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Evaluating the frequency, consumers' motivation and perception of online medicinal, herbal, and health products purchase safety in Saudi Arabia



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ABSTRACT

Objectives: Purchasing medicinal products from the internet has become more popular in the last three decades. Understanding consumers' use and perception of the safety of medicinal products obtained online is essential. Therefore, this study aims to evaluate the extent of medicines purchased from the internet in Saudi Arabia, types of products, sources of information, the satisfaction, the motivational factors, and estimate consumers' vigilance and tendency to report ADRs if occurred.

Design: A prospective cross-sectional study using a custom-designed questionnaire was conducted among community adults in Saudi Arabia, age ≥ 18 .

Setting: Evaluation of community subjects' perception towards buying medicinal products was done through the internet in Saudi Arabia from 1st July 2020 until the end of August 2020.

Main outcome measure(s): The main outcome of the study was purchasing medicinal products from the internet (Yes, No).

Results: Overall, 36% of the study participants (n = 643) have ever bought medicinal products from the internet (Table 2). Of those, the most obtained was herbal medicine, supplements, or cosmetics (61.3%). Motivational factors towards purchasing medicinal products from the internet were mostly positive, with the most commonly reported agreed motivational factors were lower cost (55.7%), easy online access (54.1%), a wide variety of products (52.6%), and more privacy (43.6%). Around 60.4% of participants believed that buying medicinal products from the internet can be safe. The most perceived risk was the difficulty of distinguishing between registered online pharmacies and other unlicensed commercial websites, with only 32.7% of the participants distinguishing between registered and unlicensed commercial websites.

Conclusions: This study sheds light on the consumers' use and perception of the safety and risks of medicinal products purchased from the internet. The study findings noticeably describe the great need to increase safety awareness about obtaining medicinal products from the internet among the Saudi community.

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1. Introduction

Internet and e-commerce have profoundly changed community attitudes towards health care aspects. People use the internet to understand some health issues; many also go online purchasing medicinal products (Huisman et al., xxxx; Sun et al., 2019). Purchasing medicinal products may present a significant health hazard since it is an unregulated market with very low consumer protection (Fittler et al., 2013). Illegal online pharmacies represent a significant universal public health and patient safety hazard (Tim

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Mackey and Liang, 2013; Mackey and Nayyar, 2016). A big problem of difficulty to distinguish between registered online pharmacies and other unlicensed commercial websites. Since many illegitimate websites are unwilling to indicate their actual location, one cannot be certain of the regulatory framework under which the internet pharmacy operates (Cohen, 2004; Orizio et al., 2011; Raine et al., 2009). Alternatively, the self-diagnosing problem arises when people diagnose their condition, then purchase medications online, i.e., developing the concept of self-medication (Aljadhey et al., 2015; Jutel, 2010). Almost all medicines of a different therapeutic category are available through the internet, such as medications for erectile dysfunction (Jackson et al., 2010) and opioids (Raine et al., 2009). Medicinal products are “substances or combination of substances that are used to treat diseases, to relieve complaints, or to restore, correct or modify physiological functions by exerting a pharmacological, immunological or metabolic action” (Scholz, 2015). Many studies attempted to understand consumers’ behaviors and underlining motivational factors leading them to shop medicinal products online. The main reported motivation factors include lower cost, convenience, perceived privacy, self-diagnosis, direct-to-consumer advertising, and own previous experience (Ashames et al., 2019; Assi Thomas et al., 2016; Shekhar et al., 2019). Studies have also reported the importance of factors like trust and brand in making purchase decisions and consumers try to be well-aware of the medicine before buying (Shekhar et al., 2019). In a mixed-methods study, interviewees’ main reasons towards internet purchasing of medicines were trust in self-care and health professional, constraints of medicine stock, the influence of cost, and the need for better options (Bowman et al., 2020).

