study depending on a public survey was conducted to identify the issues of misuse of medicines in Jeddah, Saudi Arabia, The study reviewed multiple articles published locally and internationally which all intend to determine the prevalence of medicine misuse in Saudi Arabia is highly common among all population [1]. Self-medication practices are more frequently observed for over-the-counter (OTC) drugs among health sciences students medications showed significant gender and age-related differences and it was generally higher among female students especially those of older age who also were found to be more knowledgeable about the safety issues concerning the use of these medications than male students, situations behind this common misuse found to be, tight job schedules, high job responsibilities, academic burden and during exams, many of these students use different OTC and non-OTC substances to improve their concentration or alertness while studying. Examples of these substances as stimulants, antidepressants, OTC and non-OTC analgesics, and antihistamines are all substances commonly misused by students, it was found that the use of NSAIDs and antihistamine drugs was the highest during exams period in the central region [14, 15]. Another study was conducted among pharmacy staff in the Eastern Region of Saudi Arabia to assess their knowledge, beliefs, practice, and opinions regarding the misuse and abuse of medicines in Saudi Arabia. Ninety pharmacy professionals were included and two-thirds of them agreed that misuse and abuse are two different things, and both are alarming issues. The pharmacists' reactions to the suspicious scenario of drug abuse and misuse were found to be gender specific. A quarter of female pharmacy employees were hesitant to respond to the issue, compared to 5% of male employees. The country's cultural, religious, and gender disparities may have influenced their attitude. In Saudi Arabia, there is a shortage of statistics on drug addiction; however, several researches have revealed that heroin, amphetamine, alcohol, and cannabis are the most commonly misused substances in rehab facilities. They aimed to assess pharmacy professionals' understanding of the difference between the terms misuse and abuse of medications, as well as pharmacists' beliefs about the misuse or abuse of medications in Saudi Arabia [5].

Another more recent study in 2020, stated that about 84% of community pharmacists in the capital city of Saudi Arabia had been trained in identifying drug misuse or abuse among patients, during their pharmacy college education [16]. In one case-control study done among substance users and substance use disorder (SUD), patients to identify and assess the risk factors among females who use these; found out that a portion of Saudi females also use drugs, and the usage among them are not as accessible to women as they are to men in Saudi Arabia due to the conservative

nature of the society and the strict gender segregation. Therefore, women are prone to using primitive and volatile substances such as glue, gasoline, and shisha. They were more likely to be unemployed, have unstable marriages, less education, low family income, and unstable family conditions. Regardless of study type, there should have been a more adequate representation of female patients/participants [17]. The first and only study done locally in Riyadh, on the misuse of Topical corticosteroids among females and the reasons behind their usage. These are considered one of the most used drugs by dermatologists to treat many dermatological conditions but have been misused by the female population mostly for cosmetic purposes such as skin whitening and lightening causing an increase in hair intensity and skin thinning as a common side effect. On the other hand, these studies showed that topical steroid misuse is tremendous and more common in women especially those to be found in marital status. The main explanation behind this abuse and misuse is the availability and easy accessibility of potent topical corticosteroids at a low cost over the counter [18].

According to recent estimates, up to 51% of diabetic patients worldwide are using complementary and alternative medicine (CAM). Healthcare professionals (HCPs) need to be aware of the factors that influence CAM use in diabetic patients in order to optimize prescribed therapies and enhance patient-provider communication and enhance medication safety [19, 20].

Increasing microbial resistance to antibiotics is a serious global health concern. In 2016, a study was conducted in Riyadh, that discussed the accessibility of antibiotics over-the-counter (OTC) without prescriptions showing that the highest percentage of seeking antibiotics for viral illnesses is more commonly misused among females [21]. Another study conducted in 2018, also discussed the common practice and misuse of non-prescribed sale of antibiotics in Saudi Arabia. The study explained the many scenarios presented to the pharmacists. Sore throat, common cold/flu, and cough and fever accounted for the highest rate of antibiotic misuse, with the leading condition for which antibiotics are misused is upper respiratory tract infections, most of which are usually viral without comparing the sex differences, pharmacists also disclosed that what they sold the most is Augmentin, without prescription from requests of the patients. Ciprofloxacin came second to be one of the most commonly dispensed antibiotics without prescription [22]. Another cross-sectional study was to assess the state of knowledge regarding antibiotic resistance, attitudes, and practice regarding antibiotic (AB) use and misuse among adults living in Riyadh, Saudi Arabia. The main findings of that study showed that individuals do not understand the real difference between bacteria and viruses, therefore, and that's mainly the reason behind their misuse. On the other hand, females showed good knowledge regarding the use of antibiotics during their pregnancy and breast-feeding. However, almost half of them lacked knowledge about antibiotic side effects on children's teeth and related serious allergies leading to death [13]. The goal of another study was to determine the prevalence of antibiotic self-medication in the King Khalid University Hospital population in Riyadh, Saudi Arabia, as well

as the factors that influence this practice. Patients tried self-medication to alleviate their problems or save time and money, according to studies done in Saudi Arabia between 1988 and 2009. Antibiotics were used without a prescription by 40.8 percent of the hospital's population, predominantly in older patients, and males were twice as likely as females to use them [23].

