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RESEARCH ARTICLE

Assessing knowledge and practice of online medication purchasing: A pilot study

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Abstract

Background: Online Medication Purchasing (OMP) has emerged as a growing concern because of the risk of receiving falsified products and the irrational use of medicines. Despite the government regulation about OMP, more is needed to know whether the residents are aware of this regulation. **Objective:** The study aimed to determine the level of knowledge & practice of OMP and to estimate the factors correlated to it. **Method:** A pilot project was conducted in the Wanasari village, Cibitung district, Bekasi. A validated questionnaire determined sociodemographics, knowledge, and practice toward OMP in 92 participants. A multivariate logistic regression was performed to measure the predictors of OMP knowledge. **Result:** The study showed that slightly over half of the participants have adequate knowledge of OMP (58.7%). Nevertheless, poor knowledge predominantly emerged regarding legal access to antibiotics and controlled medicines. Adequate knowledge of OMP increased for participants with higher education (OR:20.202; 95%CI:3.488-117.020; p = 0.001) and being active workers (OR:8.365; 95%CI:1.974-35.435; p = 0.004). **Conclusion:** Education and employment determine the knowledge of OMP. This study confirms that educational interventions are required to promote good practice toward OMP and protect health customers from the adverse effects of falsified medications.

Introduction

The development of the internet has changed all aspects of life, including how people meet their health needs. The online community of healthy people, newly diagnosed patients, and chronically ill patients uses the Internet to find disease-related information, find peer support, and buy medicines online (Cain *et al.*, 2000). E-pharmacy has become part of healthcare provisions globally. In fact, during the pandemic, a distinct increase was measured in purchasing medications via online pharmacy (Jairoun *et al.*, 2021). Several factors drive drug buying behaviour online, including ease of transaction and a wide selection of products (Almomani *et al.*, 2023; Bowman *et al.*, 2020; Fittler *et al.*, 2018). However, the practice of buying drugs online may have an adverse impact on health if obtained from unlicensed e-pharmacies. The risk of falsified or substandard products may occur, adversely impacting health. According to the World Health Organization, 1 in 10 health products in low to middle-income countries is estimated to be falsified (World Health Organization, 2018). Some studies revealed impurities, higher doses, and wide dose variations between medicinal products and online supplements (Merczel *et al.*, 2023; Venhuis *et al.*, 2014).

In Indonesia, a study on health content access behaviour stated that 95.56% of 674 respondents sought online drug information (Kristina *et al.*, 2019). Another survey on health students in Jakarta stated that they often purchase medicines in the marketplace, including prescription-required medicines (Cokro *et al.*, 2023). Growing concern about online drug selling has led the Indonesian government to draw up BPOM regulation No. 8, 2020, to control online drug distribution (National Food and Drug Agency (BPOM), 2020). The government has developed a policy requiring legitimate online pharmacies to be registered in the Electronic Pharmaceutical Administration System (PSEF). PSEF is a legal entity that provides, manages, and operates e-pharmacy for its own needs or the

needs of other parties. Business platforms that can register as PSEF are legal entities and have collaborated with pharmaceutical workers under applicable regulations (National Food and Drug Agency (BPOM), 2020). Legal entities registered with PSEF are official and licensed pharmacies, such as *K24klik*, *Alodokter*, and *Halodoc*. Online pharmacies can provide legal pharmaceutical services to the community. However, it has yet to be discovered how the online drug buying behaviour will be after the publication of this regulation or public awareness regarding it. This study examines the knowledge of purchasing medication online following the established guidelines.

Methods

Design

The study applied a cross-sectional design via a survey in a neighbourhood of Wanasari village, Cibitung district, Bekasi, from June to July 2023. The sample was calculated using the Lameshow Formula based on a population of approximately 381 residents living in that area. The sample included a total of 92 participants randomly selected using cluster sampling. The cluster sampling in this study was performed through two steps. First, six groups of households in a neighbourhood of Wanasari village were identified; a group of households referred to as a cluster. Second, Two out of six groups (20%) were randomly selected, and all participants were gathered from those two clusters. The inclusion criteria were residents aged 17-65 with experience purchasing online medication in the past three years. After giving informed concerns, participants were asked to fill out a paper-based questionnaire consisting of three parts of queries: sociodemographic profiles, Online Medication Purchasing (OMP) activities within the past three years, and knowledge of online medication purchasing. The questionnaire items about OMP knowledge were made using the Guttman Scale, where participants scored 1 for correct answers and 0 for incorrect ones. The content validity of each question was investigated by Pearson's correlation with a correlation coefficient ranging from 0.255-0.752. The internal consistency reliability of the questionnaire item was calculated using Cronbach's alpha reliability coefficient, given Cronbach's alpha value of 0.768. Researchers obtained ethical approval for this study from the Ethic Committee at Poltekkes Kemenkes Jakarta II number LB.02.01/KE/39/388/2023.