In Saudi Arabia, it becomes more popular to purchase medicinal products from Saudi E-pharmacy, international licensed drug stores, and commercial websites selling medicines and other supplements. Alfahad et al. have conducted a study in 2015 to evaluate the perception and knowledge of online pharmacy services among consumers in Riyadh (Alfahad et al., 2015). The authors found that around 83% of respondents did not hear about online pharmacy (82.6%) and only 1.4% purchased a medicinal product through an online pharmacy. Worldwide, Assi et al. conducted a web-based worldwide survey via email, social media, or personal communication to complete the online questionnaire and Residents in 22 countries responded ($n = 320$ participants) (Assi et al., 2016). This study showed that 65.0% participants purchased lifestyle products from the Internet, 55.6% purchased cosmetic products, and few purchased medicinal products. A study in Asia reported that more than 78% of participants use online platforms to buy their medicines (Nair and Middha).

In Saudi Arabia, there is a lack of sufficient studies evaluating the extent of purchasing medicinal products from the internet, the type of purchased medicinal products, reasons for buying online, and consumers’ perception towards medicinal product safety. Therefore, this study’s overall goal is to draw a roadmap of the extent of purchasing medicinal products from the internet in Saudi Arabia. Specific study objectives were to: (1) explore the extent of purchasing medicinal products from the internet in Saudi Arabia; (2) identify the motivational factors affecting consumers to buy medicinal products from the internet; (3) evaluate community vigilance of benefits and risks of purchasing medicinal products from the internet; and 4) estimate community willingness to report ADRs of medicinal products purchased from the internet.

2. Methods

2.1. Study design and sample

A cross-sectional study using a survey methodology was conducted from 1st July 2020 to 30th August 2020, in Saudi Arabia.

The study participants’ inclusion criteria comprised of community adults in Saudi Arabia, age ≥ 18 . We have excluded individuals less than 18 years old and those residing outside Saudi Arabia. The study was approved by the Research Center of Medical College of King Saud University and its Ethical Committee (No. E-20-4642).

2.2. Procedures

2.2.1. Questionnaire development

The questionnaire was developed after reviewing the published literature to identify existing instruments (Alfahad et al., 2015; Lee et al., 2015). An initial draft of the questionnaire was developed. The initial draft comprised of the following four sections: 1) Socio-demographic data (age, gender, marital status, education level, the region of residence, income level, and health status); 2) Online medicinal products use behavior and experience (types, resources, frequency, and satisfaction about the online medicinal products purchased); 3) Motivational factors affecting consumers to purchase medicinal products online (cost, availability, privacy, and quality); and 4) Awareness the safety of purchased medicinal products online (perceived safety and risks, adverse drug reactions reporting tendency).

2.2.2. Validation of the questionnaire

After the questionnaire development (Supplement 1), the questionnaire was translated into the Arabic Language. Then a group of researchers ($n = 5$) reviewed the questionnaire for content and clarity, and items included in the questionnaire cover all the aspects of this study’s objectives (i.e., face and content validity). The survey was then pilot tested by conducting cognitive interviews among a purposive sample of community individuals ($N = 20$). Recommendation by the researchers and the pilot participants during validation include clarifying the wording of some questions. The responses from these individuals were not included in the final analysis.

2.2.3. Data collection

The survey was disseminated online on social media platforms (e.g., Twitter, WhatsApp, and Email) via Google forms. Each eligible participant was asked to complete an informed consent form before completing an anonymous online survey.

2.3. Measures

2.3.1. Aims of the study

The study aimed to explore the extent of purchasing medicinal products from the internet (Yes, No). Individuals were asked, “Have you ever purchase medicinal products from the internet?” Medicinal products include the use of medicine (prescribed or non-prescribed). Participants were also asked about the use of herbal and health products (including the use of herbs and supplements) (Authority, 2020). Other aims include identifying the motivational factors affecting consumers to buy medicinal products from the internet; evaluating community vigilance of benefits and risks of purchasing medicinal products from the internet; and their willingness to report ADRs of medicinal products purchased from the internet.