Materials and Methods

This is an observational cross-sectional study. It was carried out as a multicentre study in multiple hospitals, Beauty salons, Public Malls, Sports clubs, and Health Centres, in Riyadh city. The survey was also published and posted on social media. The data collection was run entirely for 2 months starting from early August 2021 till late September 2021, including females with ages ranging between 16 and 60 years old, females in community or hospitals, and females who have misused herbs or medication, as well, we excluded females under the age of 16 years old and above 60 years old, healthcare staff (e.g., nurses and doctors), males and the children and females who have the correct use of herbs and medication.

The sample size calculation was around 406. The data was collected by using an online self-reported validated questionnaire, the first part, discussed the demographic information (gender, age, nationality, location, employment, health status, material status, academic qualification), health status (diabetes, hypertension, cholesterol, current or previous cancer, thyroid disease, lung disease. we discussed each participant, then the other three sections discussed the most misused medications among females in three main areas, which are prescription and non-prescription, and lastly, drugs and herbs used for cosmetics and obesity reasons. After that, it was also classified into tables to measure the level of knowledge and attitude, and lastly, there was an open question for the participants' suggestions to limit drug abuse in Saudi society.

The research design used in the questionnaire is a 5-point Likert scale, and we used the Nominal Scale Level to assess the questions related to prescription, non-prescription medications (OTC), and cosmetic misuse of these medications. Data were analyzed using Research Electronic Data Capture (REDCap) software and analyzed with Statistical Packages for the Social Sciences (SPSS) software version 20. Chi-square was used to determine any association between (i) level of knowledge and attitude and (ii) gender (female). As mentioned in the research proposal the Survey questions were 20 questions to test participants' knowledge, the other 7 questions were to test attitudes.

The list of questions was written and revised by the research team asking about the misuse of prescribed medicines, and the common use of prescribed medicines among females in our community in Saudi Arabia.

Each potential participant was administered the questionnaire or survey by the researcher who recorded the responses electronically or face to face. The questionnaire was in Arabic

and items were translated to English for reporting. The internal reliability was evaluated by Cronbach's alpha coefficient. Seven questions were used to measure the attitude with 0.711 Cronbach's alpha coefficient, while twenty questions were used to evaluate the knowledge with Cronbach's alpha coefficient of 0.7; which indicates acceptable internal reliability for both knowledge and attitude questions. Regarding ethical approval, anonymity and participation in this study were ensured to be voluntary. The respondents have been signed a consent form to participate in the survey questionnaire and all data collected from the survey questionnaire are private information that is used for research purposes only, the IRB registration number: H-01-R-069.

Results and Discussion

The participants' selection process is clearly shown by the **Figure 1** scheme. All respondents were female, and their age ranged between 16–60 years. **Table 1** represents the demographic data of the respondents. 35% of participants used more than one resource for medication information, 27% of participants used the Internet”, 18% of the participants used physicians and pharmacists as resources, and only 2% of the participants used family/friends as a resource, as shown in **Figure 2**.

For most of the participants, the mean knowledge score was 9.9 which falls in the range of 0-20, this indicates good knowledge 49.5 % and 51% of participants used more than one resource,

49% of participants used “the internet”, while 48% of the participants used physician and 50% of participants used pharmacist, and 43 % of the participants used family/friends (**Figure 3**). P-value=0.984, so p-value > 0.05, which shows no statistically significant difference, between the participants who used information resources and those who had good knowledge. Participants showed a good knowledge of Acetaminophen use (88.7 %), followed by Isotretinoin (71.2%), Vitamins (67.5%), Ibuprofen (60.6 %), and Antibiotic use (59.8%).

The mean attitude score was 29.6 out of (7-35) which indicates that participants have a good attitude toward medication safety use. The highest percentage out of 406 participants (351) 86.5% have had a good attitude, (49) 12% have a neutral attitude, and (6) 1.5% have a poor attitude, see **Figure 4**.

