Original Research

Information on antibiotics in an Indonesian hospital outpatient setting: What is provided by pharmacy staff and recalled by patients?

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Abstract

Background: The provision of information by pharmacy staff is a key factor to ensure patients' understanding and quality use of medications, including antibiotics. However, little is known regarding the transmission of information between pharmacy staff and patients in Indonesia.

Objective: This study aimed to identify information on antibiotics provided by pharmacy staff and recalled by patients in an Indonesian outpatient setting.

Methods: The study was conducted in a hospital outpatient clinic in Malang, Indonesia, in 2019. A checklist was used to obtain the data on information provided by pharmacy staff, while interviews were conducted to determine information recalled by patients (only presenting patients were included); a total of 15 information items – i.e. 14 essential and one secondary – were observed. Descriptive analysis was used to summarise data on the checklists ('given' versus 'not given') as well as responses from the interviews ('recalled' versus 'missed').

Results: Eleven pharmacy staff (two pharmacists and nine pharmacy technicians) were involved in providing information for patients obtaining oral antibiotics during the study period. Of 14 essential information items, only about half was given by pharmacy staff, with pharmacists significantly providing on average more information items than pharmacy technicians (7.96 versus 7.67 respectively; p<0.001). The most frequently information items provided (>90%) included "antibiotic identification", "indication", administration directions (i.e. "dosage", "frequency", "hour of administration", "administration before/after meal", "route of administration"), and "duration of use". A total of 230 patients consented to the study, giving 79.9% response rate. The average number of information items recalled by patients was 7.09 (SD 1.45). Almost all patients could recall information on administration directions [i.e. "route of administration" (97.0%), "frequency" (95.2%), "dosage" (92.6%), "hour of administration" (85.7%), "administration before/after meal" (89.1%)] and "duration of use" (90.9%). Fewer patients were able to recall "antibiotic identification" (76.5%) and "indication" (77.0%).

Conclusions: Pharmacy staff provided antibiotic information in a limited fashion, while patients showed adequate ability to recall the information given to them. Further study is needed to better understand the effective process of information transmission between pharmacy staff and patients, especially if more information was provided, to better optimise the use of antibiotics in outpatient settings in Indonesia.

Keywords

Consumer Health Information; Anti-Bacterial Agents; Pharmacists; Pharmacy Technicians; Professional Practice; Pharmacy Service, Hospital; Outpatient Clinics, Hospital; Cross-Sectional Studies; Indonesia

INTRODUCTION

Patient adherence has an important role in optimising the effectiveness of treatment and minimising adverse events.[1,2] In order for patients to adhere to their treatment, they must have a good understanding toward their medications.[3,4] Several studies have reported a low level of understanding by patients regarding medications they have received.[5,6] Thus, the provision of comprehensive information – including, but not limited to, medication name and indication, directions for use, side effects, precautions, contraindication, storage, and drug interactions – would be important in optimising patients' use of medications.[7,8]

Health professionals, particularly physicians and pharmacists, are regarded as trusted sources of patient information on medications.[9,10] Consequently, adequate information provision, both written and verbal, must occur at each patient encounter. It should be noted that the process of information provision has been conceptualised mainly as an action of transmission between health practitioners and patients.[11] In addition to the information given by health practitioners, it is important to understand how patients have received the information. It has been hypothetised that patients' understanding of information and moreover their ability to recall it are important

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predictors of management satisfaction and medication adherence.[12,13]

The provision of medication information should not solely rely on physicians; some studies have reported that most patients were unable to precisely recall all the information given during their visits.[14,15] Hence, pharmacists have the potential role in providing necessary information while dispensing patients' medications. Based on the pharmacy literature, the provision of medication information can be categorised as the process of counseling or as a part of counselling; regardless of the terminology used, however, medication information provided by pharmacists has resulted in positive patient outcomes.[12,16,17] A systematic review by Okumura *et al*. (2014), which included 101 randomised controlled trials, reported that pharmacist-led medication information services resulted in statistically significant improved patient outcomes, including knowledge, adherence, clinical outcome, and quality of life ($p < 0.05$).[18]