2.3.2. Independent variables

Independent variables include the socio-demographic factors (age, gender, marital status, education level, income level, and region of residence (North region, South region, East region, West region, and Middle region)); online medicinal products use and experience (types, resources, frequency, and satisfaction about the online medicinal products purchased); motivational factors affecting consumers to purchase medicinal products online (cost,

availability, privacy, and quality) were measured on 5 points Likert scale (1 indicate strongly agree to 5 indicate strongly disagree). The maximum score obtainable was 50, and the minimum was 10. Lower scores indicate positive motivational factors. Another measured variable was the awareness of the safety for medicinal products purchased online (perceived safety and risks, adverse drug reactions reporting tendency). Participants were also asked if they can distinguish between registered online pharmacies and other unlicensed commercial websites.

2.3.3. Sample size

A previous study in Saudi Arabia by Abanmy has reported the extent use of internet for online purchases among the Saudi population was 67.6% (Abanmy, 2017). Based upon this previous reported study, it was estimated that a sample size of 423 participants would be required to have a two-sided 95% confidence interval and a level of precision of $\pm 5\%$ (Pourhoseingholi et al., 2013).

2.4. Statistical analysis

Descriptive statistics were used to describe the collected data. Frequency and percentage were used to describe categorical variables. Chi-square tests were used to conduct bivariate analyses on categorical variables. All statistical analyses were carried out using SPSS version 21.0.

3. Results

3.1. Description of the study sample

Among the 643 respondents to the survey, the majority were age group between 36 and 55 (56.6%), women (92.0%), unemployed (57.7%), and have a monthly income of less than 5000 Saudi Riyal (54.4%) (Table 1). Overall, the most preferred source of obtaining medicinal products reported by respondents was the government hospitals and primary care clinics (41.2%), followed by community pharmacy (39.0%), the internet (6.8%), and the remaining use all of these sources (12.9%). Around 82.7% of the respondents indicated using the internet as a source of health information.

Around 36% of the study participants have ever purchased medicinal products from the internet (Table 1). There were statistically significant differences between users and non-users in age, gender, education level, employment, and monthly income (Table 2). For example, a significantly higher percentage of non-users were women (65.2% vs. 34.8%, P -value = 0.001) and unemployed (66.3% vs. 33.7%, P -value = 0.002) as compared to users.

3.2. Online medicinal products use and experience

Of those who purchased medicinal products from the internet, the most purchased was herbal medicine, supplements, or cosmetics (61.3%), followed by non-prescription medication (e.g., Panadol) (14.1%). Most respondents heard about purchasing medicinal products from the internet from social media or internet websites (35.5%), followed by friends or co-workers (34.5%). When respondents were asked how often they purchase medicinal products from the internet, most of them reported less than once a month (91.5%). Overall, most users were satisfied with the online purchasing of medicinal products (80.8%), the quality of medicinal products received (82.5%), and the time elapsed till they received their medicinal products (88.9%).

3.3. Motivational factors for online purchasing of medicinal products

Motivational factors towards purchasing medicinal products from the internet were mostly positive; 55.7% and 54.1% strongly agreed that lower cost and easy online access to the online pharmacist significantly contributed to purchasing medicinal products from the internet. Respondents agreed that the wide variety of products (52.6%) and more privacy (43.6%) were other common motivational factors towards purchasing medicinal products from the internet (Table 3).

3.4. Awareness of the safety of online medicinal products

Of all individuals participating in the survey ($n = 643$), 60.4% believed that purchasing medicinal products from the internet can be safe (Table 4). The most perceive risks of online medicinal product purchasing were the difficulty in distinguishing between registered online pharmacies and other unlicensed commercial websites, instructions in an unknown foreign language, the quality of the product, and people under 18 can purchase medications without restrictions. Only 32.7% of the participants can distinguish between registered online pharmacies and other unlicensed commercial websites. Of those who purchased medicinal products from the internet ($n = 235$), 7.5% suffer from adverse drug reactions after using online medicinal products. Of those, only 4.8% report it or informed their health care professional.

4. Discussion

This study evaluated the extent of medicinal products purchasing behavior from the internet in Saudi Arabia and considered their motivating factors. We observed that around one-third of participants purchased medicinal products from the internet. Assi et al., in their cross-sectional study among 320 participants, have reported a higher rate of purchased the medicinal products from the internet, with around two-thirds reported purchasing it (Assi et al., 2016). A recent study among 444 participants found that 0.45% purchased prescription medicines online in the past, while 4.3% purchased over-the-counter medicines, including vitamins, supplements, and herbal combinations (Bowman et al., 2020).