As shown in the recommendations suggested by respondents (**Table 2**); they were asked open questions to suggest ways to minimize the misuse of medications among women in Saudi society. Total number of suggestions was 86. The majority of those who responded to this question suggested that Public Awareness should be implemented (41.86%), prescriptions as mandatory (17.4%), Providing free medication consultation by a healthcare practitioner (11.6%), Mandatory Prescriber Education (8.13%), Social Media Awareness, Health Encyclopaedia And female-focused health education (5.81%), and (3.48%) suggested implanting Penalty fees.

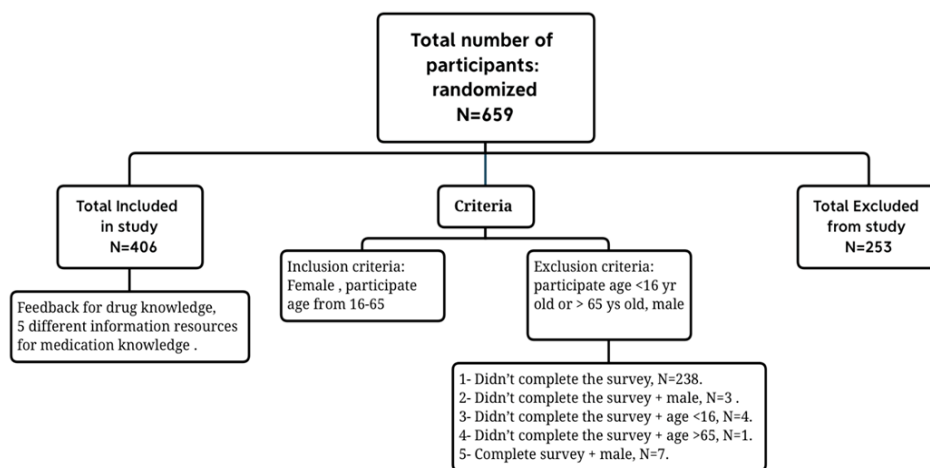


Figure 1. Participants selection process.

Table 1. Demographic information of the participants (n = 406).

	Pharmacist Consulting	Physician Consulting	Friends and family	Internet search	Multiple choices
Total Count (N)	72	75	7	111	141
Age	25 (median)	28 (median)	27 (median)	24 (median)	24 (median)
Nationality					
- Saudi	- 67 (93%)	- 67 (89.3%)	- 7 (100%)	- 107 (96.3%)	- 127 (90%)
- Non- Saudi	- 5 (6.9%)	- 8 (10.6%)	- 0 (0%)	- 4 (3.6%)	- 14 (9.9%)
Area of residency in the Kingdom:					
1. Northern Province	- 3 (4.1%)	- 6 (8%)	- 0	- 6 (5.4%)	- 4 (2.8%)
2. Middle Province	- 64 (88.8%)	- 59 (78.6%)	- 5 (71.4%)	- 91 (81.9%)	- 117 (82.9%)
3. Southern Province	- 1 (1.3%)	- 3 (4%)	- 0	- 6 (5.4%)	- 3 (2.1%)
4. Eastern Province	- 2 (2.7%)	- 4 (5.3%)	- 0	- 6 (5.4%)	- 6 (4.2%)
5. Western Province					

	- 2 (2.7%)	- 3 (4%)	- 2 (28.5%)	- 2 (1.8%)	- 11 (7.8%)
Functional status:					
1. Student	- 18 (25%)	- 22 (29.3%)	- 2 (28.5%)	- 46 (41.4%)	- 62 (43.9%)
2. Employed	- 36 (50%)	- 32 (42.6%)	- 3 (42.8%)	- 40 (36%)	- 56 (39.7%)
3. Unemployed	- 17 (23.6%)	- 18 (24%)	- 1 (14.2%)	- 21 (18.9%)	- 21 (14.8%)
4. Retired	- 1 (1.3%)	- 3 (4%)	- 1 (14.2%)	- 4 (3.6%)	- 2 (1.4%)
Health Status:					
1. Healthy	- 67 (93%)	- 64 (85.3%)	- 6 (85.7%)	- 107 (96.3%)	- 122 (86.5%)
2. Suffering with Chronic Illness	- 4 (5.5%)	- 10 (13.3%)	- 1 (14.2%)	- 4 (3.6%)	- 19 (13.4%)
3. Special needs	- 1 (1.3%)	- 1 (1.3%)	- 0	- 0	- 0
Social Status:					
1. Single	- 39 (54.1%)	- 38 (50.6%)	- 3 (42.8%)	- 76 (68.4%)	- 98 (69.5%)
2. Married	- 26 (36.1%)	- 28 (37.3%)	- 4 (57.1%)	- 30 (27%)	- 33 (23.4%)
3. Divorced	- 5 (6.9%)	- 8 (10.6%)	- 0	- 5 (4.5%)	- 8 (5.6%)
4. Widowed	- 2 (2.7%)	- 1 (1.3%)	- 0	- 0	- 2 (1.4%)

