Self-medication among Saudi students and adolescents: a systematic review

Fahad Khalawi¹*, Faisal Alghashmari¹, Bassam Tomihi², Asmaa Abdullah Moafa³, Majidah Abdulrahman Ghawi⁴, Elaf Makki⁵

ABSTRACT

Self-medication (SM) involves the administration of medication to treat symptoms or complications with no medical prescription, depending on the experience or knowledge of the individual. SM can result in severe consequences due to allergy to medications and medication interactions that the individual does not know. The present study aimed at assessing the prevalence and practice of SM among Saudi students and adolescents by reviewing the previous Saudi studies conducted on this subject. The medical literature explored PubMed and Google scholar databases from 2015 to 2021. The included searching terms were a combination of “SM and Saudi students,” “SM and Prevalence,” “SM and Saudi Adolescents,” and “Saudi prevalence and SM.” The inclusion criteria included original articles conducted on Saudi students and adolescents and full text articles. A total of 70 articles were obtained. Only nine articles were eligible for the inclusion criteria. The nine studies included a total number of 3,265 participants and covered seven regions of Saudi Arabia. Analgesics were the most commonly used medication, and the main cause for SM was a headache, whereas the significant purpose of practicing SM was saving time. SM is highly prevalent and practiced by Saudi students and adolescents; practicing SM was also high regardless of the participants’ specialty; it was also high among medical students.

Keywords: Self-medication, Saudi students, Saudi adolescents, prevalence, practice.

Introduction

Self-medication (SM) is widely practiced in developing and developed countries; the World Health Organization [1] defined SM as the selection and usage of medications by individuals to treat themselves for a self-recognized symptom or disease. SM was cited as a common problem leading to incorrect medication use [2]. SM also includes using alternative and traditional medicine such as herbal medicines, traditional products, and nutritional supplements [3]. Non-prescribed medication or over-the-counter refers to medicines for SM and are available in pharmacies without the prescription of the doctor [4,5]. Over the counter drugs reduce the number of visits to physicians and save time; however, the misuse of drugs may result in severe side effects, the interaction between drugs can occur, and the overdosing can result in bad consequences; all these can adversely affect the health of the individuals [6]. Analgesics are used for the pain management; pain killers are considered as one of the most commonly abused medications globally. Analgesics include acetaminophen (paracetamol), aspirin, and nonsteroidal anti-inflammatory drugs (NSAIDs) [7]. Paracetamol has antipyretic and analgesic effects, whereas NSAIDs have anti-inflammatory, antipyretic, and analgesic actions [8-10]. Both paracetamol and NSAIDs have adverse side effects, especially when used improperly, such as using them with no medical prescription or consulting the physician or the pharmacist. They are associated with liver, nervous system, kidney, and gastrointestinal tract [11-14]. Using antibiotics with no prescription is an emergence of antibiotic resistance [15]. Saudi Arabia reported the highest prevalence of resistant microbes in clinical isolates among Gulf Corporation Council countries [16]. The resistance of the microorganisms to the medication will lead to failure of treatment and threaten the life of the patients [17,18]. Several studies demonstrated that SM begins with adolescence and increases with increasing age [19-21]. SM among adolescents and university students represents an emerging topic in scientific research [22].

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So, this systematic review was performed to identify the prevalence and practice of SM among Saudi students and adolescents.

**Literature Search**

The Preferred Reporting Items for Systematic Reviews (PRISMA) checklist guidance for systematic review and meta-analysis [23] was followed to write this systematic review. Revising electronic databases was done to select eligible research articles between the year 2015 and 2021, including two databases: PubMed and Google scholar databases. Several keywords were used for searching purposes, including a combination of “SM and Saudi students,” “SM and Prevalence,” “SM and Saudi Adolescents,” and “Saudi prevalence and SM.” All the titles and abstracts produced from this primary exploration were revised thoroughly to prevent missing potential studies. The findings were then examined to choose only original research articles evaluating the prevalence and practicing of SM of Saudi students and Saudi adolescents. All articles from Saudi Arabia were eligible. Only articles in English were defined as articles of relevance, which were then included in the second stage.

