

## KNOWLEDGE, ATTITUDE, PRACTICE REGARDING OVER-THE-COUNTER (OTC) DRUGS MISUSE AMONG THE POPULATION IN SAUDI ARABIA

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### Abstract

**Background:** Over-the-counter (OTC) drugs are commonly used for self-medication, often leading to risks associated with misuse. In Saudi Arabia, rates of self-medication among the population are reported between 35% and 97.8%. **Objective:** This study aimed to assess the knowledge, attitudes, and practices regarding OTC drug misuse among the Saudi Arabian population, providing insights relevant to public health and education. **Methods:** A cross-sectional study was conducted in 2024 using an electronic survey that gathered data from 962 participants aged 18 and older across Saudi Arabia. The survey comprised 33 questions divided into four sections covering demographic information, knowledge about OTC drug safety, attitudes towards self-medication, and actual practices regarding drug use. **Results:** The mean age of participants was 34.5 years, with 65.7% being female. Approximately 58.2% engaged in self-medication, predicated more on personal judgment than professional advice. While 82.8% acknowledged that all medications could lead to side effects, 42.4% were unaware that self-medication might mask disease symptoms. The study revealed a significant skepticism toward the universal safety of OTC medications, with 64.9% expressing concerns. Notably, only 6.2% exhibited high adherence to recommended guidelines for OTC use, illustrating a pronounced gap in the practice versus knowledge. **Conclusion:** The findings indicate a high prevalence of self-medication and significant awareness of potential risks among Saudi Arabian individuals. Despite high levels of knowledge, poor adherence to safe practices was alarming, highlighting the urgent need for targeted educational initiatives to enhance understanding and responsible use of OTC drugs. This research underscores the necessity for public health interventions to address the gaps in knowledge and promote safer self-medication practices in the Saudi population.

**Keywords:** Knowledge, attitude, practice, over-the-counter drugs, Saudi Arabia.

**Introduction:**

Over-the-counter (OTC) medicine is more frequent than prescription drug use globally [1]. All medications legally accessible for purchase without requiring a prescription from an authorized medical professional are referred to as non-prescription drugs or OTC medications. OTC medications are typically used to treat illnesses that require no close monitoring or medical attention [2].

There have been reports of an increase in OTC drug self-medication worldwide [3]. Patients frequently underestimate the possible risks of easily acquired over-the-counter drugs because they believe them to be not harmful [4]. The frequency of SM in Arab nations, including Saudi Arabia, varies from 35% to 92% [5]. An even more significant finding was shown by a Kuwaiti study that indicated 97.8% of people self-medicated [6].

A study was carried out locally to determine the prevalence of non-prescription drugs use in a population sample of 306 individuals in Al Madina city, as well as the impact this practice has on the quality of healthcare in Saudi Arabia. There was no discernible difference between the proportions of men and women who reported using non-prescription drug (72.5%) and those who reported experiencing adverse effects (24.3%). Analgesics were the most commonly prescribed class of drugs [7]. A study conducted in Saudi Arabia (SA) found that 81.3% of participants utilized self-medication; of those, 11.47% had negative side effects and problems [8]. According to a study measuring the prevalence of OTC pharmaceutical misuse among Saudi female university students, the lifetime prevalence of misuse was found to be 29.1%; the most commonly misused medications were diphenhydramine and paracetamol, with the primary claimed causes being pain alleviation and inducing sleep [9].

Because of a shortage of relevant investigations in these specific areas, statistics are currently inadequate. There is a lack of research on the experiences and opinions of Saudi community pharmacists regarding inappropriate prescription and over-the-counter drug usage. The study intends to assess knowledge, attitude and practice level of OTC drugs in the population of Saudi Arabia.

**Materials and Methods:****Study design:**

This cross-sectional study was conducted by Saudi Arabian individuals in 2024 using an electronic survey to obtain data on practices, knowledge, and attitudes related to over-the-counter medications misuse in KSA. Men and women in Saudi Arabia's general population who were willing to participate in the study and who were at least 18 years old were included.

**Sample size:**

From July 2024 to December 2024 was the beginning of data collection. Data collection involved a target sample of 384 patients (confidence level: 95%; margin of error: 5%). The sample size was estimated using the formula:

$n = P(1-P) * Z^2 / d^2$  with a 95% confidence level.

n: Calculated sample size.

Z: The z-value for the selected level of confidence  $(1 - \alpha) = 1.96$ .

P: An estimated prevalence of knowledge.

Q:  $(1 - 0.50) = 50\%$ , i.e., 0.50.

D: The maximum acceptable error = 0.05.

Therefore, the calculated minimum sample size was:  $n = (1.96)^2 \times 0.50 \times 0.50 / (0.05)^2 = 384$ .

**Method for data collection and instrument (Data collection Technique and Tools):**

An organized survey was employed as a research instrument. This instrument was employed from a recent Saudi Arabian study [8,10–12]

The final version of the questionnaire consisted of 33 with 4 sections. Section 1, starts with a brief description of the demographic characteristics of respondents' variables. Section 2, Respondents' Knowledge About the Safety and Use of OTC. Section 3. Assessment of people's attitudes about self-medication. 4. Practices of the population on self-medication.

**Scoring system:**

Overall, 33 statements were used to assess the level of knowledge, attitude, and practice. 10 statements for demographics, 6 for knowledge, 6 for attitude, and 11 for practices. One point is given for the correct answer, and zero points are given for the incorrect answer, or I don't know." For scoring, we utilized Likert scales (dichotomous, three-point, and quality scales). The maximum score was 37 and divided as follows: the original Blooms cut-off points were 80.0%-100.0%, 60.0%-79%, and 59.0%. The participants divided into three groups based on their score.

**Knowledge score:**

Varied from 0 to 6 points and was classified into three level as follows: those with score of 3 or below ( $\leq 3$ ) were classified having a low level of knowledge. Those with score 4 as having a moderate level of knowledge .and those with scores 5 or above ( $\geq 5$ ) as a high level of knowledge.

**Attitude score:**

Varied from 0 to 6 points and was classified into three level as follows: those with score of 3 or below ( $\leq 3$ ) were classified having a low level of Attitude. those with score 4 as having a moderate level of Attitude .and those with scores 5 or above ( $\geq 5$ ) as a high level of Attitude.

**Practice score:**

Varied from 0 to 20 points and was classified into three level as follows: those with score of 12 or below ( $\leq 12$ ) were classified having a low level of Practice. those with score between 13-15 as having a moderate level of Practice. And those with scores 16 or above ( $\geq 16$ ) as a high level of Practice.

**Pilot test:**

We requested twenty people to complete the questionnaire after it was given to them. In order to assess the feasibility of the study and the ease of use of the questionnaire, this was done. The final data of the study did not include the data from the pilot trial.

**Analyzes and entry method:**

The data was inputted into the computer using the "Microsoft Office Excel Software" Windows (2021). Data was then transferred to the Statistical Package of Social Science Software (SPSS) application, version 20 (IBM SPSS Statistics for Microsoft Windows, Version 21.0.) to be statistically analyzed.