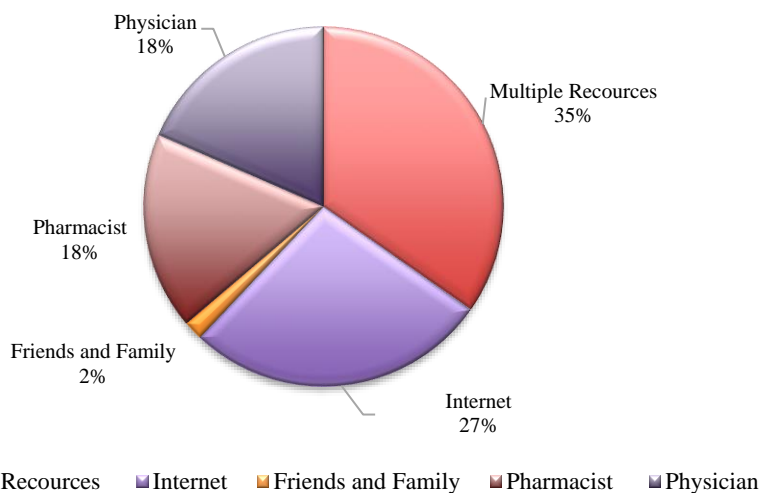


Figure 2. Information resources for medication knowledge for females in Saudi Arabia.

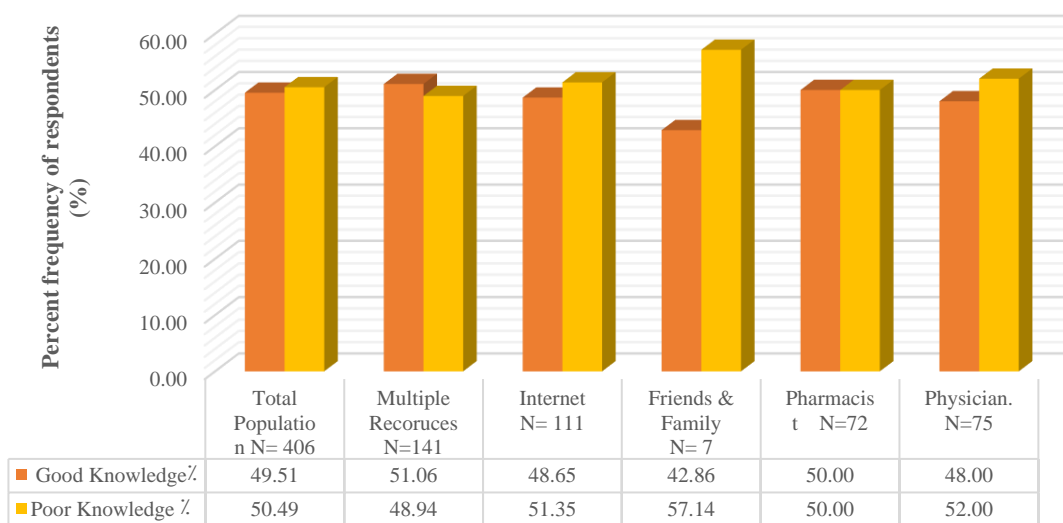


Figure 3. Percentage of good knowledge achieved for medication use.