Besides, this study found that most of the respondents indicated using the internet as a health information source. In a systemic review of thirty-seven studies, the author found that consumers' health information evaluation can be highly subjective and sometimes, misinformed (Sun et al., 2019). In terms of the type of medicinal products, most participants reported purchasing herbal medicine, supplements, and cosmetics such as vitamins, Omega 3, and supplements for hair and skin. In Saudi Arabia, most product categories can simply be classified as drugs, medical devices, and food supplements, all of which should follow specific regulations to get marketing authorization by the Saudi Food and Drug Authority (SFDA) (Authority, 2020). As some products fall in the grey area between these categories, making it difficult to ascertain the marketing authorization scheme they should follow, the SFDA has created a new classification of these products based on statutory definitions. Accordingly, our questionnaire's product categories are classified into three main categories; namely: human medicinal or pharmaceutical drugs, herbal products, health products.

In terms of the health information source, social media is the most common source of influence for purchasing medicinal products from the internet. Moreover, the lower cost-saving, easy online access, lack of local availability, wide variety of products, and privacy (41.1%) are the main motivational factors towards purchasing medicinal products from the internet in our study, which has also been reported in other studies (Assi et al., 2016;

Table 1
Characteristics of the Study Sample.

	Total		Ever Purchase Online Medicinal Product				P-value
	N	%	Yes		No		
Total	643	100	235	36.5	408	63.5	
Age Group							less than 0.0001
18–35	203	31.4	70	34.7	132	65.3	
36–55	364	56.6	151	41.5	213	58.5	
>55	77	12.0	14	18.2	63	81.8	
Gender							0.001
Male	52	8.0	24	46.2	28	53.8	
Female	591	92.0	211	34.8	380	65.2	
Nationality							0.402
Saudi	416	64.7	154	37.0	262	63.0	
Resident	227	35.3	81	35.7	146	64.3	
Education Level							0.005
Less than high school	22	3.4	9	40.9	13	59.1	
High school	132	20.5	33	25.0	99	75.0	
Undergraduate	302	47.0	110	36.4	192	63.6	
Post graduate	187	29.1	83	44.4	104	55.6	
Employment							0.002
Seeking work/ Not- Working	371	57.7	125	33.7	246	66.3	
Working (part-time)	84	13.1	23	27.4	61	72.6	
Working (full time)	188	29.2	87	46.3	101	53.7	
Monthly Income							0.001
SR < 5,000	350	54.4	112	32.0	238	68.0	
SR 5,001–15,000	221	34.4	98	44.3	123	55.7	
SR > 15,000	72	11.2	23	34.7	47	65.3	
Region of Residence							0.903
North region	29	4.5	11	37.9	18	62.1	
South region	25	3.9	7	28.0	18	72.0	
East region	44	6.8	16	36.4	28	63.6	
West region	45	7.0	18	40.0	27	60.0	
Middle region	500	77.8	183	36.6	317	63.5	

Note: Study Sample Comprised of 643 Participating Adults
SR: Saudi Riyals

Bowman et al., 2020). Although these are the perceived benefits, medicinal products purchased from the internet has possible risks as information are often missing from foreign products, and many products are delivered without any or any adequate declaration of the ingredients and adulteration with synthetic drugs is a potentially serious problem which needs adequate regulatory measures (Ernst, 2002). Dieter Müller et al. report 17 cases of poisoning with a single product bought from the internet as a declaration of the ingredients was not available (Müller et al., 2009). In our study, one-half of the study participants consider buying medicinal products from the internet to be safe. In terms of the associated risks of online medicinal products purchasing, many participants believe about the difficulty of distinguishing between registered online pharmacies and other unlicensed commercial websites. Not surprisingly, only one-third of the participants can distinguish between the registered and unlicensed commercial websites. Inability to authenticate legitimate drug sellers by the vast majority of participants in our study may increase the chance to encounter such illegal websites that market counterfeit and substandard products and sell medications without prescriptions. In Saudi Arabia, there is no known private company or organization to monitor online vendors' adherence to accepted pharmacy practice standards, and regulatory authorities make no classification for the legitimate and illicit health-related websites. Although most of the registered local pharmacies have developed their websites for selling their products, many other web-based health-related stores remain unknown and unauthorized with no restriction on their accessibility. Worldwide, several Internet pharmacy certification organizations such as "Leg script" in the USA and "CIPA" in Canada, endorse several certifying standards, check the legitimacy of online pharmacies, and maintain pharmacy practice safety. Legiscript, for example, monitors more than 6 million health-related websites