**Results:**

Table (1) displays various demographic parameters of the participants with a total number of (962). The age distribution is relatively diverse with a mean age of 34.5 (sd = 14.1), with 19.0 % falling within the 29 - 40 years group. There is a skew to gender with females predominating at 65.7%; Date's analysis

suggests that the demographic potential also lags. The largest share (42.8%) of the participants is in the Southern region, and the Central region (25.2%) corresponds to the geographic regional difference. Interestingly, the response shows that most respondents (50.2 %) are married, while a significant percentage have remained single (45.3%). Most educational attainment is at the bachelor's degree level (63.8%), and while only a tiny proportion has postgraduate qualifications (8.8%), they seem to be educated. Both occupationally and students form by far the greatest group (38.6 per cent, resp.), and a large part (30.7 per cent) are students. In terms of income distribution there is a duality of 34.1% earning more than 10,000 SAR and the same proportion (33.6%) with an income of less than 1,000 SAR showing inequity. In addition, 27.8% of participants report chronic diseases, particularly diabetes mellitus, the most common (21.0%).

**Table (1): Sociodemographic characteristics of participants (n=962)**

| <b>Parameter</b>                      |                     | <b>No.</b> | <b>Percent (%)</b> |
|---------------------------------------|---------------------|------------|--------------------|
| <b>Age</b><br>(Mean: 34.5, STD: 14.1) | Less than 21 years  | 132        | 13.7               |
|                                       | 21 to 23            | 176        | 18.3               |
|                                       | 24 to 28            | 155        | 16.1               |
|                                       | 29 to 40            | 183        | 19.0               |
|                                       | 41 to 50            | 162        | 16.8               |
|                                       | more than 50        | 154        | 16.0               |
| <b>Gender</b>                         | Female              | 632        | 65.7               |
|                                       | Male                | 330        | 34.3               |
| <b>Residential region</b>             | Northern region     | 35         | 3.6                |
|                                       | Southern region     | 412        | 42.8               |
|                                       | Central region      | 242        | 25.2               |
|                                       | Eastern region      | 70         | 7.3                |
|                                       | Western region      | 203        | 21.1               |
| <b>Marital status</b>                 | Single              | 436        | 45.3               |
|                                       | Married             | 483        | 50.2               |
|                                       | Divorced            | 29         | 3.0                |
|                                       | Widowed             | 14         | 1.5                |
| <b>Educational level</b>              | Primary school      | 4          | .4                 |
|                                       | Middle school       | 10         | 1.0                |
|                                       | High school         | 152        | 15.8               |
|                                       | Diploma             | 95         | 9.9                |
|                                       | Bachelor's degree   | 614        | 63.8               |
|                                       | Postgraduate degree | 85         | 8.8                |
|                                       | Uneducated          | 2          | .2                 |
| <b>Occupational status</b>            | Student             | 295        | 30.7               |
|                                       | Employee            | 371        | 38.6               |
|                                       | Unemployed          | 190        | 19.8               |
|                                       | Retired             | 106        | 11.0               |
| <b>Nationality</b>                    | Saudi               | 922        | 95.8               |
|                                       | Non-Saudi           | 40         | 4.2                |
| <b>Monthly income in SAR</b>          | Less than 1000      | 323        | 33.6               |

|                                          |                                 |     |      |
|------------------------------------------|---------------------------------|-----|------|
|                                          | 1000 to 3000                    | 122 | 12.7 |
|                                          | 3001 to 7000                    | 78  | 8.1  |
|                                          | 7000 to 10000                   | 111 | 11.5 |
|                                          | More than 10000                 | 328 | 34.1 |
| <b>Chronic diseases</b>                  | No                              | 695 | 72.2 |
|                                          | Yes                             | 267 | 27.8 |
| <b>If yes, state the disease (n=267)</b> | Respiratory diseases            | 25  | 9.4  |
|                                          | Hypertension and heart diseases | 38  | 14.2 |
|                                          | Liver diseases                  | 2   | 0.7  |
|                                          | Renal diseases                  | 4   | 1.5  |
|                                          | Diabetes mellitus               | 56  | 21.0 |
|                                          | Others                          | 142 | 53.2 |

As shown in figure 1, A substantial majority, 58.3%, in positive with the fact that 560 people affirmatively engage in self-medication which indicates a common practice which may reflect a growing penchant to self-medication as opposed to following professional medical advice. On the other hand, 28.9 percent (278 respondents), all deny having taken part in participating in self-medication, thus raising concerns about the impact of this on public safety and education of hygiene. Additionally, 12.9% (124) remain uncertain regarding their practices.

**Figure (1): Illustrates self-medication definition among participants.**

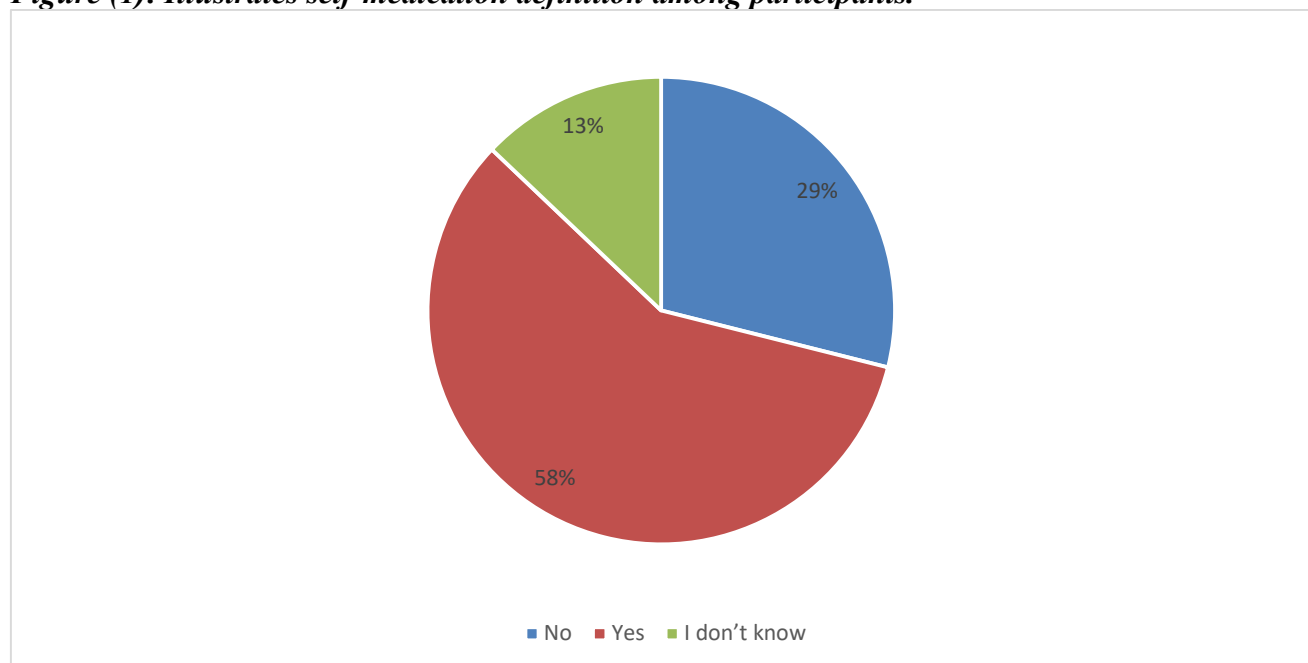


Table (2) shows important insights into the knowledge and perceptions around over the counter (OTC) drug misuse that feedback from a cohort of 962 respondents presents data in Table 2. More notably, a large majority, 58.2, follow in the practice of the self-medication, which means a broad trust in personal judgment rather than that of a professional medical advice. This inclination is tempered by great awareness of dangers inherent to medications, as shown by 82.8 percent agreeing that all medications