Antibiotics are among the most commonly used medications globally.[19] It has been estimated that antibiotic consumption in outpatient settings is far greater that in inpatient settings.[20] Hospital outpatient clinics are one of the outpatient settings with high antibiotic prescription rates.[21,22] Hence, it is important to develop strategies to reduce the negative impacts of improper antibiotic use, especially antibiotic side effects and resistance, in outpatient settings.[23] A study of 553 patients receiving antibiotic prescriptions in outpatient settings in The Netherlands reported that 31% of the patients were not given any information regarding the antibiotics prescribed; of those given information, only 37% indicated that they received information on how to use their antibiotics.[24] Unsurprisingly, poor understanding by patients, being linked with low adherence to antibiotic treatments have been reported.[25,26]

In Indonesia, antibiotics have been one of the most frequently prescribed medications, and problems with adherence in outpatient settings have been well documented.[27-30] While patients' understanding of information is one of the key factors to adherence, little is known regarding the transmission of information related to antibiotics between pharmacy staff and patients in outpatient settings. This lack of data hampers the development of appropriate strategies for effective transmission of antibiotic information to improve patients' understanding and quality use of antibiotics. Considering the widespread use of antibiotics in Indonesia, failure to optimise the provision of antibiotic information – including that in the outpatient settings – has the potential to increase the risk of improper use of antibiotics which further promotes antibiotic resistance.[31,32] Hence, this study aimed to identify the information provided by pharmacy staff and the information subsequently recalled by patients receiving antibiotic treatment in an Indonesian hospital outpatient setting.

METHODS

Research setting

This study was conducted at an outpatient clinic of a private hospital in Malang, Indonesia. Malang is the second largest city in the province of East Java, with a population of approximately 861,000. There are 21 hospitals operating in the city – 18 of which are privately owned.[33] The private hospital used for this study has 16 specialty care services and seven sub-specialty care services. The inpatient care units in the hospital accommodate 185 beds with a bed occupancy rate (BOR) of 75%. With the implementation of national health coverage [*Jaminan Kesehatan Nasional*, JKN] by the Indonesian Government since 2014, hospital outpatient clinics have become one of the main referral centres for patients unable to be adequately treated in the primary care facilities.[34] This study hospital outpatient clinic had an average monthly attendance of 17,839 patients; of which, an average of 554 patients were prescribed antibiotics.

The process of medication dispensing in this outpatient clinic starts with patients submitting the prescription at the pharmacy counter, followed by conducting prescription screening, preparing medications (including labelling medication containers), checking, and providing the dispensed medications to patients. The outpatient clinic also provided delivery services. This study received ethical approval from the Research Ethics Committee of Universitas Surabaya (082/KE/VII/2019), and an official permit from the hospital director (RSIA/0539/III.6.AU/F/V/2019).

Study design and participant recruitment

This study involved pharmacy staff and patients obtaining oral antibiotics from the study setting. The observations were conducted between July and September 2019. Patients prescribed oral antibiotics and collecting them themselves during the study observation days were included, while those receiving antibiotic prescriptions for tuberculosis or using the hospital's delivery services were excluded as they received different interventions. Patients meeting the inclusion criteria were given information relating to the study. If they agreed to participate, they were asked to give written informed consent. Sample size was calculated by considering the population size of 554 (i.e. monthly average number of patients prescribed antibiotics), using 95% confidence interval and 5% margin of error, thus giving a sample size of 228 patients.[35]

The pharmacy staff included in this study were those in charge of handing out the dispensed antibiotics to patients consenting to participate. There were 15 pharmacy staff in this study setting, comprising of two pharmacists and 13 pharmacy technicians. Based on the practice standards, pharmacists have the responsibility to supply prescribed medications; while pharmacy technicians could provide assistance under pharmacist supervision.[36,37] Pharmacy Technicians in Indonesia hold educational qualifications and are not just trained in the workplace. All pharmacy staff received prior explanation about this study, and were asked for written consent if they agreed to participate. However, they were not informed when the data collection would take place. The data collectors were pharmacy technician interns who were already assigned to this study setting before the data collection took place, thus observation bias (Hawthorne effect) was expected to be minimal.[38]

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Table 1. Checklist of antibiotic information items

No	Information items	Recommendation from literature			Final Checklist
		MoH-RI[39]	PIONAS[40]	ASHP[16]	
Essential					
1	Drug name (antibiotic identification)	√	√	√	√
2	Indication	√		√	√
3	Dosage (quantity taken at each administration)	√	√	√	√
4 & 5	Time of administration (hour of administration, and administration before/after meal)	√	√	√	√
6	Directions for use (frequency - number of administration per day)	√	√	√	√
7	Route of administration	√	√		√
8	Duration of use	√		√	√
9	Drug-drug interaction	√	√	√	√
10	Drug-food interaction	√	√		√
11	Potential side effects	√	√	√	√
12	Actions taken when side effects occur		√	√	√
13	Storage	√	√	√	√
14	Actions taken when missing/omitting a dose		√		√
Secondary					
15	Disposal		√	√	√

MoH-RI= Ministry of Health Republic of Indonesia; PIONAS= *Pusat Informasi Obat Nasional* (National Medicine Information Centre); ASHP= American Society of Health-System Pharmacists.