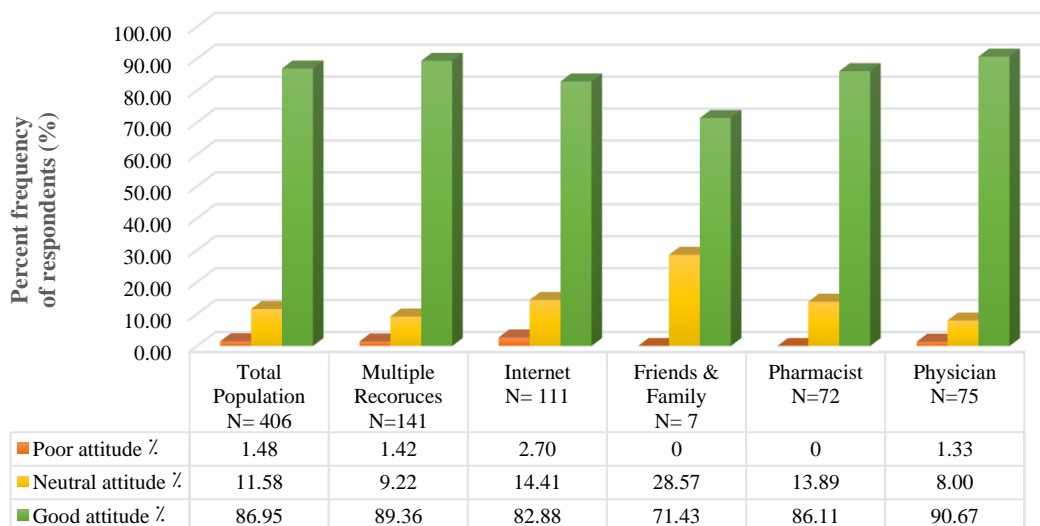


Figure 4. Attitude toward medication safety use among females in KSA.

Table 2. Recommendations suggested by participants (n = 86)

Recommendations	Number of Suggestion Repeated	Percentage %	Suggested Sectors Responsible for implementing this recommendation
<ul style="list-style-type: none"> ➤ Public Awareness: <ul style="list-style-type: none"> Suggesting: <ul style="list-style-type: none"> - Campaigns with the participation of public health sectors in malls hospitals and universities to educate the female community - Spread awareness about the danger of the side effects of medications misused - The downside of misusing without counseling a healthcare provider or a prescription 	36	41.86%	Ministry of Health Ministry of Education Ministry of Media Saudi Food and Drug Authority Saudi society of medication education
<ul style="list-style-type: none"> ➤ Penalty fees <ul style="list-style-type: none"> - Fraud - false advertising on social media - Raise prices 	3	3.48%	Ministry of Commerce and Investment Ministry of Health
<ul style="list-style-type: none"> ➤ Health Encyclopaedia ➤ Online accessible Medication counseling service 	5	5.81%	Ministry of Health Saudi food and drug authority King Abdullah Bin Abdulaziz Arabic Health Encyclopaedia
<ul style="list-style-type: none"> ➤ Force mandatory prescriptions especially for: <ul style="list-style-type: none"> - chronic illness medications - Cosmetics medication 	15	17.4%	Ministry of Health Saudi food and drug authority
<ul style="list-style-type: none"> ➤ Mandatory Prescriber Education <ul style="list-style-type: none"> - Give needed prescriptions only - Sufficient quantity and duration prescribed to each patient - Each medication sale linked with patient ID 	7	8.13%	Ministry of Health
<ul style="list-style-type: none"> ➤ Female-focused health education ➤ Especially for teens and young adults 	5	5.81%	Ministry of Education
<ul style="list-style-type: none"> ➤ Providing free medication consultation <ul style="list-style-type: none"> - of a healthcare practitioner 	10	11.6%	Ministry of Health
<ul style="list-style-type: none"> ➤ Social Media Awareness <ul style="list-style-type: none"> - Campaign through advertisement - Video and short documentary education about medication misuse 	5	5.81%	Ministry of Health Ministry of Education Ministry of Media Saudi Food and Drug Authority Saudi society of medication education

To our knowledge, this is the first study that focused on investigating the prevalence of medication misuse among the

female population exclusively. Our study findings support the importance of our research objectives. To compare each

information resource and respondents' knowledge concerning over-the-counter (OTC), prescription medications, addiction and abuse, opinions and beliefs, general knowledge, and prevalence of misuse.

Respondents got good knowledge concerning OTC medications from friends and family compared to respondents who got knowledge from pharmacists and physicians. As well, there was only one question concerning addiction & abuse. This indicates that there is no statistically significant difference between the two sources of knowledge on the OTC medication use and the prescribed medications use as the P value was above 0.05 (0.984). A similar thing applies to Opinions Believes, and General Knowledge questions.

This indicates the ignorance among females regarding the proper source for getting consultation concerning taking their medications, and that it is very uncommon that healthcare providers will be consulted on addiction and abuse of medications. This supported why those respondents depended on friends and family more than healthcare providers. So, we should think deeply and suggest recommendations on how to solve this issue. To suggest recommendations to enhance the good knowledge resources from healthcare providers rather than other unreliable resources.

After reviewing these findings, we concluded that some of the family and friends are healthcare providers "so they were selected by respondents as family and friends rather than healthcare providers; which could be because healthcare providers in the health facilities were not easily accessed during COVID-19 period. Instead, Family and friends were easily accessible.