can cause side effects and 89.7 percent aware of risk in changing dosage without the advice of healthcare professional. The data also shows a very strong consensus around the need to report adverse reactions, with 93.1 percent agreeing to do so. But worryingly, many of these (around 42.4 percent) were unaware that self-medication can mask disease symptoms.

**Table (2): Parameters related to knowledge regarding over the counter (OTC) drugs misuse (n=962).**

| <b>Parameter</b>                                                                                                       |              | <b>No.</b> | <b>Percent (%)</b> |
|------------------------------------------------------------------------------------------------------------------------|--------------|------------|--------------------|
| <b><i>Self-medication is the practice of using medication on oneself without a doctor's instructions?</i></b>          | No           | 278        | 28.9               |
|                                                                                                                        | Yes          | 560        | 58.2               |
|                                                                                                                        | I don't know | 124        | 12.9               |
| <b><i>Do all medications, whether prescribed or over the counter, have side effects?</i></b>                           | No           | 92         | 9.6                |
|                                                                                                                        | Yes          | 797        | 82.8               |
|                                                                                                                        | I don't know | 73         | 7.6                |
| <b><i>Do you think that changing a medication's dosage without talking to a doctor or pharmacist is dangerous?</i></b> | No           | 49         | 5.1                |
|                                                                                                                        | Yes          | 863        | 89.7               |
|                                                                                                                        | I don't know | 50         | 5.2                |
| <b><i>If there any adverse reactions, you should inform your doctor or pharmacist?</i></b>                             | No           | 20         | 2.1                |
|                                                                                                                        | Yes          | 896        | 93.1               |
|                                                                                                                        | I don't know | 46         | 4.8                |
| <b><i>Using medications containing unknown substances in people with liver and kidney problems is harmful?</i></b>     | No           | 47         | 4.9                |
|                                                                                                                        | Yes          | 810        | 84.2               |
|                                                                                                                        | I don't know | 105        | 10.9               |
| <b><i>Certain diseases' alert signs and symptoms can be masked by self-medication?</i></b>                             | No           | 408        | 42.4               |
|                                                                                                                        | Yes          | 218        | 22.7               |
|                                                                                                                        | I don't know | 336        | 34.9               |

As shown in figure (2), Of 962 people sampled, a majority of people (6 of 962, 65%) agreed that OTC medications are not safe and effective. For comparison, however, only 21.8 percent (210 participants) affirmed safety and effectiveness, 13.3 percent (128 individuals) claimed uncertainty, and 11.3 percent (92 individuals) hadn't yet formed an impression.

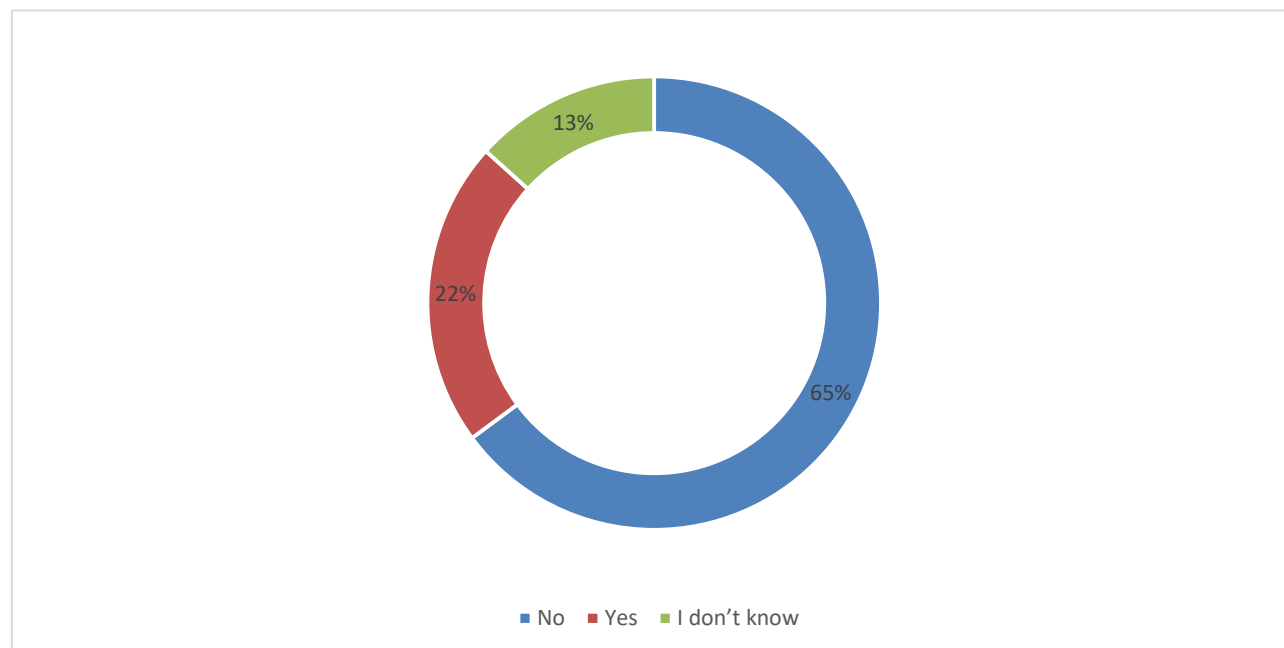
**Figure (2): Illustrates safety and efficacy of OTC medications according to participants.**

Table 3 contains data which suggests some interesting angles to participants attitudes towards the misuse of over the counter (OTC) drugs and focuses on important considerations in the safety, understanding, and responsible use of medications. However, over 64.9% of them do not feel that OTC medications are universally safe and effective, implying that they have a certain level of skepticism and that they might engage in such cautious OTC consumption as might be expected. Additionally, 82.7% state that a fundamental knowledge about drug action is needed to order self-medication, confirming that education is a key to prevent misusing. The high 80 percent disapproval of OTC medication sharing endorses an understanding of the risks of shared use. They are also aware of the requirements of the prescription, with 79.8% saying they know what these prescriptions are used for and only 61% are aware of how much they should take and what could be the adverse effects of their nonprescription medications. Finally, the level of individuals (71.7 percent) who relay additional prescriptions to pharmacists is responsible in the manner of the medication management that clearly shows the inclination to take proactive health care steps.

