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Mapping medication selling practices at nonpharmacy outlets during the COVID-19 pandemic: an example of Indonesia

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Abstract

Objectives: Nonpharmacy outlets are common medication suppliers in Indonesia, yet little is known regarding their practices. This study aimed to evaluate the medication selling practices occurring in kiosks and minimarkets during the coronavirus disease 2019 pandemic.

Methods: A cross-sectional study included all minimarkets ($N = 101$) and a convenience sample of kiosks (a minimum sample size, $N = 67$) in District X, Indonesia. A validated tool was used to collect data on the characteristics of kiosks/minimarkets and their medication selling practices (i.e. drug management and drug information).

Key findings: A sample of 67 kiosks and 52 minimarkets (response rate 51.5%) consented to participate in this study. Kiosks and minimarkets generally stocked nonprescription drugs, particularly cough and/or common cold products or analgesic-antipyretics; while >90% of kiosks and 15.4% of minimarkets provided prescription medicines. Medications in kiosks and minimarkets were mainly obtained from pharmacies (94.0% vs. 17.0%, respectively) or pharmaceutical wholesale representatives (68.7% vs. 96.0%, respectively). Most minimarkets or kiosks satisfied drug storage standards (100.0% vs. 88.1%, respectively). During the previous week, >80% of kiosks and minimarkets reported purchases of nonprescription drugs, and approximately 5% reported sales of prescription drugs. No drug information was provided by kiosk or minimarket staff.

Conclusions: Minimarkets and kiosks may improve access to basic medications, but no information is provided regarding their use. These outlets should be licensed and policed to ensure the range and quality of drugs, and information provided to the Indonesian community is appropriate.

Keywords: COVID-19; medication selling; nonpharmacy outlet; Indonesia

Introduction

The role of the private sector, including pharmacy and nonpharmacy outlets, in the provision of medicines has been well established, including in low-and-middle income countries (LMICs) [1]. In Indonesia, nonpharmacy outlets, such as privately run kiosks ('warung'—a roadside stall) or minimarkets (a small-size supermarket/store), are often chosen by the local community as the first point of contact for obtaining medicines [2, 3]. Their appeal lies in the large number and wide distribution of kiosks and minimarkets across Indonesia, which can fulfil the increasing demand of Indonesian households for convenience and accessibility in shopping, including obtaining medications to treat their health problems [4]. This convenience was emphasized during the COVID-19 pandemic where public mobility was restricted, and disrupted supply chains or increased demand for medicines occurred [5–7].

All medicines distributed in Indonesia must be registered with the Food and Medicine Supervisory Board (*Badan Pengawas Obat dan Makanan*, BPOM) [8]. Licensed medicines in Indonesia can be categorized into nonprescription drugs (i.e. general sale and general sale with cautionary labels) and prescription drugs [9, 10]. General sale and general sale with cautionary labels can be legally obtained without a doctor's prescription. For general sale medicines with cautionary labels, there is an additional cautionary label requirement—either P1, P2, P3, P4, P5, or P6 (e.g. P1: Caution! a potent drug—carefully read the directions for use); hence, it can only be sold in a limited quantity (with adequate information provided by a staff-member with a pharmacy background) [11].

Pharmacy outlets, including pharmacies (such as community pharmacies and pharmacy units in clinics/hospitals) and drug stores, are authorized to sell medications (for

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which they are required to hold a license from the government). Pharmacies are allowed to distribute all categories of medicines, while drug stores can only supply nonprescription medicines [12–14]. Both are required to have a staff-member with pharmacy background (a pharmacist—for a pharmacy or a pharmacy technician—for a drug store) who are responsible for drug management and drug-related care (e.g. drug information) [15–17]. At the time of this study and the coronavirus disease 2019 (COVID-19) pandemic, while it was not clear whether nonpharmacy outlets could sell general sale drugs without a drug retailer license, they could not sell general sale drugs with cautionary labels and prescription medicines without a license [12–14] Due to weak law enforcement, however, sales of those drug categories from nonpharmacy outlets have been reported [18].

An underlying concern arising from the public obtaining medicines at unlicensed nonpharmacy outlets is a lack of quality control which might be linked with potential problems, such as a higher likelihood of counterfeit or substandard drugs [19, 20]. In addition, sales can often occur without adequate assistance for the purchaser or information provision [19]. A lack of information provided while practising self-medication might cause potential safety issues, such as adverse drug reactions, incorrect route of administration, incorrect choice of therapy, polypharmacy and overdosing, or duplication of therapy [19].

The widespread distribution of kiosks and minimarkets across Indonesia has made them important medication suppliers to the public, particularly during the COVID-19 pandemic, yet little is known regarding their functions in medication selling. Hence, this study aimed to evaluate the characteristics of and medication selling practices (i.e. drug management and drug information) at nonpharmacy outlets (i.e. kiosks and minimarkets) in District X, Indonesia, during the pandemic. These findings could be of importance in providing insight into the quality assurance of medication available via nonpharmacy outlets. It should be noted that a new law was issued in November, 2023 (after data was collected for this study), which has permitted hypermarkets/supermarkets/minimarkets to retail nonprescription drugs [10], but the follow-up regulations relating to the specific implementation of this change have not been thus far issued. Based on the new law, it is unlikely kiosks will be able to sell nonprescription medicines.