Quarantine and crises created a major gap between patients and healthcare providers. These results emphasize the necessity for different sectors to take action and recommendations to minimize drug misuse by the female community. These sectors were mentioned by respondents in the last open question in the survey. Which could be Governmental, such as the Ministry of Health, Ministry of Education, and Ministry of Media or Healthcare providers, Patients themselves (**Table 2**).

Misuse can cause extreme consequences involving mortality, adverse drug reactions (ADRs), dependence, tolerance, resistance to antibiotics, and elevated healthcare utility [1, 24, 25]. In addition, the concern of misuse and abuse of medicinal drugs has emerged as a severe issue afflicting all countries, mainly to health, social, economic, and security [5, 26, 27].

However, Comparing the results of the present study with those in the literature is not accurate since studies differ in their definitions of medication misuse and the methodologies implied and many countries also differ in their cultures and health care systems. However, there is a general agreement among these studies that there is a high prevalence of medication misuse in the community especially in self-medication of analgesics among students of Health Sciences colleges [15], misuse of topical corticosteroids is prevalent among females [18], and antibiotic misuse among elderly [12, 21, 23].

Interestingly, a correlation was found between the level of education and age with the good knowledge and attitude on medication misuse. As agreed by other studies, the main reasons

behind that could be possibly because the Saudi youth is more educated and exposed to the mass media now which increased the habit of self-medication and in turn can lead to medication misuse, [17, 21] as well it was significantly was affected by nationality [22]. Although the robotic pharmacy solution under investigation proved to be quite successful, maintaining stock levels requires a strong upstream supply chain. To fully benefit from the automation solution, it was integrated with the facility's IT systems for appointment scheduling, medication records, and prescription preparation. lowering medication mistakes and increasing patient satisfaction overall [28, 29]. Some other studies, also showed that prescribed medicines information obtained from sources other than physicians were largely on analgesics (including narcotic analgesics), antibiotics, and antipyretics [1, 30, 31]. on the other hand, health staff were the least influential source of information about self-medication [32-35].

As suggested by earlier studies, drug regulatory authorities such as Saudi Food and Drug (SFDA) and the Ministry of Health should implement a system for controlling the dispensing patterns and attitudes in Saudi community pharmacies [14]. As it was suggested by our respondents (17.4%), placing prescription restrictions [16].

There are some limitations to this study. One major limitation of the present study was by use of an electronic self-administered questionnaire that may have a recall bias, which also, made it hard for us as researchers to reach all age categories especially elderly ones. Another, as a cross-sectional design, could only study medication misuse behavior and attitude at a particular point in time, and due to the COVID-19 period and the social distancing, it was not easy to reach all respondents in the community.

Conclusion

This study's main objectives were met as it showed a good attitude toward medication safety use with a lack of knowledge about medication among females in Saudi Arabia. Further investigations helped us to understand the prevalence of medication misuse among females in Saudi Arabia, the impact of different information resources in improving the safe use of medication, and to increase the level of knowledge and awareness on the proper use of medications and propose preventive measures. As it was found there is a great need to enhance patient education programs in the healthcare system and community. It was highly recommended by 41.86% of participants to implement public awareness by the Ministry of Health and other regulatory authorities in Saudi Arabia. For more stronger conclusion, we suggest further research to observe actual behavior with a study type that can follow up with female medication misuse and study their consumption behavior, knowledge, and attitude.

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Conflict of interest: None

Financial support: None

Ethics statement: The respondents have been signed a consent form to participate in the survey questionnaire and all data collected from the survey questionnaire are private information that is used for research purposes only, the IRB registration number: H-01-R-069.