**Table (3): participants attitude regarding over the counter (OTC) drugs misuse (n=962).**

| Parameter                                                                                                      |              | No. | Percent (%) |
|----------------------------------------------------------------------------------------------------------------|--------------|-----|-------------|
| <i>Are OTC medications all safe and effective in your opinion?</i>                                             | No           | 624 | 64.9        |
|                                                                                                                | Yes          | 210 | 21.8        |
|                                                                                                                | I don't know | 128 | 13.3        |
| <i>Do you believe that in order to self-medicate, a fundamental understanding of drug action is necessary?</i> | No           | 85  | 8.8         |
|                                                                                                                | Yes          | 796 | 82.7        |
|                                                                                                                | I don't know | 81  | 8.4         |
| <i>Is it appropriate to share over-the-counter medications</i>                                                 | No           | 770 | 80.0        |

|                                                                                                                                        |              |     |      |
|----------------------------------------------------------------------------------------------------------------------------------------|--------------|-----|------|
| <i>with others?</i>                                                                                                                    | Yes          | 135 | 14.0 |
|                                                                                                                                        | I don't know | 57  | 5.9  |
| <i>Are you aware of the prescription needed for the medication you recently got?</i>                                                   | No           | 117 | 12.2 |
|                                                                                                                                        | Yes          | 768 | 79.8 |
|                                                                                                                                        | I don't know | 77  | 8.0  |
| <i>Are you aware of the dosage, administration method, and any adverse reactions of the medication you got without a prescription?</i> | No           | 274 | 28.5 |
|                                                                                                                                        | Yes          | 584 | 60.7 |
|                                                                                                                                        | I don't know | 104 | 10.8 |
| <i>Do you tell the pharmacist know about any additional prescriptions you take at home when you get a drug without a prescription?</i> | No           | 197 | 20.5 |
|                                                                                                                                        | Yes          | 690 | 71.7 |
|                                                                                                                                        | I don't know | 75  | 7.8  |

Table 4 offers great insights into the practice of over-the-counter drug misuse among participants and regarding prevalence and risk of self-medication. Notably, 57.3% respondents report self-medication over recent six months, and almost half (52.7%) purchased medication from pharmacies without prescriptions at least once. OTC medications in this study were most common and while this type of medication is essential for managing pain, its misuse and dependency is a troublesome trend that should be addressed. Moreover, while large 62.5 of participants agreed that certain medications required prescriptions, 22.6 of respondents were even unaware, signalling a gap in the public's knowledge of drug regulations. The data also shows a reliance on pharmacies acting as the primary source for self-medication, with 93 per cent of participants purchasing medications via this channel.

**Table (4): participants' practice regarding over the counter (OTC) drugs misuse (n=962).**

| <i>Parameter</i>                                                                                                                       |                           | <i>No.</i> | <i>Percent (%)</i> |
|----------------------------------------------------------------------------------------------------------------------------------------|---------------------------|------------|--------------------|
| <i>In the past six months, have you used self-medication?</i>                                                                          | No                        | 411        | 42.7               |
|                                                                                                                                        | Yes                       | 551        | 57.3               |
| <i>In the past six months, how frequently often did you go to the pharmacy to buy medications for yourself without a prescription?</i> | 1                         | 507        | 52.7               |
|                                                                                                                                        | 2                         | 260        | 27.0               |
|                                                                                                                                        | ≥3                        | 195        | 20.3               |
|                                                                                                                                        |                           |            |                    |
| <i>In the past six months, which medication did you take without a prescription? *</i>                                                 | Painkillers               | 711        | 73.9               |
|                                                                                                                                        | Antibiotics               | 99         | 10.3               |
|                                                                                                                                        | Antipyretics              | 292        | 30.4               |
|                                                                                                                                        | Antihistamines            | 75         | 7.8                |
|                                                                                                                                        | Cold and flu preparations | 212        | 22.0               |
|                                                                                                                                        | Antiacid drugs            | 139        | 14.4               |
|                                                                                                                                        | Others                    | 95         | 9.9                |
|                                                                                                                                        | None                      | 113        | 11.7               |
| <i>In the past six months, what indication have you taken over-the-counter drugs for? *</i>                                            | Headache                  | 596        | 62.0               |
|                                                                                                                                        | Common cold               | 415        | 43.1               |
|                                                                                                                                        | Fever                     | 260        | 27.0               |
|                                                                                                                                        | Allergy                   | 210        | 21.8               |
|                                                                                                                                        | Digestive system disorder | 160        | 16.6               |
|                                                                                                                                        | Acne/skin diseases        | 76         | 7.9                |

|                                                                                                                      |                                                  |     |      |
|----------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|-----|------|
|                                                                                                                      | Menstrual problems                               | 188 | 19.5 |
|                                                                                                                      | Other                                            | 76  | 7.9  |
|                                                                                                                      | None                                             | 121 | 12.6 |
| <i>Are you know if the medications you use need a prescription?</i>                                                  | No                                               | 217 | 22.6 |
|                                                                                                                      | Yes                                              | 601 | 62.5 |
|                                                                                                                      | I don't know                                     | 144 | 15.0 |
| <i>Where do you get your knowledge about taking medication on your own?</i>                                          | Relatives                                        | 97  | 10.1 |
|                                                                                                                      | Friends                                          | 28  | 2.9  |
|                                                                                                                      | Internet                                         | 204 | 21.2 |
|                                                                                                                      | Television                                       | 3   | .3   |
|                                                                                                                      | Advised by doctors but sold without prescription | 175 | 18.2 |
|                                                                                                                      | Pharmacist                                       | 455 | 47.3 |
| <i>Are you aware of any potential adverse reactions from the medication you have been using for self-medication?</i> | No                                               | 263 | 27.3 |
|                                                                                                                      | Yes                                              | 536 | 55.7 |
|                                                                                                                      | I don't know                                     | 163 | 16.9 |
| <i>If you decide to self-medicate, where do you get the medication?</i>                                              | Pharmacy                                         | 895 | 93.0 |
|                                                                                                                      | Street market                                    | 10  | 1.0  |
|                                                                                                                      | Herbal store                                     | 34  | 3.5  |
|                                                                                                                      | Friend                                           | 23  | 2.4  |
| <i>What is the main reason for your self-medication? *</i>                                                           | To save money                                    | 126 | 13.1 |
|                                                                                                                      | To save time                                     | 498 | 51.7 |
|                                                                                                                      | Privacy Urgency                                  | 72  | 7.5  |
|                                                                                                                      | No healthcare facility nearby                    | 95  | 9.9  |
|                                                                                                                      | Health problem not serious                       | 547 | 56.9 |
|                                                                                                                      | Embarrassed of discussing own symptom.           | 68  | 7.1  |
| <i>Have you experienced the adverse effects of self-medication?</i>                                                  | No                                               | 758 | 78.8 |
|                                                                                                                      | Yes                                              | 204 | 21.2 |
| <i>If yes what was it? * (n=204)</i>                                                                                 | Drug side effects                                | 99  | 48.5 |
|                                                                                                                      | Disease recurrence                               | 64  | 31.4 |
|                                                                                                                      | Development of drug resistance                   | 42  | 20.6 |
|                                                                                                                      | Drug-drug interactions                           | 42  | 20.6 |

*\*Results may overlap*

Table 5 presents some of the data on the varying levels of knowledge about misuse of over the counter (OTC) drugs among the surveyed population. 49.0% of respondents (reported 48.8%) possessed a high knowledge, noting a great understanding of the risk OTC drug misuse, as nearly half of respondents had a high level of knowledge. On the flip side, the results show that 31.4 per cent enjoyed a moderate level of knowledge, while 19.6 per cent understand of a low degree.