Methods

Study setting

This research was conducted in one of the four districts (District X) in an urban city in a central part of Indonesia. District X has an area of 2412.93 km [2] with the highest population density of 8601 per km [2]; and has the largest number of minimarkets, micro, small and medium enterprises (MSMEs) in the city [21, 22]. This research was carried out at nonpharmacy outlets, i.e. kiosks and minimarkets.

Study design and sample recruitment

This study obtained ethical approval from the Institutional Ethical Committee University of Surabaya (No. 205/KE/XI/2021).

This is a cross-sectional semi-structured interview study, complemented by on-site observation, to explore medication selling practices in kiosks and minimarkets in Indonesia.

Based on 2020 data, there were 198 kiosks in District X [22], however there was no information on their location or addresses. Thus, the researchers explored District X and approached every kiosk found. Once a kiosk met the inclusion criteria (i.e. selling medications), it was included as a sample until a minimum sample size of 67 was reached. The minimum sample size was determined using Slovin's formula with a 10% margin of error based on a sampling frame of 198 kiosks [23]. Meanwhile, in 2010, there were 52 reported minimarkets in District X [24]. A further field survey conducted by researchers in August 2021 found another 49 minimarkets in District X, giving a total of 101 minimarkets; all of the minimarkets were included in this study.

Data collection

This cross-sectional survey was conducted from August to November 2021. A data collection tool was developed to record medication selling practices in these outlets. Literature has suggested that ensuring the interviewees understand the questions while obtaining relevant data is the most important stage in exploratory data gathering [25]. This study used a literature review of prior studies and the government standards [14–16, 26, 27], to determine the nature and scope of medication selling activities, and to initially develop the questions in the data collection tool. The tool was validated by two experts in pharmacy practice to ensure the questions were aligned with the scope and relevant to the study objectives. The tool was subsequently piloted to 20 kiosk/minimarket staff (not in District X) where some minor changes related to the use of language (such as source of medications rather than distributors) were made to allow for a better understanding; the final data collection tool is provided in a Supplementary File. A pilot test is an important part of the exploratory data gathering as it can detect any possible errors at the early stage of research, and improves credibility [28, 29].

The research team members (A.K.Y., L.P.S.) visited all of the kiosks/minimarkets together in person. At each outlet, the researchers provided information regarding the nature of study to the owner or representative of the outlet, and asked for their participation. If they were willing to participate, a written informed consent was obtained. Data collection then occurred as follows:

Section A: the characteristics of the kiosk/minimarket

The researchers asked a mixture of open/closed-ended questions about location, opening hours, number of customers and medication purchasers, availability of a drug retailer license as well as characteristics of the staff.

Section B: drug management

- Medications provided: this included on-site observation by the researchers to list medications available in the kiosk/minimarket, and continued by asking open-ended questions about the sources of medications (distributors).
- Storage: based on the list of medications available in the kiosk/minimarket, each medication was assessed (on-site observation) as to whether it was stored according the standards (yes/no checklist); the storage standards, including: (i) storing medicines in cupboards or racks which are easily visible to customers, (ii) storing medicines separately from any other goods, (iii) storing medicines in the original packaging from the manufacturer, (iv) storing

medicines in accordance with the storage instructions in the packaging [14, 17].

- Medications purchased: the researchers asked an open-ended question (sales data was used if available) regarding medications sold in a kiosk/minimarket within the past 7 days. Sales data was only available in the minimarkets, but no such data was available from any kiosk.

Section C: drug information

The researchers conducted observations on one or two encounters with drug purchasers per kiosk/minimarket while they visited the outlet (accidental sampling). During the observation of each encounter, drugs purchased were listed; for each drug, information given or pointed out (from the packaging/leaflet) by the outlet staff was noted. Then, the information was coded based on the seven basic information requirements (marked 'Yes' if the code occurred, and 'No' if the code did not occur). The basic information included drug name, composition, indication, directions for use, side effects, storage, and expiration date; all of which are considered mandatory in the Government initiative ('Smart Use of Medications Movement', *GeMa CerMat*) to enable a member of the community to rationally use their medications [27].

Data analysis

Responses from the questions related to characteristics (Section A) were analysed descriptively; SPSS Statistics (IBM Corp., Armonk, NY, USA) version 26 was used to assist with the analysis.