References

- Tobaiqy M, Radwi M, Alhasan AH, Basaeed LF, Stewart D. General public's perspectives of issues relating to misuse of medicines: A cross-sectional survey in Jeddah, Saudi Arabia. *Int J Clin Pharm.* 2019;41(5):1148-51. doi:10.1007/s11096-019-00893-5
- Alqahtani SS. Community pharmacists' opinions towards poor prescription writing in Jazan, Saudi Arabia. *Healthcare (Basel).* 2021;9(8):1077. doi:10.3390/healthcare9081077
- AlKhamees OA, AlNemer KA, Bin Maneca MW, AlSugair FA, AlEnizi BH, Alharf AA. Top 10 most used drugs in the Kingdom of Saudi Arabia 2010-2015. *Saudi Pharm J.* 2018;26(2):211-6. doi:10.1016/j.jsps.2017.12.009
- National Institute on Drug Abuse. Summary of Misuse of Prescription Drugs. National Institute on Drug Abuse. 2023. [Online]. Available from: <https://nida.nih.gov/publications/research-reports/misuse-prescription-drugs/overview>
- Alshayban DM, Chacko RJ, Aljishi F, Lucca JM. Knowledge, perception, and practice of pharmacy professionals on drug misuse and abuse in eastern region of Saudi Arabia. *J Rep Pharm Sci.* 2020;9(1):86-91. doi:10.4103/jrptps.JRPTPS_34_19
- Aldayyen AM, Alwabari MA, Alhaddad F, Alhumaid MA, Alsuwailem N, Alanzi A, et al. Types, trends, and patterns of the reported antimicrobial errors to the eastern region's medical centers in Saudi Arabia: A cross-sectional study. *Saudi Pharm J.* 2023;31(4):569-77. doi:10.1016/j.jsps.2023.02.009
- Alshammari TM, Alenzi KA, Alatawi Y, Almordi AS, Altebainawi AF. Current situation of medication errors in Saudi Arabia: A nationwide observational study. *J Patient Saf.* 2022;18(2):e448-53. Available from: www.journalpatientsafety.com
- Almalki ZS, Alqahtani N, Salway NT, Alharbi MM, Alqahtani A, Alotaibi N, et al. Evaluation of medication error rates in Saudi Arabia: A protocol for systematic review and meta-analysis. *Medicine (Baltimore).* 2021;100(9):e24956. doi:10.1097/MD.00000000000024956
- Alshammari FM, Alanazi EJ, Alanazi AM, Alturifi AK, Alshammari TM. Medication error concept and reporting practices in Saudi Arabia: A multiregional study among healthcare professionals. *Risk Manag Healthc Policy.* 2021;14:2395-406. doi:10.2147/RMHP.S281154
- Al-Mutairi A, AlFayyad I, Altannir Y, Al-Tannir M. Medication safety knowledge, attitude, and practice among hospital pharmacists in tertiary care hospitals in Saudi Arabia: A multi-center study. *Arch Public Health.* 2021;79(1):130. doi:10.1186/s13690-021-00616-1
- Syed MH, Yasmeen A, Van Hout MC. Physician perspectives on codeine accessibility, patterns of use, misuse, and dependence in Saudi Arabia. *Int J Ment Health Addict.* 2023;21(3):1436-54. doi:10.1007/s11469-021-00670-4
- Khalifeh MM, Moore ND, Salameh PR. Self-medication misuse in the Middle East: A systematic literature review. *Pharmacol Res Perspect.* 2017;5(4):e00323. doi:10.1002/prp2.323
- Alyami MH, Naser AY, Alswar HS, Alyami HS, Alyami AH, Al Sulayyim HJ. Medication errors in Najran, Saudi Arabia: Reporting, responsibility, and characteristics: A cross-sectional study. *Saudi Pharm J.* 2022;30(4):329-36. doi:10.1016/j.jsps.2022.02.005
- Almalak H, Alkheib DA, Alsaleh HM, Khan TM, Hassali MA, Aljadhey H. Students' attitude toward use of over the counter medicines during exams in Saudi Arabia. *Saudi Pharm J.* 2014;22(2):107-12. doi:10.1016/J.JSPS.2013.02.004
- Al Essa M, Alshehri A, Alzahrani M, Bustami R, Adnan S, Alkeraidees A, et al. Practices, awareness and attitudes toward self-medication of analgesics among health sciences students in Riyadh, Saudi Arabia. *Saudi Pharm J.* 2019;27(2):235-9. doi:10.1016/j.jsps.2018.11.004
- Mobrad AM, Alghadeer S, Syed W, Al-Arifi MN, Azher A, Almetawazi MS, et al. Knowledge, attitudes, and beliefs regarding drug abuse and misuse among community pharmacists in Saudi Arabia. *Int J Environ Res Public Health.* 2020;17(4):1334. doi:10.3390/ijerph17041334
- Saquist N, Rajab AM, Saquist J, AlMazrou A. Substance use disorders in Saudi Arabia: A scoping review. *SATPP.* 2020;15:1-2. doi:10.1186/s13011-020-00285-3
- Khalifa AF, Alragas AM, Abohamad AS, Alharbi AA, Alruwaili HS, Alghamdi MM, et al. Topical corticosteroid misuse among females in Riyadh city. *Med Sci.* 2021;25(107):120-5.
- Alzahrani AS, Greenfield SM, Shrestha S, Paudyal V. Views of healthcare professionals on complementary and alternative medicine use by patients with diabetes: A qualitative study. *BMC Complement Med Ther.* 2024;24(1):81. doi:10.1186/s12906-024-04385-6
- Al-Ahmadi RF, Al-Juffali L, Al-Shanawani S, Ali S. Categorizing and understanding medication errors in hospital pharmacy in relation to human factors. *Saudi Pharm J.* 2020;28(12):1674-85. doi:10.1016/j.jsps.2020.10.014
- Bin Nafisah S, Bin Nafesa S, Alamery AH, Alhumaid MA, AlMuhaidib HM, Al-Eidan FA. Over-the-counter antibiotics in Saudi Arabia, an urgent call for policy makers.