**Table (5): Shows knowledge regarding over the counter (OTC) drugs misuse score results.**

|                          | Frequency | Percent |
|--------------------------|-----------|---------|
| High Level of knowledge  | 471       | 49.0    |
| Moderate knowledge level | 302       | 31.4    |
| Low knowledge level      | 189       | 19.6    |
| Total                    | 962       | 100.0   |

Table 6 presents the data showing insights into how the population surveyed felt about over the counter (OTC) drugs being used in ways they should not be. Of note, a large proportion of these (55.4%) express high levels of concern with regards to potential misuse of OTC drugs via inducing a feeling of high while likely unaware of how dangerous it can be. On the other side, 23.4% of respondents showed a moderate attitude which may mean that some of the issues are understood or recognized, others are not. A minority of only 21.2% showed a very low level of concern, perhaps because they did not know or because they were too much in the dark about the consequences of misuse.

**Table (6): Shows attitude regarding over the counter (OTC) drugs misuse score results.**

|                        | Frequency | Percent |
|------------------------|-----------|---------|
| High level of attitude | 533       | 55.4    |
| Moderate attitude      | 225       | 23.4    |
| Low attitude           | 204       | 21.2    |
| Total                  | 962       | 100.0   |

The data in Table 7 presents a full picture of the over the counter (OTC) drug misuse practice levels found in the dataset and exposes some concerning trends. Results show significant gap in awareness or adherence to recommended guideline because 93.3% of the participants demonstrated low level of practice concerning OTC drug misuse. However, not only do only 6.2% of people show moderate practice, but only 0.4% manage a high level of practice.

**Table (7): Shows practice regarding over the counter (OTC) drugs misuse score results.**

|                        | Frequency | Percent |
|------------------------|-----------|---------|
| High level of practice | 4         | .4      |
| Moderate practice      | 60        | 6.2     |
| Low practice level     | 898       | 93.3    |
| Total                  | 962       | 100.0   |

Table (8) shows that knowledge level regarding over the counter (OTC) drugs has statistically significant relation to age (P value=0.0001), marital status (P value=0.004), educational level (P value=0.007), and nationality (P value=0.038). It also shows statistically insignificant relation to gender, residential region, occupational status, monthly income and chronic diseases.

**Table (8): Relation between knowledge level regarding over the counter (OTC) drugs and sociodemographic characteristics.**

| <b>Parameters</b>             |                       | <b>Level of knowledge</b>          |                                      | <b>Total<br/>(N=962)</b> | <b>P<br/>value*</b> |
|-------------------------------|-----------------------|------------------------------------|--------------------------------------|--------------------------|---------------------|
|                               |                       | <b>High Level of<br/>knowledge</b> | <b>Moderate or low<br/>knowledge</b> |                          |                     |
| <b>Gender</b>                 | Female                | 313                                | 319                                  | 632                      | 0.628               |
|                               |                       | 66.5%                              | 65.0%                                | 65.7%                    |                     |
|                               | Male                  | 158                                | 172                                  | 330                      |                     |
|                               |                       | 33.5%                              | 35.0%                                | 34.3%                    |                     |
| <b>Age</b>                    | Less than 21<br>years | 41                                 | 91                                   | 132                      | 0.0001              |
|                               |                       | 8.7%                               | 18.5%                                | 13.7%                    |                     |
|                               | 21 to 23              | 91                                 | 85                                   | 176                      |                     |
|                               |                       | 19.3%                              | 17.3%                                | 18.3%                    |                     |
|                               | 24 to 28              | 71                                 | 84                                   | 155                      |                     |
|                               |                       | 15.1%                              | 17.1%                                | 16.1%                    |                     |
|                               | 29 to 40              | 99                                 | 84                                   | 183                      |                     |
|                               |                       | 21.0%                              | 17.1%                                | 19.0%                    |                     |
|                               | 41 to 50              | 99                                 | 63                                   | 162                      |                     |
|                               |                       | 21.0%                              | 12.8%                                | 16.8%                    |                     |
|                               | more than 50          | 70                                 | 84                                   | 154                      |                     |
|                               |                       | 14.9%                              | 17.1%                                | 16.0%                    |                     |
| <b>Residential<br/>region</b> | Northern<br>region    | 12                                 | 23                                   | 35                       | 0.112               |
|                               |                       | 2.5%                               | 4.7%                                 | 3.6%                     |                     |
|                               | Southern<br>region    | 203                                | 209                                  | 412                      |                     |
|                               |                       | 43.1%                              | 42.6%                                | 42.8%                    |                     |
|                               | Central region        | 118                                | 124                                  | 242                      |                     |
|                               |                       | 25.1%                              | 25.3%                                | 25.2%                    |                     |
|                               | Eastern region        | 28                                 | 42                                   | 70                       |                     |
|                               |                       | 5.9%                               | 8.6%                                 | 7.3%                     |                     |
|                               | Western region        | 110                                | 93                                   | 203                      |                     |
|                               |                       | 23.4%                              | 18.9%                                | 21.1%                    |                     |
| <b>Marital status</b>         | Single                | 192                                | 244                                  | 436                      | 0.004               |
|                               |                       | 40.8%                              | 49.7%                                | 45.3%                    |                     |
|                               | Married               | 260                                | 223                                  | 483                      |                     |
|                               |                       | 55.2%                              | 45.4%                                | 50.2%                    |                     |
|                               | Divorced              | 16                                 | 13                                   | 29                       |                     |
|                               |                       | 3.4%                               | 2.6%                                 | 3.0%                     |                     |
|                               | Widowed               | 3                                  | 11                                   | 14                       |                     |
|                               |                       | 0.6%                               | 2.2%                                 | 1.5%                     |                     |
| <b>Educational level</b>      | Primary school        | 1                                  | 3                                    | 4                        | 0.007               |
|                               |                       | 0.2%                               | 0.6%                                 | 0.4%                     |                     |
|                               | Middle school         | 3                                  | 7                                    | 10                       |                     |
|                               |                       | 0.6%                               | 1.4%                                 | 1.0%                     |                     |
|                               | High school           | 63                                 | 89                                   | 152                      |                     |
|                               |                       |                                    |                                      |                          |                     |