Data from open-ended questions or observations related to medications provided/purchased (Section B) were analysed descriptively. While open-ended data related to source of medication (Section B) were analysed using quantitative content analysis [30]; the data was coded, and the presence of each data item (or code) were presented as frequencies and percentages. In addition, 'Yes' and 'No' responses from observation checklists related to drug storage (Section B) and drug information (Section C) were analysed with the outlet (kiosk/minimarket) as the unit of analysis. An outlet was considered 'Yes' compliance with a storage criterion (e.g. criterion a) if all drugs in the outlet were assessed as 'Yes' for that criterion; and considered 'No' if any of the drugs were marked 'No'. This procedure was used for each of the four storage criteria. For provision of drug information, an outlet was considered to provide the information (e.g. product name) if all drugs purchased by sampled customers in the outlet were marked 'Yes' for that information; and 'No' if any of the drugs was marked 'No'. This procedure was used for each of the seven information items. Number of outlets with 'Yes' and 'No' responses were calculated and the percentages were obtained.

Results

There were total of 67 kiosks and 52 minimarkets in District X that consented to be involved in this study. From 101 minimarkets in District X, 52 minimarkets agreed to participate (response rate 51.5%); another 26 minimarkets refused to participate due to their management' disapproval, and 23 minimarkets had closed permanently.

Kiosk and minimarket characteristics

Most kiosks or minimarkets were located on the roadside with an average opening hours of 19.9 ± 3.1 and 14 ± 2.4 per day, respectively. On average, the number of staff in a kiosk or minimarket was 2.0 ± 0.5 and 3.0 ± 1.4, respectively. Most staff in the kiosks and minimarkets were high school graduates (66.9% and 89.0%, respectively), and none had any pharmacy education background. The average drug purchases in kiosks and minimarkets per day were 7.0 ± 3.9 and 10.0 ± 9.0, respectively; all kiosks and minimarkets had no drug retailer licenses. Details of the characteristics of participating kiosks/minimarkets can be seen in Table 1.

Drug management

Profiles of medication provided

Most kiosks and minimarkets stocked nonprescription drugs, including general sale medicines (100.0% vs. 100.0%, respectively), and general sale medicines with cautionary labels (100.0% vs. 94.2%, respectively). General sale medicines mostly available in kiosks and minimarkets were analgesic-antipyretics (100.0% vs. 100.0%, respectively). With regard to general sale medicines with cautionary labels, more than 80% of kiosks stocked common cold products and analgesic-antipyretics; while more than 80% of minimarkets provided common cold products, common cold-cough products, cough products, and analgesic-antipyretics. In addition, most kiosks and minimarkets stocked herbal medicines (95.52% vs.

Table 1. Characteristics of the participating kiosks and minimarkets.

Characteristics of kiosks/minimarkets		
	Kiosks (*N* = 67) *n* (%)	**Minimarkets (*N* = 52) *n* (%)**
Location		
Housing area	3 (4.5)	1 (2.0)
Roadside	64 (95.5)	51 (98.0)
Number of customers/day (mean ±SD)	50.5 ± 21.9	84.0 ± 56.5
Number of customers purchasing medications/day (mean ±SD)	7.0 ± 3.9	10.0 ± 9.0
Opening hours/day (mean ±SD)	19.9 ± 3.1	14.0 ± 2.4
Number of staff	2.0 ± 0.5	3.0 ± 1.4
Characteristics of staff		
	Kiosk staff (*N* = 136)	**Minimarket staff (= 156)**
Educational level		
No education	5 (3.7)	0 (0.0)
Elementary school	38 (27.9)	5 (3.0)
Junior high school	22 (16.2)	7 (4.0)
Senior high school	69 (50.7)	133 (85.0)
Diploma	0 (0.0)	3 (2.0)
Bachelor	2 (1.5)	8 (5.0)
Educational background		
Health (not pharmacist or pharmacy technician)	0 (0.0)	1 (1.0)
Nonhealth	136 (100.0)	155 (99.0)
Working hours/day (mean ± SD)	9.8 ± 2.5	7.0 ± 0.9

98.08%, respectively), and supplements (60.19% vs. 88.46%, respectively).

More than 90.0% of kiosks stocked prescription medicines (63/67), particularly analgesics (59/63) and antibiotics (43/63). Meanwhile, only 15.4% minimarkets stocked prescription medicines (8/52), particularly analgesics (7/8). Details of the medicines available in kiosks and minimarkets can be seen in Table 2.

Kiosks mainly purchased their medications from community pharmacies [63/67 (94.0%)]; other sources were pharmaceutical wholesale representatives [46/67 (68.7%)], grocery stores [26/67 (38.8%)], and markets [1/67 (1.5%)]. Meanwhile, most minimarkets obtained medications from pharmaceutical wholesale representatives [50/52 (96.0%)].

Storage

All minimarkets conformed to the drug storage standards (100.0%), but a slightly lower figure was reported for kiosks (88.1%) (Table 3). Of the nine kiosks that did not meet the standards: seven kiosks did not meet criterion (a) (i.e.: stored

Table 2. Profiles of medicines available from kiosks and minimarkets.