**Eligibility criteria**

The second step was deciding on the eligible studies’ inclusion criteria. Abstracts were assessed manually to select the relevant studies for revision. The inclusion criteria were studies conducted on adolescents and students, cross-sectional and descriptive studies conducted on students from Saudi universities. The final stage was gathering the pre-defined information from the final record of eligible articles and summarizing them. Reviews, studies that had incomplete or overlapped data were excluded. Also, unavailable full-text articles or inappropriate study designs were excluded. The full description of the search strategy is shown in Figure 1.

**Data Review and Analysis**

Stage one in the data review included a preliminary review; data were extracted using a specially designed excel sheet. Chosen data from eligible research articles were then revised via the excel sheet. Any articles published by one research group examining similar potential studies. The findings were then examined to choose only original research articles evaluating the prevalence of SM among the participants. The studies were conducted on different regions in Saudi Arabia, including, the University of Tabuk [24], Jazan University [25,30], Riyadh Universities [26] and high schools in Riyadh [29], King Khaled University in Abha [27], Imam Abdulrahman Bin Faisal University in Dammam [29], King Abdul-Aziz University in Jeddah [31], and the University of Taibah in Madinah [32].

There were several types of medication reported as used by SMs, including analgesics, traditional medicine, skin ointment, nutritional supplements, cough syrups, drops for eye and ears, NSAIDs, antibiotics, medications for cold and flu, creams, antihistamines, sedatives, and antipyretic. Analgesics were reported by eight studies [24-29,31,32], antibiotics were reported by five studies [27,29-32], NSAIDs were reported by four studies [24-26,31], cough, fever, and cold medications were reported by three studies [24,28,32], antihistamines were reported in three studies [29,31,32], sedatives were reported in one study [30]. Analgesics were the most common medication used by SM, with the highest prevalence reported to be 96.5%, [26] represented in administrating paracetamol. In contrast, the least prevalence was reported to be 21.8%, and it was also reported as paracetamol [31]. The prevalence of antibiotics usage was the highest at 35.4% [27], and it was the least at 2.5% [31]. NSAIDs were in the second rank used as SM; the highest administration was reported as 49.1% [26], whereas the least prevalence was reported as 3.9% [31].

The prevalence and practice of SM ranged from 98.7% [27] to 19.61% [29]. Seven studies reported the main reason for practicing SM [24-27,29,30,32], and the most common was time-saving. The major complications caused by self medications were reported by eight studies [24-28,30-32], and they were headache, runny nose, menstrual pain, fever, cough, cold, and sore throat. Only three studies reported the source of obtaining the medication administrated by SM [24,28,29]; the main source was the pharmacy.

**Discussion**

SM is used to treat or prevent minor symptoms or ailments, which do not justify medical consultation [22]. The prevalence of SM in the Middle East was in the range of 19% to 82%, as reported by a systematic review that included 22 studies [33]. The rate of SM in Riyadh was 78.7% among 681 patients at Al Wazarat health care center [34]. A study from Qassim conducted on the population attending community pharmacies for over-the-counter medication reported that 75% purchased non-prescribed medication [35].
This systematic review was conducted to investigate SM’s overall prevalence and practice among Saudi students and adolescents. This systematic review included studies that covered seven regions in Saudi Arabia. The studies included were matched in the design; all the studies [24-28,30-32] reported a higher prevalence of SM that exceeded 50% in all the studies, except for one study [29] reported a prevalence of less than 50%. That study was conducted on medical and pharmacy students; the practice was higher among medical students (49.3%) than pharmacy students (19.61%). The remaining eight studies [24-28,30-32] reported a prevalence ranged between 98.7% [27] and 64.8% [32].