|                              |                   |       |       |       |       |
|------------------------------|-------------------|-------|-------|-------|-------|
|                              |                   | 13.4% | 18.1% | 15.8% |       |
|                              |                   | 45    | 50    | 95    |       |
|                              | Diploma           | 9.6%  | 10.2% | 9.9%  |       |
|                              | Bachelor's degree | 303   | 311   | 614   |       |
|                              |                   | 64.3% | 63.3% | 63.8% |       |
|                              | Postgraduate      | 56    | 29    | 85    |       |
|                              |                   | 11.9% | 5.9%  | 8.8%  |       |
|                              | Uneducated        | 0     | 2     | 2     |       |
| <b>Occupational status</b>   | Student           | 134   | 161   | 295   | 0.137 |
|                              |                   | 28.5% | 32.8% | 30.7% |       |
|                              | Employee          | 195   | 176   | 371   |       |
|                              |                   | 41.4% | 35.8% | 38.6% |       |
|                              | Unemployed        | 97    | 93    | 190   |       |
|                              |                   | 20.6% | 18.9% | 19.8% |       |
|                              | Retired           | 45    | 61    | 106   |       |
|                              |                   | 9.6%  | 12.4% | 11.0% |       |
| <b>Nationality</b>           | Saudi             | 445   | 477   | 922   | 0.038 |
|                              |                   | 94.5% | 97.1% | 95.8% |       |
|                              | Non-Saudi         | 26    | 14    | 40    |       |
|                              |                   | 5.5%  | 2.9%  | 4.2%  |       |
| <b>Monthly income in SAR</b> | Less than 1000    | 145   | 178   | 323   | 0.168 |
|                              |                   | 30.8% | 36.3% | 33.6% |       |
|                              | 1000 to 3000      | 57    | 65    | 122   |       |
|                              |                   | 12.1% | 13.2% | 12.7% |       |
|                              | 3001 to 7000      | 35    | 43    | 78    |       |
|                              |                   | 7.4%  | 8.8%  | 8.1%  |       |
|                              | 7001 to 10000     | 57    | 54    | 111   |       |
|                              |                   | 12.1% | 11.0% | 11.5% |       |
| <b>Chronic disease</b>       | No                | 177   | 151   | 328   | 0.209 |
|                              |                   | 37.6% | 30.8% | 34.1% |       |
|                              | Yes               | 122   | 145   | 267   |       |
|                              |                   | 25.9% | 29.5% | 27.8% |       |

**\*P value was considered significant if  $\leq 0.05$ .**

Table (9) shows attitude level regarding over the counter (OTC) drugs has statistically significant relation to gender (P value=0.007). It also shows statistically insignificant relation to age, residential region, marital status, educational level, occupational status, nationality, monthly income and chronic diseases.

**Table (9): Attitude level regarding over the counter (OTC) drugs in association with sociodemographic characteristics.**

| <b>Parameters</b>         |                       | <b>Level of Attitude</b>       |                            | <b>Total<br/>(N=962)</b> | <b>P<br/>value*</b> |
|---------------------------|-----------------------|--------------------------------|----------------------------|--------------------------|---------------------|
|                           |                       | <b>High attitude<br/>level</b> | <b>Moderate or<br/>low</b> |                          |                     |
| <b>Gender</b>             | Female                | 370                            | 262                        | 632                      | 0.007               |
|                           |                       | 69.4%                          | 61.1%                      | 65.7%                    |                     |
|                           | Male                  | 163                            | 167                        | 330                      |                     |
|                           |                       | 30.6%                          | 38.9%                      | 34.3%                    |                     |
| <b>Age</b>                | Less than 21<br>years | 61                             | 71                         | 132                      | 0.077               |
|                           |                       | 11.4%                          | 16.6%                      | 13.7%                    |                     |
|                           | 21 to 23              | 102                            | 74                         | 176                      |                     |
|                           |                       | 19.1%                          | 17.2%                      | 18.3%                    |                     |
|                           | 24 to 28              | 83                             | 72                         | 155                      |                     |
|                           |                       | 15.6%                          | 16.8%                      | 16.1%                    |                     |
|                           | 29 to 40              | 96                             | 87                         | 183                      |                     |
|                           |                       | 18.0%                          | 20.3%                      | 19.0%                    |                     |
|                           | 41 to 50              | 102                            | 60                         | 162                      |                     |
|                           |                       | 19.1%                          | 14.0%                      | 16.8%                    |                     |
|                           | more than 50          | 89                             | 65                         | 154                      |                     |
|                           |                       | 16.7%                          | 15.2%                      | 16.0%                    |                     |
| <b>Residential region</b> | Northern region       | 15                             | 20                         | 35                       | 0.083               |
|                           |                       | 2.8%                           | 4.7%                       | 3.6%                     |                     |
|                           | Southern region       | 223                            | 189                        | 412                      |                     |
|                           |                       | 41.8%                          | 44.1%                      | 42.8%                    |                     |
|                           | Central region        | 127                            | 115                        | 242                      |                     |
|                           |                       | 23.8%                          | 26.8%                      | 25.2%                    |                     |
|                           | Eastern region        | 40                             | 30                         | 70                       |                     |
|                           |                       | 7.5%                           | 7.0%                       | 7.3%                     |                     |
|                           | Western region        | 128                            | 75                         | 203                      |                     |
|                           |                       | 24.0%                          | 17.5%                      | 21.1%                    |                     |
| <b>Marital status</b>     | Single                | 241                            | 195                        | 436                      | 0.701               |
|                           |                       | 45.2%                          | 45.5%                      | 45.3%                    |                     |
|                           | Married               | 268                            | 215                        | 483                      |                     |
|                           |                       | 50.3%                          | 50.1%                      | 50.2%                    |                     |
|                           | Divorced              | 18                             | 11                         | 29                       |                     |
|                           |                       | 3.4%                           | 2.6%                       | 3.0%                     |                     |
|                           | Widowed               | 6                              | 8                          | 14                       |                     |
|                           |                       | 1.1%                           | 1.9%                       | 1.5%                     |                     |
| <b>Educational level</b>  | Primary school        | 1                              | 3                          | 4                        | 0.576               |
|                           |                       | 0.2%                           | 0.7%                       | 0.4%                     |                     |
|                           | Middle school         | 6                              | 4                          | 10                       |                     |
|                           |                       | 1.1%                           | 0.9%                       | 1.0%                     |                     |
|                           | High school           | 82                             | 70                         | 152                      |                     |
|                           |                       |                                |                            |                          |                     |