and merchants and classifies Internet pharmacy websites into four categories (Legitimate, unverified, unapproved, and rogue) (Fittler et al., 2013). In a cross-sectional study, the patient experience when searching to purchase frequently prescribed psychiatric drugs was investigated, the authors found that out of 176 pharmacy websites entered in the legiscript database, the prescription was required in only 20 (12%) whereas 147 (88%) did not require a prescription for commonly prescribed psychiatrist agents, this resulted in more than 71% of online pharmacies to be classified as rogue or unapproved (Monteith and Glenn, 2018).

Besides, participants believe about the risks due to the lower quality of the product than community pharmacies, and people under 18 can purchase medications without restrictions. Although participants have concerns about the lower quality, most users in this study were satisfied with the online purchasing experience and the quality of medicinal products they received. Besides, many participants perceived the safety of online medicinal products purchasing. Bowman et al., in their study, found that safety issues was the primary reason for not purchasing online (Bowman et al., 2020). In a systematic review of 193 studies, the researchers found that the quality of drugs purchased from online pharmacies very often found inappropriate packaging and labeling (Orizio et al., 2011). Another study showed that more than 73% of online medicines buyers were able to verify the quality of purchased medicines by verifying their brands or the presence of harmful substances (Nair and Middha).

It has been observed in this study that few participants suffer from adverse drug reactions after using online medicinal products; of those, less than five percent reported them or informed their health care professionals. The lower number of reporting adverse drug reactions from online medicinal products emphasized the need to educate the public about the Saudi Vigilance Adverse drug

Table 2
Online Medicinal Products Use and Experience.

	N	%
Total	643	100
Ever Purchase Online Medicinal Product		
Yes	235	36.5
No	408	63.5
Category of medicinal products purchased online*¥		
Lifestyle drugs (e.g., Viagra and birth control pills)	14	3.5
Non-prescription medicines (e.g., Panadol)	57	14.1
Prescription medicines (e.g., Antibiotic)	14	3.5
Narcotics	17	4.2
Refill medication for chronic condition	17	4.2
Herbal medicine, supplements, and cosmetics	235	61.3
Others	37	9.2
From where did you hear about online medicine purchasing*¥		
Social media/internet websites	206	35.5
Family	95	16.4
Friends or co-workers	200	34.5
Health care provider (physician, pharmacist, nurse)	79	13.6
How often do you purchase medicinal products from the internet?*		
Less than once a month	214	91.5
More than once a month	6	2.6
Satisfaction about the online purchasing of medicinal products*		
Yes	189	80.8
No	41	17.5
Satisfaction about the quality of medicinal products you received?*		
Yes	193.0	82.5
No	34.0	15.5
Satisfaction about the time elapsed till you received your medicinal products*		
Yes	208.0	88.9
No	24.0	10.3

*Results Based on 235 Participating Adults who Reported Ever Purchased Medicinal Products from the internet
¥ Multiple choice was allowed for these questions

Table 3
Motivational Factors for Online Purchasing of Medicinal Products*

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
	%	%	%	%	%
Lower cost and variety of discount offers	55.7	14.3	18.3	6.1	5.7
Unavailability of medicines in the local market	40.7	15.2	30.3	5.6	8.3
More convenience; it reduces visits to health care professionals and community pharmacies	41.1	18.6	29.0	5.2	6.1
More convenience; easy online access to the cyber pharmacist for drug information from home and at anytime	54.1	21.9	19.3	3.4	1.3
More privacy	43.6	17.5	20.5	10.7	7.7
More details on the product than ones provided by the pharmacist	37.1	13.8	26.7	9.5	12.9
Wide variety of products	52.6	24.1	16.8	3.9	2.6
Better quality of products	30.4	19.6	30.0	10.9	9.1
Not able to get prescription for some products	23.1	13.5	24.0	19.7	19.7
Unsatisfied with the quality of clinical services provided in local community pharmacy	13.6	10.5	30.3	15.8	29.8