The prevalence of SM among adolescents was reported to be in the range of 2% to 92% [36-38]. In this systematic review, only one study included adolescents [28], and the prevalence of SM was 94.5% higher than what was reported in the previous studies [36-38].

The current systematic review showed that analgesics were the most common and highly used medication and paracetamol was the central used analgesics. Paracetamol usage was reported to be 96.5% [26]; only one study said a low prevalence of paracetamol usage (21.8%) [31]. The second rank of usage was NSAIDs; the highest usage of NSAIDs was reported in one study only [26], 49.1%. Surprisingly, antibiotics were in the third rank, where only five studies [27,29,-32] reported that antibiotics were used by SM. The highest prevalence rate of self-administered antibiotics was 35.4% [27], and the least rate was 2.5% [31]. This can be attributed to the efforts performed for the reduction of over usage of antibiotics and its severe consequences such as resistance of bacteria to the antibiotics. However, the high usage of analgesics is alarming, and efforts should be exerted to increase the knowledge of students and the population in general regarding the over usage of analgesics.

Analgesics were the most reported medication (18.3%) purchased without a prescription, as reported from a study from the Qassim region, followed by antihistamines and antibiotics in the third rank [35]. Similarly, a previous Saudi study reported that the rate of SM of antibiotics was 34% among 1,264 individuals living in Saudi Arabia [15], which was similar to our findings. In another Saudi study conducted on 2,979 patients, 84.1% reported using analgesics for SM [39]. This means that the prevalence...
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<td>Gutierrez et al. (2020) [24]</td>
<td>Cross-sectional descriptive</td>
<td>-128 female nursing students -Age: 19-25 years</td>
<td>-To determine the prevalence and practice of SM among female nursing students of the University of Tabuk -University of Tabuk</td>
<td>-Analgesic (90.2%) -Traditional medicines (62%) -5Skin ointment (40.2%) -Nutritional supplements (36.3%) -Cough syrup, eye/ear drops (23.5%)</td>
<td>High prevalence of SM (79.7%) The major cause for SM was saving time (51%) Complications caused usage; headache (76.6%), runny nose (37.3%), dental pain (37.3%), wounds (25.5%) Medicines for SMs obtained from; pharmacy (87.5%)</td>
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<td>Faqhi and Sayed (2020) [25]</td>
<td>Cross-sectional descriptive</td>
<td>-177 female nursing students -Age 20 ± 3 years</td>
<td>-To generate data on SM practice among nursing undergraduate students -Department of nursing, University college Farasan province, Jazan university</td>
<td>-Analgesics; Acetaminophen (57%) -NSAIDs; Ibuprofen (20%), diclofenac (5%), meloxicam (3%)</td>
<td>High SM practice (87%) Main reason for SM; lack of time to consult doctor (68%) The major causes of SM were; headache (45%), menstrual pain (23%), fever (14%)</td>
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<td>Al Essa et al. (2019) [26]</td>
<td>Cross-sectional</td>
<td>-272 health sciences students (males + females) from different universities -Age; &lt;20–&gt;22 years old</td>
<td>-To investigate and assess practices, awareness and attitudes toward analgesics SM among health science students -Different universities in Riyadh</td>
<td>-Analgesics; paracetamole (96.5%). NSAIDs (49.1%)</td>
<td>High practice of SM (73.2%) Main reason for self medication; was to play an active role regarding their health (47.4%), long time waiting for physician (39%), don’t visit the physician for minor illness (26%). The major causes for SM; headache (92%), fever (52.2%), menstrual cramps (43.8%), cold (38.9%)</td>
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<td>Alshahrani et al. (2019) [27]</td>
<td>Cross-sectional</td>
<td>-528 students (males + females); 274 medical students, 254 non-medical students -Age; not stated</td>