|                              |                   |       |       |       |       |
|------------------------------|-------------------|-------|-------|-------|-------|
|                              |                   | 15.4% | 16.3% | 15.8% |       |
|                              |                   | 50    | 45    | 95    |       |
|                              | Diploma           | 9.4%  | 10.5% | 9.9%  |       |
|                              | Bachelor's degree | 346   | 268   | 614   |       |
|                              |                   | 64.9% | 62.5% | 63.8% |       |
|                              | Postgraduate      | 48    | 37    | 85    |       |
|                              |                   | 9.0%  | 8.6%  | 8.8%  |       |
|                              | Uneducated        | 0     | 2     | 2     |       |
| <b>Occupational status</b>   | Student           | 163   | 132   | 295   | 0.981 |
|                              |                   | 30.6% | 30.8% | 30.7% |       |
|                              | Employee          | 208   | 163   | 371   |       |
|                              |                   | 39.0% | 38.0% | 38.6% |       |
|                              | Unemployed        | 103   | 87    | 190   |       |
|                              |                   | 19.3% | 20.3% | 19.8% |       |
|                              | Retired           | 59    | 47    | 106   |       |
|                              |                   | 11.1% | 11.0% | 11.0% |       |
| <b>Nationality</b>           | Saudi             | 510   | 412   | 922   | 0.785 |
|                              |                   | 95.7% | 96.0% | 95.8% |       |
|                              | Non-Saudi         | 23    | 17    | 40    |       |
|                              |                   | 4.3%  | 4.0%  | 4.2%  |       |
| <b>Monthly income in SAR</b> | Less than 1000    | 175   | 148   | 323   | 0.676 |
|                              |                   | 32.8% | 34.5% | 33.6% |       |
|                              | 1000 to 3000      | 67    | 55    | 122   |       |
|                              |                   | 12.6% | 12.8% | 12.7% |       |
|                              | 3001 to 7000      | 42    | 36    | 78    |       |
|                              |                   | 7.9%  | 8.4%  | 8.1%  |       |
|                              | 7001 to 10000     | 57    | 54    | 111   |       |
|                              |                   | 10.7% | 12.6% | 11.5% |       |
| <b>Chronic disease</b>       | No                | 192   | 136   | 328   | 0.992 |
|                              |                   | 36.0% | 31.7% | 34.1% |       |
|                              | Yes               | 148   | 119   | 267   |       |
|                              |                   | 27.8% | 27.7% | 27.8% |       |

**\*P value was considered significant if  $\leq 0.05$ .**

Table (10) shows that practice level regarding over the counter (OTC) drugs has statistically significant relation to gender (P value=0.003), educational level (P value=0.010), and chronic diseases (P value=0.008). It also shows statistically insignificant relation to age, residential region, marital status, occupational status, nationality, and monthly income.

**Table (10): Relation between practice level regarding over the counter (OTC) drugs and sociodemographic characteristics.**

| <b>Parameters</b>         |                       | <b>Practice level</b>                |                               | <b>Total<br/>(N=962)</b> | <b>P<br/>value*</b> |
|---------------------------|-----------------------|--------------------------------------|-------------------------------|--------------------------|---------------------|
|                           |                       | <b>High or moderate<br/>practice</b> | <b>Low practice<br/>level</b> |                          |                     |
| <b>Gender</b>             | Female                | 53                                   | 579                           | 632                      | 0.003               |
|                           |                       | 82.8%                                | 64.5%                         | 65.7%                    |                     |
|                           | Male                  | 11                                   | 319                           | 330                      |                     |
|                           |                       | 17.2%                                | 35.5%                         | 34.3%                    |                     |
| <b>Age</b>                | Less than 21<br>years | 7                                    | 125                           | 132                      | 0.151               |
|                           |                       | 10.9%                                | 13.9%                         | 13.7%                    |                     |
|                           | 21 to 23              | 13                                   | 163                           | 176                      |                     |
|                           |                       | 20.3%                                | 18.2%                         | 18.3%                    |                     |
|                           | 24 to 28              | 12                                   | 143                           | 155                      |                     |
|                           |                       | 18.8%                                | 15.9%                         | 16.1%                    |                     |
|                           | 29 to 40              | 16                                   | 167                           | 183                      |                     |
|                           |                       | 25.0%                                | 18.6%                         | 19.0%                    |                     |
|                           | 41 to 50              | 13                                   | 149                           | 162                      |                     |
|                           |                       | 20.3%                                | 16.6%                         | 16.8%                    |                     |
|                           | more than 50          | 3                                    | 151                           | 154                      |                     |
|                           |                       | 4.7%                                 | 16.8%                         | 16.0%                    |                     |
| <b>Residential region</b> | Northern region       | 0                                    | 35                            | 35                       | 0.533               |
|                           |                       | 0.0%                                 | 3.9%                          | 3.6%                     |                     |
|                           | Southern region       | 27                                   | 385                           | 412                      |                     |
|                           |                       | 42.2%                                | 42.9%                         | 42.8%                    |                     |
|                           | Central region        | 17                                   | 225                           | 242                      |                     |
|                           |                       | 26.6%                                | 25.1%                         | 25.2%                    |                     |
|                           | Eastern region        | 4                                    | 66                            | 70                       |                     |
|                           |                       | 6.3%                                 | 7.3%                          | 7.3%                     |                     |
|                           | Western region        | 16                                   | 187                           | 203                      |                     |
|                           |                       | 25.0%                                | 20.8%                         | 21.1%                    |                     |
| <b>Marital status</b>     | Single                | 30                                   | 406                           | 436                      | 0.510               |
|                           |                       | 46.9%                                | 45.2%                         | 45.3%                    |                     |
|                           | Married               | 29                                   | 454                           | 483                      |                     |
|                           |                       | 45.3%                                | 50.6%                         | 50.2%                    |                     |
|                           | Divorced              | 3                                    | 26                            | 29                       |                     |
|                           |                       | 4.7%                                 | 2.9%                          | 3.0%                     |                     |
|                           | Widowed               | 2                                    | 12                            | 14                       |                     |
|                           |                       | 3.1%                                 | 1.3%                          | 1.5%                     |                     |
| <b>Educational level</b>  | Primary school        | 2                                    | 2                             | 4                        | 0.010               |
|                           |                       | 3.1%                                 | 0.2%                          | 0.4%                     |                     |
|                           | Middle school         | 0                                    | 10                            | 10                       |                     |
|                           |                       | 0.0%                                 | 1.1%                          | 1.0%                     |                     |
|                           | High school           | 8                                    | 144                           | 152                      |                     |
|                           |                       |                                      |                               |                          |                     |
|                           |                       |                                      |                               |                          |                     |
|                           |                       |                                      |                               |                          |                     |