- J Infect Public Health. 2017;10(5):522-6. doi:10.1016/j.jiph.2016.09.016
22. Alhomoud F, Almahasnah R, Alhomoud FK. You could lose when you misuse - factors affecting over-the-counter sale of antibiotics in community pharmacies in Saudi Arabia: A qualitative study. *BMC Health Serv Res.* 2018;18(1):915. doi:10.1186/s12913-018-3753-y
 23. Al-Qahtani MA, Amin HS, Al-Qahtani AA, Alshahrani AM, Alghamdi HA, Althwayee MS, et al. Self-medication with Antibiotics in a primary care setting in King Khalid University Hospital, Riyadh, Saudi Arabia. *J Family Community Med.* 2018;25(2):95-101. doi:10.4103/jfcm.jfcm_124_17
 24. Yasmeen A, Syed MH, Alqahtani SS, Kashan Syed N, Meraya AM, Wazaify M, et al. Suspected inappropriate use of prescription and non-prescription drugs among requesting customers: A Saudi community pharmacists' perspective. *Saudi Pharm J.* 2023;31(7):1254-64. doi:10.1016/j.jsps.2023.05.009
 25. Altyar A, Sadoun SA, Aljohani SS, Alradadi RS. Evaluating pharmacy practice in hospital settings in Jeddah City, Saudi Arabia: Dispensing and Administration-2019. *Hosp Pharm.* 2022;57(1):32-7. doi:10.1177/0018578720970470
 26. Alanazi SA, Al Amri A, Almuqbil M, Alroumi A, Gamal Mohamed Alahmadi M, Obaid Ayesh Alotaibi J, et al. Use of potentially inappropriate medication for elderly patients in tertiary care hospital of Riyadh, Saudi Arabia. *Saudi Pharm J.* 2024;32(4):102015. doi:10.1016/j.jsps.2024.102015
 27. Parentela GM. Mental health research studies in Saudi Arabia for the years 2009-2019; A systematic scoping review. *Arch Psychiatr Nurs.* 2021;35(2):232-41. doi:10.1016/j.apnu.2021.01.001
 28. Momattin H, Arafa S, Momattin S, Rahal R, Waterson J. Robotic pharmacy implementation and outcomes in Saudi Arabia: A 21-month usability study. *JMIR Hum Factors.* 2021;8(3):e28381. doi:10.2196/28381
 29. Pertheban T, Arokiasamy L. The relationship between supply chain resilience elements and organisational performance: The mediating role of supply chain ambidexterity. *Glob Bus Manag Res.* 2019;11(1). Available from: <https://www.proquest.com/docview/2236131523/9E058307C1614223PQ/2?accountid=142908&sourcetype=Scholarly%20Journals>
 30. Algabbani AM, Alzahrani KA, Sayed SK, Alrasheed M, Sorani D, Almohammed OA, et al. The impact of using pictorial aids in caregivers' understanding of patient information leaflets of pediatric pain medications: A quasi-experimental study. *Saudi Pharm J.* 2022;30(5):544-54. doi:10.1016/j.jsps.2022.02.017
 31. Egunsola O, Ali S, Al-Dossari DS, Alnajrani RH. A retrospective study of pediatric medication errors in Saudi Arabia. *Hosp Pharm.* 2021;56(3):172-7. doi:10.1177/0018578719882318
 32. Kentab BY, Barry HE, Al-Aqeel SA, Hughes CM. Improving medication dispensing and counselling for patients with vision impairment: A qualitative study of pharmacist-reported barriers and facilitators. *BMC Health Serv Res.* 2024;24(1):534. doi:10.1186/s12913-024-11009-9
 33. Aljuaid M, Alajman N, Alsafadi A, Alnajjar F, Alshaikh M. Medication error during the day and night shift on weekdays and weekends: A single teaching hospital experience in Riyadh, Saudi Arabia. *Risk Manag Healthc Policy.* 2021;14:2571-8. doi:10.2147/RMHP.S311638
 34. Alghanim SA. Self-medication practice among patients in a public health care system. *East Mediterr Health J.* 2011;17(5):409-16. doi:10.26719/2011.17.5.409
 35. National Institute on Drug Abuse. Misuse of Prescription Drugs Research Report. National Institute on Drug Abuse. 2020:1-29.