Research instrument

A checklist was used to obtain data on information given by the pharmacy staff. The information items listed in the checklist were drafted from literature, and validated with two drug information pharmacists in Universitas Surabaya.[16,39,40] The validation process resulted minor adjustments to the checklist, including: "name of antibiotic" was referred to "antibiotic identification"; "directions for use" was specified to "frequency (number administered per day)"; "time of administration" was divided into two items, i.e. "hour of administration" and "administration before/after meal"; and "dosage" was defined as "dosage (quantity taken at each administration)". The information items were classified into essential (14 items) and secondary (1 item, i.e. "disposal" as it is only applied for dry syrup antibiotics, considering the possibility of residuals). The final checklist can be seen in Table 1. The checklist was used to document information verbally given by pharmacy staff, as well as information on the label attached to the medication containers.

To obtain data on patients' recall of information, an interview guide was developed to assess patients' ability to recall information provided by the pharmacy staff. The first question in the guide was: "Of the medications you have received, could you identify which ones are antibiotics?". If patients failed to identify the antibiotics, the data collectors would pick the antibiotics for the patients. Then, patients were asked to answer questions about each information item previously provided by the pharmacy staff. The interview guide was validated by two patients, and only minor language revisions were required.

Data collection

The data collection was conducted with the help of eight data collectors, i.e. pharmacy technician interns in this study setting. Two training sessions were given prior to the data collection. The first session consisted of providing information relating to the process of medication dispensing in the outpatient clinic, types of antibiotics available, research objectives, data collection procedure, and technical guidelines to complete the checklist which was followed by a simulation. The second session aimed to explain and simulate the interview guide. The simulation was followed by feedback from the principal researcher, and only those who were able to correctly complete the checklist and conduct the interviews were allowed to start collecting data.

The data collection was done during the clinic's busiest days (Tuesday-Thursday) and hours (9 to 11 am and 6 to 8 pm) between July to September 2019; patients were conveniently selected based on their accesibility, and the recruitment was stopped when a minimum sample size of 228 patients was reached. The pharmacy counter staff receiving prescriptions were in charge of selecting prescriptions which meet the inclusion criteria. A training session was conducted prior to the data collection, and a form containing details on the inclusion criteria was provided to their desks. The pharmacy counter staff were asked to give special marks (i.e. yellow stickers) on the prescriptions which met the inclusion criteria; this was to help the data collectors to identify the potential participants to be observed during the information provision and to be approached for information recall.

Tabel 2. Characteristics of pharmacy staff providing information

Characteristics	n (%)
Pharmacist (n=2)	
Gender	
Male	2 (100.00)
Female	0 (0.00)
Age; years. mean (SD)	24.50 (0.71)
Work experience; years. mean (SD)	2.00 (0.00)
Pharmacy technician[ǂ] (n=9)	
Gender	
Male	2 (22.22)
Female	7 (77.78)
Age; years. mean (SD)	30.11 (7.10)
Work experience; years. mean (SD)	9.78 (7.81)

[ǂ] Diploma in Pharmacy qualification

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Table 3. Information given by pharmacy staff