Drug types	Kiosks (*N*=67) *n* (%)[a]	Minimarkets (*N* = 52) *n* (%)[a]
General sale medicines	67 (100.0)	52 (100.0)
Analgesic-antipyretic (e.g. paracetamol)	67 (100.0)	52 (100.0)
Oral antiseptic (e.g. dequalinium chloride)	0 (0.0)	2 (3.9)
Antidiarrhoeal (e.g. attapulgite)	43 (64.2)	43 (82.7)
Laxative (e.g. sodium citrate/sodium lauryl suate/glycerol)	0 (0.0)	8 (15.4)
Acid reducter (e.g. antacid—magnesium hydroxide/alumunium hydroxide)	57 (85.1)	28 (53.8)
General sale medicines with cautionary labels	67 (100.0)	49 (94.2)
Analgesic (e.g. paracetamol/hyoscyamine)	33 (49.2)	40 (76.9)
Analgesic–antipyretic (e.g. paracetamol/ propyphenazone/caffeine/dexchlorpheniramine maleate)	65 (97.0)	48 (92.3)
Motion sickness product (e.g. dimenhydrinate)	39 (58.2)	12 (23.1)
Anti-allergy (e.g. chlorpheniramine maleate)	16 (23.9)	18 (34.6)
Common cold-cough product (e.g. paracetamol/ pseudoephedrine HCl/dextromethorphan HBr)	46 (68.7)	49 (94.2)
Common cold product (e.g. paracetamol/ phenylephrine HCl/chlorpheniramine maleate	67 (100.0)	48 (92.3)
Cough product (e.g. guaifenesin/dextromethorphan HBr/chlorpheniramine maleate)	31 (46.3)	43 (82.7)
Laxative (Bisacodyl)	1 (1.5)	7 (13.5)
Lubricating eye drop (e.g. *tetrahydrozoline* HCl)	1 (1.5)	4 (7.7)
Bronchodilator (e.g. theophylline)	25 (37.3)	0 (0.0)
Prescription medicines	63 (94.0)	8 (15.4)
Analgesic (e.g. NSAID—mefenamic acid, sodium diclofenac)	59 (88.1)	7 (13.5)
Antibiotic (e.g. tetracycline, amoxicillin)	43 (64.2)	1 (1.9)
Anti-inflammatory (e.g. corticosteroids)	1 (1.5)	0 (0.0)
Anti-fungal (e.g. ketoconazole)	1 (1.5)	0 (0.0)
Herbal medicines	64 (95.5)	51 (98.1)
Acid reducer	3 (4.5)	6 (11.5)
Antidiarrhoeal	50 (74.6)	42 (80.8)
Antihemorrhoid	0 (0.0)	12 (23.1)
Antigout	13 (19.4)	1 (1.9)
Antimyalgia	40 (59.7)	36 (69.2)
Analgesic	15 (22.4)	0 (0.0)
Cough products	0 (0.0)	28 (53.8)
Menstrual disorder product	0 (0.0)	4 (7.7)
Immune booster	11 (16.4)	32 (61.5)
Sleep product	0 (0.0)	1 (1.9)
Laxative	4 (6.0)	19 (36.5)
Vaginal care product	0 (0.0)	4 (7.7)
Supplements	41 (60.2)	46 (88.5)
Immune booster	1 (1.5)	17 (32.7)
Vitamin and/or mineral	41 (60.2)	46 (88.5)

[a]Each kiosk/minimarket can provide >1 type of medicines.

Table 3. Profiles of medicine storage in kiosks and minimarkets.

Medication storage criteria[a]		Kiosks ($N = 67$) n (%)	Minimarkets ($N = 52$) n (%)
Criteria a: storing medications in cupboards or racks which are easily visible to customers	Yes	60 (89.5)	52 (100.0)
	No	7 (10.4)	0 (0.0)
Criteria b: storing medicines separately from any other goods	Yes	65 (97.0)	52 (100.0)
	No	2 (3.0)	0 (0.0)
Criteria c: storing medicines in the original packaging from the manufacturer	Yes	67 (100.0)	52 (100.0)
	No	0 (0.0)	0 (0.0)
Criteria d: storing medicines in accordance with the storage instructions in the packaging	Yes	67 (100.0)	52 (100.0)
	No	0 (0.0)	0 (0.0)
All criterias (from a to d)	Yes	59 (88.1)	52 (100.0)
	No	8 (11.9)	0 (0.0)

[a]The observation result was considered as 'Yes' if all the drugs in a kiosk/minimarket were stored according to the criteria, or 'No' if there are any drugs stored not according the criteria.

in cupboards or racks that were visible to customers) and 2 kiosks which did not meet criterion (b) (i.e.: stored separately from any other goods).

Profiles of medications purchased

In the last 7 days, most kiosks and minimarkets reported purchases of general sale medications, i.e. analgesics-antipyretics (80.6% vs. 96.2%, respectively). Furthermore, about 50% of kiosks or minimarkets reported purchases of general sale medicines with cautionary labels, i.e. common cold products or analgesic-antipyretics. About 5% of kiosks and minimarkets reported sales of prescription drugs (i.e. analgesics). The details of the drugs purchased in the last 7 days from kiosks and minimarkets can be seen in Table 4.