Assessment

The sociodemographic data was analysed and presented in frequency tables. The total score of correct answers about online medication purchasing was calculated. Respondents were categorised into two types based on median scores since the scores were not normally distributed. Then, the chi-square test via SPSS ver.23 was applied to compare sociodemographics and level of knowledge of online medication purchasing.

Results

A total of 92 participants were involved in the study; 57.6% were aged between 18 and 45, and 61.9% were female. Most participants had a secondary level of education (70.7%). Most were married (79.4%), and slightly more than half were unemployed (Table I).

Table I: Sociodemography characteristics

Characteristics	N	%
Age		
18-45	53	57.6
46-65	39	42.4
Gender		
Male	35	38.0
Female	57	61.9
Education		
Primary & secondary	65	70.7
Tertiary	27	29.4
Marital status		
Single	19	20.7
Married	73	79.4
Employment		
Yes	43	46.7
No	49	53.3

As described in Table II, participant's online buying behaviour showed that more than 80% of participants purchased non-prescription medicines online. About 50% buy medicinal products through open marketplaces. Various reasons have led to this practice, one of which is that the price offered on the platform was cheaper (29.4%). Furthermore, participants mentioned that easy-way transactions (28.26%) enabled online medication purchasing. As many as 55.4% of participants access e-pharmacy once every month. Meanwhile, most participants received information about online medicine from their families and colleagues (53.3%).

Table II: The use of the internet for medication purchasing

Characteristics	N	%
Type of medication		
Prescription	18	19.6
Non-prescription	74	80.4
Source		
Open marketplace	47	51.1
Legitimate e-pharmacy	45	48.9
Frequency of online access		
Once a month	51	55.4
More than once a month	41	44.6
Reason for buying		
Low price	27	29.4
Convenient transaction	26	28.3
More accessible	20	21.7
Various product choices	19	20.6
Source of information		
Family & colleague	49	53.3
Online advertisement	30	32.6
Healthcare providers	13	14.1

Knowledge related to purchasing drugs online after the enactment of government regulations is described in Table III through the percentage of correct answers from 13 questions. Most of the participants were able to answer the questions correctly. However, in several question items, the correct percentage was still in the range of 50%, such as the question about the requirement for a prescription to purchase antihypertensive antidiabetic medicines and similar questions regarding opioids and psychotropics. More than 50% of participants also answered questions about drug labelling incorrectly. Based on a median score (≥11), the level of knowledge of online medication purchasing was categorised into adequate (58.7%) and inadequate (41.3%). Multivariate analysis showed that two sociodemographic factors, employment and education, were predictive factors of the knowledge level of online medication purchasing ($p < 0.05$), as described in Table IV. The odds ratio (OR) of having adequate knowledge of OMP increased for participants who had a tertiary level of education (OR:20.202; 95%CI:3.488-117.020; $p = 0.001$) and had a steady job (OR:8.365; 95%CI:1.974-35.435; $p = 0.004$).

Table III: Participant's response to knowledge questionnaires

Questions	Correct answer (%)
PSEF is a legal entity that provides and manages online pharmacies following regulations in Indonesia	90 (97.8)
Halodoc, Go Apotik, and *K24klik* are registered as online pharmacies in the PSEF systems	84 (91.3)
Vitamins, supplements, and traditional medicines can be purchased online without prescriptions	78 (84.8)
Medications for hypertension and diabetes can be purchased online without prescriptions	51 (55.4)
Purchasing medication through the Internet poses the risk of medication misuse	84 (91.3)
Supplements or vitamins purchased online must be registered through a regulator (BPOM)	91 (98.9)
All medications purchased online do not require a prescription	60 (65.2)
Antibiotics can be purchased online without a prescription	59 (64.1)
Prescribed medications can be purchased through the open marketplace	63 (68.5)
Traditional medicines can be obtained from the Internet as long as it has legal permission from the Ministry of Health	71 (77.2)
Opioids and psychotropics can be purchased online without a prescription	42 (45.7)
The green dot on medication packages indicates that it can be purchased online without a prescription	86 (93.5)
The blue dot on medication packages indicates that it can be purchased online without a prescription	44 (47.8)