<td>-To explore the pattern of SMs among King Khalid University students, Saudi Arabia -King Khalid university in Abha</td>
<td>-Pain killers (91.6%) reported by medical students -Antibiotics (35.4%) reported by non-medical students</td>
<td>High practicing SM (98.7%) Main reason for SM; time saving (64.2%), mild symptoms (51.7%), quick relief (36.9%) The major causes of SM; headache (75.9%), cough &amp; cold (52.5%), fever (35.6%), body pain (24.6%)</td>
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<td>Albatti et al. (2017) [28]</td>
<td>Observational cross-sectional</td>
<td>-400 adolescent students (males + females) -Age; 13-18 years</td>
<td>- To estimate the prevalence of SM among adolescents aged 13-18 years of both genders in Riyadh, Saudi Arabia -Private and governmental Intermediate and high schools in Riyadh</td>
<td>-Analgesics (87.3%) -In the second rank was; cold and flu medication (56.7%) reported by males, creams (54.5%) reported by females</td>
<td>High prevalence of SMs (94.5%) The major cause of SM was headache The source of medicine for self medication; pharmacy (51.64%), parents (34.33%)</td>
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<td>Albusalih et al. (2017) [29]</td>
<td>Cross-sectional</td>
<td>-450 students (males + females); 297 from medicine college, 153 from pharmacy college -Age; 18-23 years old</td>
<td>- To report SM prevalence of prescription and non-prescription drugs among pharmacy and medical students - Pharmacy and medicine colleges of Imam Abdulrahman Bin Faisal University in Dammam</td>
<td>-Analgesics (72.35%) -Anti-histamines (39.16%) -Antibiotics (16.59%)</td>
<td>Self-mediation among pharmacy students (19.61%) SM among medical students (49.3%) The main reason for SM; mild problems (35.1%), previous experience (14.2%) Obtained medication from; pharmacy (68%), available in house (30.9%)</td>
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<td>Albasheer et al. (2016) [30]</td>
<td>Cross-sectional, self-administrated questionnaire based study</td>
<td>-300 medical students (males + females) -Age; 19-24 years</td>
<td>- To assess the knowledge, attitude and magnitude of SM among medical students of Jazan University, Jazan -Jazan university</td>
<td>-Sedatives (58.6%) -Antibiotics (15.33%)</td>
<td>High prevalence of SM (83.7%) The main reason for SM; having sufficient information, previous experience The major causes for SM pain (69%), cold (45%), cough (34%), heart burn (24%), migraine (23%)</td>
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<td>Aashi et al. (2016) [31]</td>
<td>Descriptive cross-sectional</td>
<td>-507 medical students (males + females) -Age; not stated</td>
<td>-To investigate the irrational uses of these medications which are NSAIDS, paracetamol, antibiotic antihistamines, opioids, and anti-anxiety drugs among medical students in KAU - Medical college of King Abdul-Aziz university in Jeddah</td>
<td>-Paracetamol (21.8%) -NSAIDs (3.9%) -Anti-histamine (3.7%) -Antibiotics (2.5%)</td>
<td>High rate of self medication (74%) The major causes; relief of fever (20.4%), sore throat (13%), moderate muscle and joint pain (12.1%)</td>
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of SM of antibiotics did not vary between the general population and specific adolescent population.

Analgesics’ usage is not restricted to Saudi Arabia; a previous systematic review included studies conducted on adolescents [22]. The most commonly used medications were pain killers, antipyretics, cough and cold medications, dermatological medicines, nutritional supplements, and antibiotics. In Jordan, it was found that 61.3% of university students used analgesics as SM. Although the study revealed that antibiotics were also in the third rank among the medication used, the prevalence was much higher than all the included studies in this systematic review, as it was 65.7% [40]. In Nigeria, SM analgesia was reported by 34.3% of the pharmacy students who participated, followed by antibiotics 25.2% [41].