Drug information

Ninety-eight encounters with drug purchasers in 67 kiosks were observed [median: 1 encounter per kiosk (range 1–2)]; while in 52 minimarkets, 100 encounters were observed [median: 2 encounters per minimarket (range 1–2)]. In all of the encounters, the observations suggested no information was given/pointed out by kiosk or minimarket staff to the drug purchasers.

Discussion

This study has provided insight into medication selling practices from nonpharmacy outlets in an urban Indonesian setting during the COVID-19 pandemic. This study was conducted in District X—an urban area in the central part of Indonesia and located near Java island—where more than 50% of Indonesians live, thus the district has similar characteristics to other urban cities in Java [31, 32]. All participating kiosks and minimarkets had no drug retailer licenses. While, they provided a range of nonprescription and even some prescription drugs, none provided the necessary drug information as part of a sale, possibly reflecting a lack of pharmacy training. This would imply that customers had

Table 4. Profiles of medicines purchased in kiosks and minimarkets (in the last 7 days).

Drug types	Kiosks ($N = 67$) n (%)[a]	Minimarkets ($N = 52$) n (%)[a]
General sales medicines		
Analgesic-antipyretic	54 (80.6)	50 (96.2)
Antidiarrhoeal	3 (4.5)	2 (3.8)
Acid reducer	10 (14.9)	0 (0.0)
General sales medicines with cautionary labels		
Analgesic	2 (3.0)	6 (11.5)
Analgesic-antipyretic	28 (41.8)	26 (50.0)
Common cold product	39 (58.2)	26 (50.0)
Common cold-cough product	0 (0.0)	6 (11.5)
Cough products	5 (7.5)	25 (48.1)
Bronchodilator	2 (3.0)	0 (0.0)
Prescription medicines		
Analgesic	4 (6.0)	2 (3.8)
Antibiotic	1 (1.5)	0 (0.0)
Herbal medicines		
Antidiarrhoeal	6 (9.0)	9 (17.3)
Anti-myalgia	0 (0.0)	1 (1.9)
Cough product	0 (0.0)	2 (3.8)
Immune system product	5 (7.5)	11 (21.1)
Supplements		
Immune system products	0 (0.0)	2 (3.8)
Vitamin and/or mineral	2 (3.0)	3 (5.8)

[a]Each kiosk/minimarket can sell >1 type of medicines.

to be able to understand how to administer and store these medications to ensure their own safety. However, wide-spread medication selling practices in nonpharmacy outlets might increase accessibility to basic medications, especially during emergency situations, such as the COVID-19 pandemic. Improved licensing and policing are required to ensure that nonpharmacy outlets purchase and supply medications of appropriate quality, and appropriate information is provided to the community.

There are some limitations to this study. The convenience sampling method used for kiosks was considered the only feasible manner by which it could be conducted. No complete lists (sampling frame) of kiosks existed, making it impossible to obtain a random sample. While a sound response rate from minimarkets was achieved (51.2%), many minimarkets refused to participate, which were mainly chain minimarkets (due to the lack of support from the management), thus this study is mostly representative of independent minimarkets. The study used self-reported data on medications purchased in the kiosks, which might subject to recall bias; however, the question used to obtain the information was over a short period (last 7 days to limit recall factors). There was a risk of observation bias (Hawthorne effect) while observing the information provided by the kiosk or minimarket staff [33]; however, this might be minimal as the outlet staff were not informed when an observation might take place.

In a systematic review by Miller et al., a range of private drug retailer outlets was reported in LMICs, including

pharmacist-run pharmacies, non pharmacist-run pharmacies, and both registered and unregistered nonpharmacy outlets [34]. While several studies have reported on outlets legally entitled to operate without a pharmacist, including type II pharmacies in Thailand, class II and III pharmacies in Lao PDR, type C pharmacies in Pakistan, drug stores in Indonesia, and drug retailers in Nepal; only one study in Indonesia has reported on the practice of medications selling (i.e. antibiotics) from unregistered nonpharmacy outlets (i.e. kiosks) [18, 34]. A recent study conducted during the COVID-19 pandemic in a district in East Java, Indonesia, also reported such practises in kiosks [26]. In parallel, this present study reported that kiosks and minimarkets stocked some prescription drugs, which is illegal [10, 15]. Medication selling practices, particularly prescription medications, in nonpharmacy outlets poses a potential safety risk to the community and should be ceased by strict enforcement. However, there was limited evidence of policing these outlets when practicing illegally (it usually only occurs when a problem arises).

Kiosks and minimarkets in this study have provided a range of nonprescription drugs (i.e. general sale drugs and general sale drugs with cautionary labels). The most commonly purchased items were analygesics–antipyretics, common cold and cough products, that are commonly used to treat COVID-19 symptoms [35]. This is similar to the findings from other studies conducted during the COVID-19 pandemic [26, 36]. It should be noted that at the time of this study and the COVID-19 pandemic, kiosks or minimarkets might only be allowed to sell general sale medications. The new law (recently promulgated in November, 2023) includes hypermarkets/supermarkets/minimarkets as nonpharmacy outlets that can be licenced to sell nonprescription drugs (but does not include kiosks) [10]; This change, however, should be followed-up with regulations for implementation (such as standards of practice) to ensure that an appropriate quality of medications is distributed via these outlets. In addition, licensing kiosks to sell general sale drugs should be considered since they can improve accessibility to basic medications which are often used by the public to treat minor ailments.