Information items; n (%)	Total (N= 230)	Pharmacist (n= 142)	Pharmacy technician (n= 88)	p-value[†]
Antibiotic identification[¶]				
Written (label)	184 (80.0)	122 (85.9)	62 (70.5)	0.004*
Verbal	207 (90.0)	136 (95.8)	71 (80.7)	<0.001*
Combined (written and/or verbal)	211 (91.7)	138 (97.2)	73 (83.0)	<0.001*
Indication				
Written (label)	90 (39.1)	61 (43.0)	29 (33.0)	0.132
Verbal	222 (96.5)	140 (98.6)	82 (93.2)	0.030*
Combined (written and/or verbal)	226 (98.3)	142 (100.0)	84 (95.5)	0.011*
Route of administration				
Written (label)	229 (99.6)	142 (100.0)	87 (98.9)	0.204
Verbal	220 (95.7)	142 (100.0)	78 (88.6)	<0.001*
Combined (written and/or verbal)	229 (99.6)	142 (100.0)	87 (98.9)	0.204
Frequency (number of administration per day)				
Written (label)	230 (100.0)	142 (100.0)	88 (100.0)	1.000
Verbal	220 (95.7)	142 (100.0)	78 (88.6)	<0.001*
Combined (written and/or verbal)	230 (100.0)	142 (100.0)	88 (100.0)	1.000
Dosage (each administration)				
Written (label)	230 (100.0)	142 (100.0)	88 (100.0)	1.000
Verbal	220 (95.7)	142 (100.0)	78 (88.6)	<0.001*
Combined (written and/or verbal)	230 (100.0)	142 (100.0)	88 (100.0)	1.000
Time (hour) of administration				
Written (label)	229 (99.6)	142 (100.0)	87 (98.9)	0.204
Verbal	199 (86.5)	137 (96.0)	62 (70.5)	<0.001*
Combined (written and/or verbal)	229 (99.6)	142 (100.0)	87 (98.9)	0.204
Time of administration (before/after meal)				
Written (label)	221 (96.1)	137 (96.5)	84 (95.5)	0.698
Verbal	186 (80.9)	119 (83.8)	67 (76.1)	0.152
Combined (written and/or verbal)	221 (96.1)	137 (96.5)	84 (95.5)	0.698
Duration of drug use				
Written on e-ticket	217 (94.3)	142 (100.0)	75 (85.2)	<0.001*
Verbal	219 (95.2)	139 (97.9)	80 (90.9)	0.016*
Combined (written and/or verbal)	225 (97.8)	142 (100.0)	83 (94.3)	0.004*
Actions taken when missing/omitting a dose				
Written (label)	2 (0.9)	0 (0.0)	2 (2.3)	0.072
Verbal	3 (1.3)	2 (1.4)	1 (1.1)	0.860
Combined (written and/or verbal)	3 (1.3)	2 (1.4)	1 (1.1)	0.860
Drug-drug interaction				N/A
Written (label)	0 (0.0)	0 (0.0)	0 (0.0)	
Verbal	0 (0.0)	0 (0.0)	0 (0.0)	
Combined (written and/or verbal)	0 (0.0)	0 (0.0)	0 (0.0)	
Drug-food interaction				N/A
Written (label)	0 (0.0)	0 (0.0)	0 (0.0)	
Verbal	0 (0.0)	0 (0.0)	0 (0.0)	
Combined (written and/or verbal)	0 (0.0)	0 (0.0)	0 (0.0)	
Potential side effects				N/A
Written (label)	0 (0.0)	0 (0.0)	0 (0.0)	
Verbal	0 (0.0)	0 (0.0)	0 (0.0)	
Mixed (e-ticket and/or verbal)	0 (0.0)	0 (0.0)	0 (0.0)	
Actions taken when side effects occur				
Written (label)	0 (0.0)	0 (0.0)	0 (0.0)	1.000
Verbal	2 (0.9)	2 (1.4)	0 (0.0)	0.265
Combined (written and/or verbal)	2 (0.9)	2 (1.4)	0 (0.0)	0.265
Storage				N/A
Written (label)	0 (0.0)	0 (0.0)	0 (0.0)	
Verbal	0 (0.0)	0 (0.0)	0 (0.0)	
Combined (written and/or verbal)	0 (0.0)	0 (0.0)	0 (0.0)	
Number of information items given				<0.001*
Mean (SD)	7.85 (0.52)	7.96 (0.35)	7.67 (0.67)	
Range (possible range 0-14)	5-10	7-10	5-9	

N/A= not applicable; [†]*p*-value from Kruskall-Wallis tests; [*]*p*-value significant; [¶]Indicating which medications are antibiotics