Table IV: Association between sociodemographics and level of knowledge

Characteristics	Level of knowledge		OR	95% CI	*p*-value
	Inadequate N (%)	Adequate N(%)			
Age					
18-45	17 (32.1)	36 (67.9)	1.000		0.686
46-65	21 (53.8)	18 (46.2)	0.751	0.188-3.009	
Gender					
Male	4 (11.4)	31 (88.6)	1.000		0.052
Female	34 (59.6)	23 (40.4)	0.205	0.041-1.016	
Education					
Primary & secondary	36 (55.4)	29 (44.6)	1.000		0.001*
Tertiary	2 (7.4)	25 (92.6)	20.202	3.488-117.020	
Marital status					
Single	4 (21.1)	15 (78.9)	1.000		0.506
Married	34 (46.6)	39 (53.4)	0.553	0.096-3.167	
Employment					
No	32 (65.3)	17 (34.7)	1.000		0.004*
Yes	6 (13.9)	37 (86.1)	8.365	1.974-35.435	
Total	38 (41.3)	54 (58.7)			

*Multivariate logistic regression, *p*-value less than 0.05 is considered to be statistically significant (95% CI)

Discussion

The study showed that slightly more than fifty percent of participants have adequate knowledge of online medication purchasing following the BPOM regulation. However, knowledge about legal access to prescription-required medicines online needs to be improved. More than half of the participants had assumed that providing opioids, psychotropics, antihypertensives, and antidiabetic drugs online does not require a prescription. This may lead to irrational use of medicines since those drug categories require supervision from healthcare providers. Forty-seven participants (51.1%) have experienced buying medicines via e-commerce. These findings imply that Indonesians are familiar with online buying but need to learn about the legal aspects of medication provision. The public may not be aware of the closed supply chain of medicinal products. These rigorous rules of drug distribution are applied to ensure the quality and safety of medicines (Fittler *et al.*, 2013). Buying health products from the Internet is beneficial in terms of time and cost, but it is not worth the health risks that may occur after consuming drugs from unreliable sources. A study by Venhuis *et al.* (2014) reported variability of dose units in a package of falsified medicine purchased online. Another study from Hertig *et al.* (2021) recounted a patient's experience who received a counterfeit antidiabetic medication from the Internet. An experimental study in the United Arab Emirates analysing furosemide from illegal online sources showed that the percentage of active ingredients was below the standard and did not pass the test based on British Pharmacopeia 2018 (Ashames *et al.*, 2019).

The findings demonstrated the association between socio-demographics and the knowledge of online medication purchasing. It was found that those participants most likely to have adequate knowledge of online medication purchasing were active workers and had higher education. The study investigating knowledge of online medication buying was limited. However, a cross-sectional study by Alwhaibi *et al.* (2021) indicated that gender (male) and employment significantly correlate to online drug-purchasing behaviour.

The Indonesian government has provided an official platform where online pharmacies registered in the Ministry of Health system will serve customers and provide guaranteed quality products. Even though the public knows government regulations about online medication distribution, buying medication in an open marketplace commonly emerges. The challenge of this health issue is how to change people's point of view towards the risks of online purchases. Some determinants, including testimonials from the family and minimal interaction with health providers, influence the gap between knowledge and actual behaviour. This phenomenon is in line with a study in the United Kingdom, where social factors, such as other consumers' reviews, may influence the decision to buy medication online. This practice could be explained by

the theory of planned behaviour (TPB), in which normative beliefs and perceived behavioural control predict the intention to buy medication online (Almomani *et al.*, 2023). As drug informers, pharmacists are crucial in carrying out awareness campaigns to educate the public about the risks of illegal medications and increase access to valuable pharmacy services. Pharmacists and other healthcare providers should be adequately prepared to protect the community from unlicensed online pharmacies.

Conclusion

The level of education and employment status are strong determinants of knowledge of OMP. Educational intervention is crucial to ensure the safety of online access to medicines, minimise the risk of receiving counterfeit drugs, and reduce inappropriate use of medications in the community.

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