|                              |                   |       |       |       |       |
|------------------------------|-------------------|-------|-------|-------|-------|
|                              |                   | 12.5% | 16.0% | 15.8% |       |
|                              |                   | 3     | 92    | 95    |       |
|                              | Diploma           | 4.7%  | 10.2% | 9.9%  |       |
|                              | Bachelor's degree | 47    | 567   | 614   |       |
|                              |                   | 73.4% | 63.1% | 63.8% |       |
|                              | Postgraduate      | 4     | 81    | 85    |       |
|                              |                   | 6.3%  | 9.0%  | 8.8%  |       |
|                              | Uneducated        | 0     | 2     | 2     |       |
| <b>Occupational status</b>   | Student           | 17    | 278   | 295   | 0.105 |
|                              |                   | 26.6% | 31.0% | 30.7% |       |
|                              | Employee          | 31    | 340   | 371   |       |
|                              |                   | 48.4% | 37.9% | 38.6% |       |
|                              | Unemployed        | 14    | 176   | 190   |       |
|                              |                   | 21.9% | 19.6% | 19.8% |       |
|                              | Retired           | 2     | 104   | 106   |       |
|                              |                   | 3.1%  | 11.6% | 11.0% |       |
| <b>Nationality</b>           | Saudi             | 61    | 861   | 922   | 0.826 |
|                              |                   | 95.3% | 95.9% | 95.8% |       |
|                              | Non-Saudi         | 3     | 37    | 40    |       |
|                              |                   | 4.7%  | 4.1%  | 4.2%  |       |
| <b>Monthly income in SAR</b> | Less than 1000    | 20    | 303   | 323   | 0.719 |
|                              |                   | 31.3% | 33.7% | 33.6% |       |
|                              | 1000 to 3000      | 7     | 115   | 122   |       |
|                              |                   | 10.9% | 12.8% | 12.7% |       |
|                              | 3001 to 7000      | 6     | 72    | 78    |       |
|                              |                   | 9.4%  | 8.0%  | 8.1%  |       |
|                              | 7001 to 10000     | 5     | 106   | 111   |       |
|                              |                   | 7.8%  | 11.8% | 11.5% |       |
| <b>Chronic disease</b>       | No                | 26    | 302   | 328   | 0.008 |
|                              |                   | 40.6% | 33.6% | 34.1% |       |
|                              | Yes               | 27    | 240   | 267   |       |
|                              |                   | 42.2% | 26.7% | 27.8% |       |

**\*P value was considered significant if  $\leq 0.05$ .**

### Discussion:

Over-the-counter medications are therapeutic products that are sold directly to consumers by pharmacies or retail outlets, in contrast to prescription medications, which require a valid prescription from a physician [13]. OTC drugs play a significant role in the prevention and treatment of various minor health issues, such as headaches, the common cold, musculoskeletal pain, allergies, and heartburn. Regulatory agencies typically select OTC medications based on their safety and efficacy

profiles [14]. Important facets of consumer medication practices include non-adherence, drug sharing, and self-medication. Self-medication refers to individuals acquiring medications to address their symptoms without seeking advice from healthcare professionals. The World Health Organization (WHO) states that self-medication is generally recognized as a vital component of healthcare, benefiting from ongoing improvements in public knowledge, education, and socioeconomic conditions [15]. Self-medication is a form of self-care where individuals can promptly identify their symptoms and often manage them with easily accessible medications, such as OTC drugs. Reports indicate that university students have misused various pain relievers, vitamins, and sedatives, with OTC drug misuse becoming increasingly prevalent among young adults. As these individuals age, they must make independent decisions regarding the acquisition and use of medications for their health. Inappropriate medication use stemming from self-medication can arise from insufficient knowledge, potentially leading to incorrect usage for unintended purposes and incorrect dosages [16]. Thus, we aimed in this study to assess knowledge, attitude, and practice level of OTC drugs misuse in the population of Saudi Arabia. In our study, we found a significant prevalence of self-medication, with 58.2% of participants engaging in this practice, which aligns closely with prior research highlighting varying rates of self-medication among different populations. For instance, Wuraola Akande-Sholabi et al. [17] report a self-medication prevalence of 76% in their cross-sectional study, while studies in Serbia and India noted similar figures at 79.9% and 78.6%, respectively [18,19]. In contrast, a concerning high prevalence was observed in Kuwait, where self-medication rates reached 97.8% [20]. Our results indicated a considerable awareness of the risks associated with medications, with 82.8% acknowledging potential side effects. This awareness is mirrored by findings from Judith P. Kelly et al., who established that 85% of participants were aware of safe dosing guidelines for over-the-counter (OTC) antipyretics [21]. However, despite this knowledge, 42.4% of our respondents were unaware that self-medication can mask disease symptoms, highlighting a gap in understanding similar to that reported by Yan Zhang et al. [22], where knowledge levels averaged 57.17% across various dimensions, including attitudes towards self-medication. Our study demonstrates skepticism towards the universal safety of OTC drugs, with 64.9% expressing concerns. This finding contrasts with Bahrin Dzulkharnain et al.'s study, which reported a majority (92.9%) of participants demonstrating a positive attitude towards OTC medicine use [23], suggesting cultural or educational influences on attitudes toward self-medication practices. Furthermore, while our study revealed that 82.7% of participants believe that understanding drug actions is essential for responsible self-medication, adherence to recommended usage guidelines is notably low, with 93.3% demonstrating insufficient compliance. The findings from the Aga Khan University study further elucidate this issue by indicating that 83.7% of respondents practiced good handling of OTC drugs, despite some gaps in knowledge, as only 56.1% had good knowledge of drug classification as OTC [24]. This discrepancy emphasizes the need for educational interventions in our study population to bridge the gap between knowledge and practice. In terms of demographic correlations, our findings showed significant associations between knowledge levels and participants' age, marital status, educational level, and nationality. This aligns with Sivasakthi et al. (2020) [25], who highlighted access factors that may influence self-medication behaviors. Additionally, our report of 22.6% of participants lacking awareness of prescription requirements indicates a notable deficit in understanding the regulatory framework surrounding medications, a finding that merits further investigation. With nearly half (49.0%) of our participants demonstrating high awareness of OTC drug misuse, concerns about potential misuse leading to harmful effects are clearly prevalent; however, 21.2% of respondents reported low concern regarding such issues. This low concern among a segment of the population raises important questions about the effectiveness of current educational campaigns on the risks of self-medication.

**Conclusion:**

In conclusion, our study reveals a significant prevalence of over-the-counter (OTC) drug misuse among the population in Saudi Arabia, with 58.2% of participants reporting self-medication practices. While there is notable awareness of the risks associated with OTC medications, as evidenced by 82.8% of respondents acknowledging potential side effects, a substantial gap exists in understanding the implications of self-medication, specifically its capacity to mask underlying health conditions. Despite a strong consensus on the necessity for informed self-medication practices—highlighted by 82.7% of participants endorsing the importance of understanding drug actions—adherence to safe usage guidelines remains alarmingly low, with 93.3% demonstrating inadequate practices. Our findings suggest an urgent need for targeted educational interventions to enhance public knowledge regarding the safe and effective use of OTC drugs, as well as to address prevalent misconceptions that contribute to misuse. Ultimately, addressing these issues is crucial for improving healthcare outcomes and minimizing potential risks associated with unregulated self-medication in Saudi Arabia.

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**Ethical approval:**

After fully explaining the study and emphasizing that participation is optional, each participant gave their informed consent. The information gathered was safely stored and utilized exclusively for study.

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**Conflict of interests:**

The authors declare no conflict of interest.

**Informed consent:**

Written informed consent was acquired from each individual study participant.

**Data and materials availability:**

All data associated with this study are present in the paper.

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