Paracetamol was reported to be the major analgesics used in our systematic review; however, paracetamol was responsible for 50% of self-poisoning cases and cases around 200 deaths annually [42]. The drug shows no age discrimination [43]; it is contraindicated in case of allergy of the drug ingredients, patients with severe renal or hepatic failure, and deficiency of methemoglobin reductase [44]. The high prevalence of using paracetamol in the studies of this systematic review can be attributed to the low awareness among students and adolescents about the adverse effects of paracetamol; however, the majority of students of the included studies were related to the medical field. A previous Saudi study that included 1,554 participants showed that paracetamol was the main analgesic used, and 70.9% reported that they would consult a physician or pharmacist if their pain did not get relief after administrating paracetamol by themselves. Moreover, 29% had no awareness about the possible adverse effects of analgesic usage [45].

Also, the increased usage of NSAIDs is associated with an increased risk of ulcers and bleeding, which threaten the patient’s life [45]. NSAIDs are contraindicated in case of NSAIDs allergy, severe liver, and kidney insufficiency, pregnant and breastfeeding mothers, and in case of the active peptic ulcer [46]. Our analysis showed that NSAIDs were in the second rank after using paracetamol, another alarming.

The most prevalent complaints experienced by the study population were reported to include ear problems, cough, headache, cold, fever, and skin complaints [47]. The major cause for self-administration of medication was the headache, menstrual cramps, fever, cold, and sore throat. The major reason for not visiting a doctor and refusing to SM was saving time. They may wait for the physician and have no time to visit the doctor; some reports that the complaints were mild, and some reported having an experience. In a previous Saudi study conducted on the population attending community pharmacies in the Qassim region, it was found that the reasons for SM included repetition of a previously prescribed medication by a health care professional as the significant reason, followed by the disease is minor, and shortness of time was the least reported reason [35].

Similar findings were reported from Jordan, where the university students reported that headache is the major cause for SM, followed by colds and flu and fever. The lack of time to visit was the third reason for SM, whereas in our findings, it was the major reason.

In Saudi Arabia, antibiotics can be purchased with no prescription, and it was found in Riyadh that 79% of participants purchased antibiotics with no prescription [34]. Moreover, it was reported that 77.6% of the Saudi pharmacists dispensed antibiotics without prescription [48]. Out of the nine studies, only three [24,28,29] investigated the place of obtained medication. The primary source was the pharmacy, and the other sources reported were parents and home medicine. A previous study [47] also reported that the source of medicine obtained by adolescents was community pharmacy, whereas the source for headaches and menstrual pain was home medicine [47].

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<td>Aljaouni et al. (2015) [32]</td>
<td>Cross-sectional</td>
<td>-503 students; medical (349), non-medical (154); -Age: &lt;20-&gt;24 years</td>
<td>- To assess students’ practices, knowledge, awareness and the reasons behind SM at Taibah University, Madinah - Taibah University, Madinah</td>
<td>-Analgesics (60.3%) -Antibiotics (30.6%) -Antipyretics (5.6%) -Anti-histamines (1.1%)</td>
<td>Self medication (64.8%); Higher prevalence among medical students (66%); The main reason for SM was experience in SM; The major causes; sore throat &amp; upper respiratory tract infection (42.9%); headache (35.9%); fever (14.1%)</td>
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Conclusion

SM is highly prevalent and practiced by Saudi students and adolescents. Practicing SM was also high regardless of the participants’ specialty; it was also high among medical students. Analogies were the most commonly used medication, and the leading cause for SM was a headache, whereas the significant purpose of practicing SM was saving time. The high usage of analogies by SM seems to be similar to antibiotics, and it requires great attention. An online consultation can save time and prescribe the correct medication, especially since the reported conditions are simple and do not require medical investigations such as headache and menstrual cramps; these can reduce the rate of SM. This can help minimize SM, especially during the COVID-19 pandemic, where gathering should be avoided. Also, pharmacists should not give the patients medications without medical prescriptions.

List of Abbreviations

Prisma Preferred Reporting Items for Systematic Reviews

Conflict of interest

The authors declare that there is no conflict of interest regarding the publication of this article.

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