Findings from this study sample indicated that all kiosk/minimarket staff did not provide any drug information to customers purchasing medications. In parallel, previous studies have reported the lack of drug information disclosure at nonpharmacy outlets. Dulęba et al. studied 400 customers purchasing medications at nonpharmacy outlets in Poland which indicated a lack of consultation/advice (76.3%) [37]. A study in Sweden also reported staff in nonpharmacy outlets provided no information regarding alternatives/choices of drug therapy as well as advice on the medication sold [38]. Evidence is available that providing drug information can increase knowledge, adherence, as well as reduce the risk of side effects and drug use interactions [27, 39, 40].

Most kiosks and minimarkets purchased their medications from community pharmacies or pharmaceutical wholesale representatives. Based on the regulations of the Ministry of Health, pharmacies and drug stores are not allowed to distribute medications for resale and only can supply drugs directly to customers [14–16]. Medications available in pharmacies and drug stores must be obtained from a licensed pharmaceutical wholesaler (*Pedagang Besar Farmasi*, PBF) [12]; however, they are not permitted to act as wholesalers. The procurement of drugs from illegal sources will potentially lead to a higher likelihood of the distribution of counterfeit or substandard drugs. A small study conducted in Phnom Penh, Cambodia, reported data obtained from 20 illegal drug store outlets reported that all samples of aspirin tablets were found to be of poor quality [41]. A small study in Indonesia reported that 18% of 104 antibiotic samples obtained from drug retailer outlets in Indonesia, such as kiosks, were sub-standard [18]; although the deviations (less active ingredient) were small, increased enforcement of the current regulations with regards to manufacturing and distribution control warrants further attention.

Conclusion

Minimarkets and kiosks may improve access to basic medications for Indonesians, particularly during an emergency situation, such as the COVID-19 pandemic. In addition to nonprescription drugs, these outlets were reported to illegally stock some prescription drugs. Sales of prescription drugs should cease by adequate policing due to their potential high risks for patients where an approriate medical diagnosis and oversight from pharmacists is required. Licensing such outlets should be considered to maintain quality of medications distributed and information provided to the community. The recent law (issued after this study) has permitted nonprescription drugs sales at minimarkets, thus further studies are necessary to evaluate the performance of minimarkets after licensing.

Supplementary Material

Supplementary data are available at *International journal of Pharmacy Practice* online.

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Author contributions

Conceptualization and methodology: A.P.S., Y.I.W. Investigation: A.K.Y., L.P.S. Project administration: A.K.Y., L.P.S. Formal analysis: A.K.Y., L.P.S., Y.I.W., C.B. Supervision: Y.I.W., A.P.S., B.S. Writing-original draft: A.K.Y., L.P.S., Y.I.W. Writing–review and editing: A.K.Y., L.P.S., Y.I.W., A.P.S., B.S., C.B. All authors had a complete access to the data that supported the findings of this study, and the data are available from the corresponding author (Y.I.W.) upon reasonable request.

Conflict of interest

The authors declare that there are no conflicts of interest.

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Data access statement

Research data underpinning this study would be stored for 5 years in the University of Surabaya where access is limited to the primary investigator. Paper copies are kept in a locked file cabinet in the primary investigator's office, while electronic data are stored in a password protected computer.

Data availability

The data underlying this article will be shared on reasonable request to the corresponding author.

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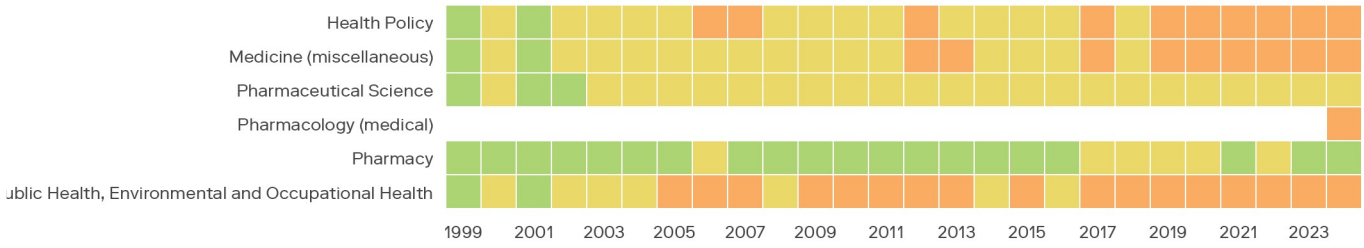