*Results Based on 235 Participating Adults who Reported Ever Purchased Medicinal Products from the internet

events (ADEs) reporting system “Saudi Vigilance” in Saudi Arabia, which has been established 2009 by the Saudi Food and Drug Authority to allow the public to report ADEs related to medicinal products (Alharf et al., 2018; Alshammari et al., 2017).

The above-mentioned findings of this study highlight the importance of increasing the awareness of purchasing medicinal products from the internet. Educational campaigns can help educate the community about reliable sources of health information on the internet and trustworthy online stores. Besides, regulatory agencies may need to increase the community’s awareness about reporting ADRs of medicinal products purchased from the internet.

4.1. Strengths and limitations

This study provides a knowledge base on the extent of medicinal purchasing behavior from the internet in Saudi Arabia. Large

sample size was collected to provide precise and representative findings. Also, this study investigated the motivating factors towards purchasing medicinal products from the internet. However, it has some limitations. First, the study participants consisted mostly of women and those living in the central region of Saudi Arabia. However, according to the age structure of the population of Saudi Arabia in 2019, approximately 32% aged between 35 and 54 and 33% aged between 15 and 35, both make up the biggest share of the Saudi population, with more than 83% of the population living in urban areas (General Authority of Statistics, 2019). The mean sex ratio is 1.21 males per female. Although most of our respondents were aged from 36 to 55, followed by 18–35, there was not much diversity in terms of sex category and geographical distribution, which affect the generalizability of the study findings.

Second, the survey was self-reported; therefore, we cannot exclude recall bias. Besides, we have advertised the survey (with

Table 4
Awareness of Online Medical Products Safety.

	N	%
Total	643	100.0
Do you think purchasing medicinal products from the internet can be safe		
Yes	331	60.4
No	312	48.5
What are the risks of purchasing medicinal products from the internet?		
Difficulty to distinguish between registered online pharmacies and other unlicensed commercial websites	361	18.6
Lack of supervision of a healthcare professional	239	12.3
People under 18 can purchase medications without restrictions	294	15.1
No proper information regarding the use of the products	159	8.2
People may get medicinal products that they don't need that can worsen their condition	247	12.7
The quality of the product could be lower compared to community pharmacies	297	15.3
Instructions may be in a foreign unknown language	316	16.2
Others	32	1.6
Can you distinguish between registered online pharmacies and other unlicensed commercial websites?		
Yes	210	32.7
No	432	67.2
Have you ever suffer from any adverse drug reactions after you use online medicinal products?		
Yes	47	7.5
No	448	71.1
If you answered Yes; did you report it or informed it to your health care professional?*		
Yes	30	4.8
No	115	18.3

*Results Based on 235 Participating Adults who Reported Ever Purchased Medicinal Products from the internet
 † Multiple choice was allowed for these questions

survey link) on social media using different social media platforms; therefore, we do not know how many potential participants came across the survey information and decided to not respond to it, as the denominator to calculate the response rate for our survey is unknown.

5. Conclusions

This study sheds light on the consumers' use and perception of the safety and risks of medicinal products purchased from the internet. The study findings noticeably describe the great need to increase safety awareness about purchasing medicinal products from the internet among the Saudi community. Also, there is a need to educate consumers about trustworthy licensed commercial websites to buy medicinal products. The majority of the respondents purchased herbal products and supplements; whereas, only a small minority purchased medicines online. The main reasons for buying from the internet were low cost, easy online access, a wide variety of products, and consumer privacy.

Authors' contribution

All authors substantially contributed to the conception, design, acquisition, and interpretation of data. All authors have also participated in drafting and revising the manuscript and approved of the final version.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jps.2020.12.017>.

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