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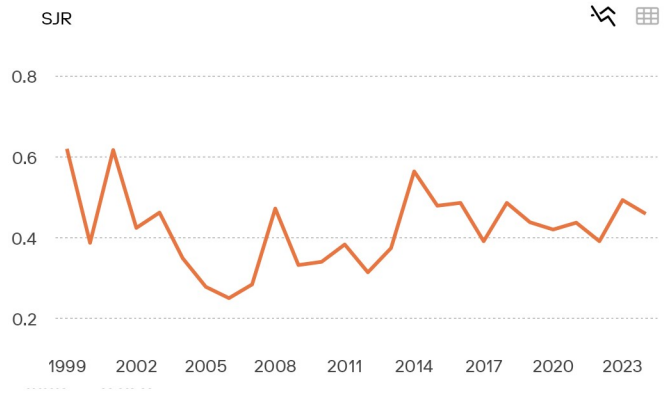
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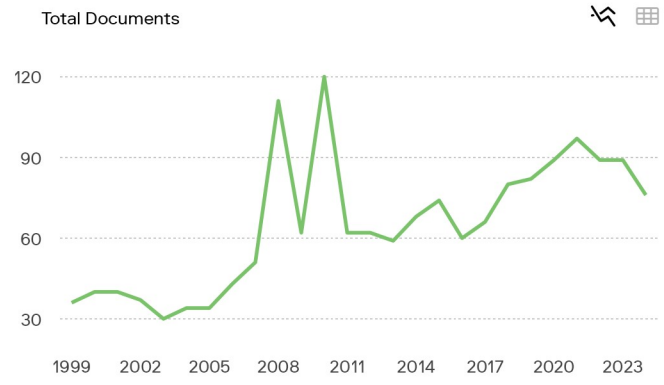
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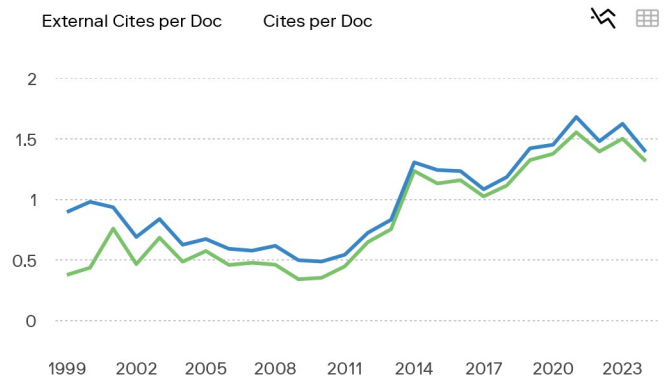
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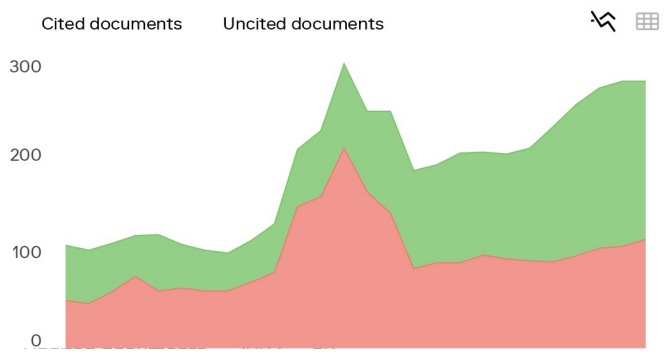
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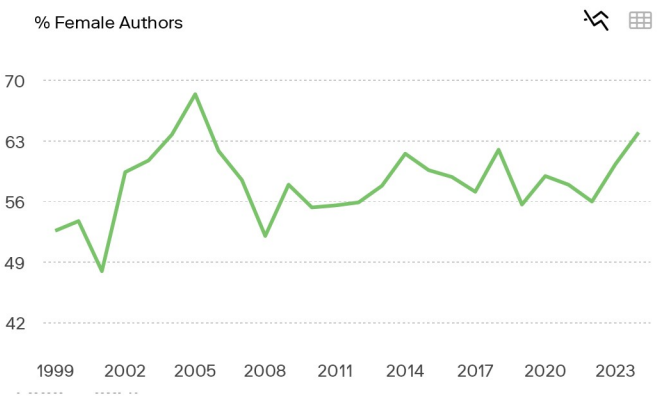

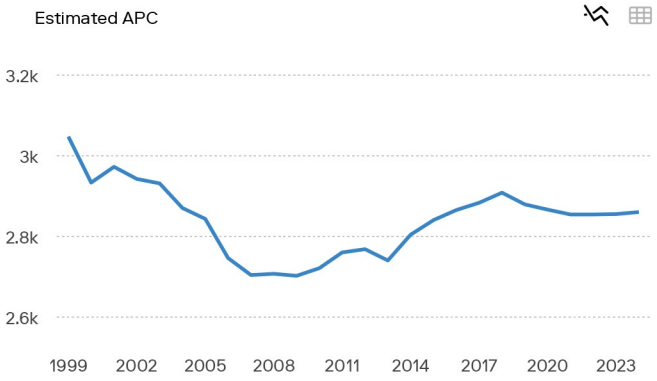

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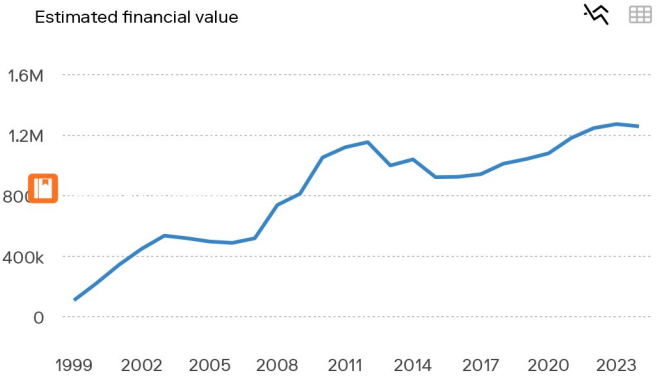

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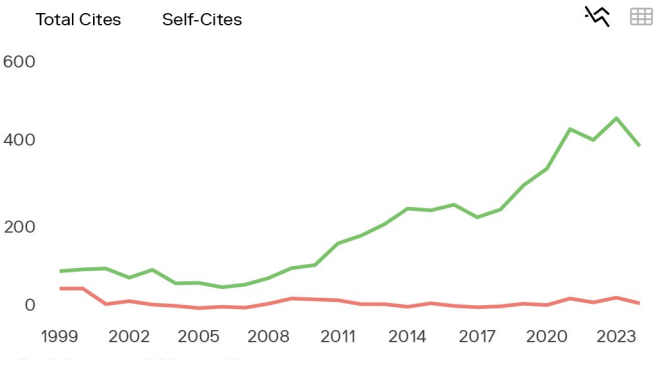

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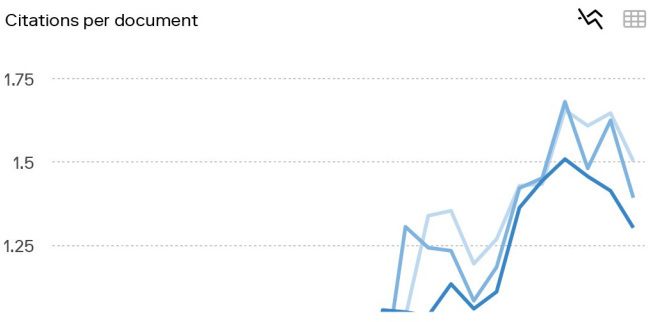

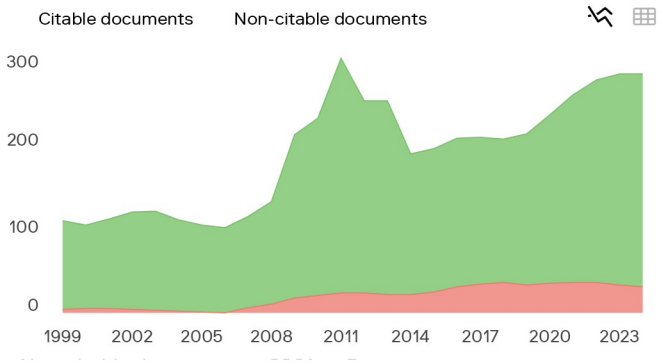

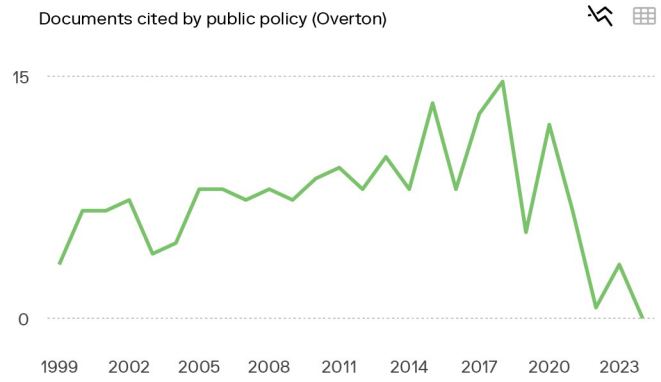

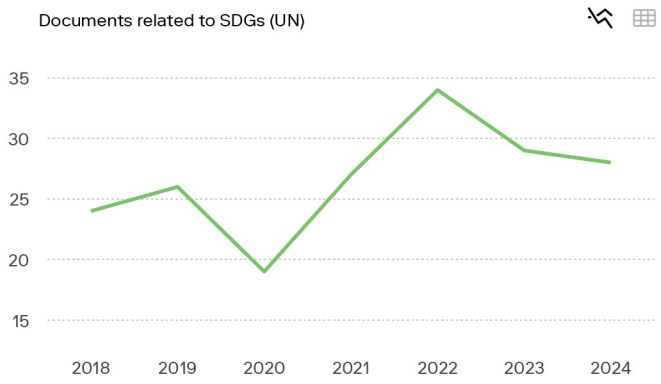

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