Before providing dispensed medications, it is the hospital procedure to check whether the person present is the patient or a representative; only the patients themselves were included in this study. The data collectors would approach the patients according to their convenient accessibility, and observe the information given by the pharmacy staff when handing out the dispensed antibiotics; this included verbal information as well as written information on the label attached to the medication container. The provision of verbal or written information was documented in the checklist which was marked as 'given' or 'not given'. Upon completion of information provision by the pharmacy staff, patients were approached

by the data collectors and again were checked if they themselves were the patients; only the patients themselves would be included in which they were explained about the study aims and were asked to participate. If they agreed to participate, they were asked to provide written informed consent and were interviewed to assess their ability to recall the information. At the beginning of the interview, patients were asked to identify which of their medications were antibiotics; if they failed to choose the correct ones, the data collectors would pick the antibiotics for them. Patients were then asked about each information item previously provided by the pharmacy staff; during the process, patients could see the label if they wished to read it (but the data collectors could not direct them to do so). The interview process was documented in which the information items correctly recalled by patients would be categorised as 'recalled', while items not reported or misreported by patients were treated as 'missed'. Initially the interview process was planned to be audiotaped, but this was considered not feasible due to the loud background noise while patients were unwilling to move to a private counselling area.

Data analysis

Data analysis was conducted descriptively and presented in the form of percentages or mean and standard deviation (SD). Differences between groups were tested using T-test or Kruskall-Wallis sign-ranked test (if the data were not normally distributed) for interval/ordinal data, and chi-square test was used for nominal data. Data on information given by pharmacy staff was analysed by determining the frequency and percentage of pharmacy staff who either provided or did not provide each of the information items ('given' versus 'not given'); these analyses were done for verbal and written information separately, as well as for the combination of verbal and written information. The number of information items given by each pharmacy staff member was calculated, and the mean (SD) was determined for the total pharmacy staff. For data on patient information recall, frequency and percentage of patients who 'recalled' versus 'missed' for each information item was calculated. The number of information items recalled by patients was analysed for each patient, and mean (SD) was determined for the total patients. The data analysis process was assisted with the use of Statistical Package for the Social Science (SPSS) software version 23 (IBM Corp., Armonk, NY, USA).

RESULTS

In total, 11 pharmacy staff – including two pharmacists and nine pharmacy technicians – were involved in providing information for patients when obtaining oral antibiotics within the study period. Pharmacists had worked in this setting for two years on average, while pharmacy technicians had a longer work experience of 10 years on average; most of the pharmacy staff were female. The characteristics of the pharmacy staff giving the information can be seen in Table 2.

In general, almost all pharmacy staff provided essential information – either verbal or written – on which medications were antibiotics ("antibiotic identification"), "indication", administration directions (including: "dosage", "frequency", "hour of administration" and "administration before/after meal", and "route of administration"), as well as "duration of use". Meanwhile, information regarding "action taken when missing/omitting a dose", "drug-drug interaction", "drug-food interaction", "storage", "side effects", and "action taken when side effects occur" were rarely communicated to patients. Of the 62 patients receiving dry syrup antibiotics, none was given secondary information on "disposal". Details of the essential information given by pharmacy staff, either verbal or written, are presented in Table 3.

Pharmacists in this study significantly provided more verbal or written information regarding "antibiotic identification", "indication", and "duration of use" compared to pharmacy technicians (all p-values <0.011). In addition, pharmacists provided more verbal information on "antibiotic identification", "indication", administration directions (including: "route of administration", "dosage", "frequency", and "hour of administration"), as well as "duration of use" (all p-values <0.031). The average number of information items given by pharmacists was significantly higher than pharmacy technicians (7.96 versus 7.67, respectively; p<0.001).

A total of 288 patients were approached during the study period; of those, 230 patients consented to the study, thus giving a response rate of 79.9%. Meanwhile, 58 patients refused to participate mainly due to lack of time or having other prior appointments. Of the 230 participating patients, approximately 60% were females, and graduated from senior high school (30.9%) or had a bachelor degree (24.3%). Of the total, 142 patients received information from pharmacists and 88 patients received information

Table 4. Characteristics of participating patients

Characteristics	Total (N= 230)	Patient provided information by		p-value†
		pharmacist (n= 142)	pharmacy technician (n= 88)	
Gender; n (%)				0.678
Male	85 (37.0)	51 (35.9)	34 (38.6)	
Female	145 (63.0)	91 (64.1)	54 (61.4)	
Age; years, mean (SD)	42.33 (15.36)	42.22 (14.95)	42.51 (16.08)	0.916
Education; n (%)				0.393
Elementary school	19 (8.3)	12 (8.5)	7 (8.0)	
Junior high school	22 (9.6)	13 (9.2)	9 (10.2)	
Senior high school	71 (30.9)	42 (29.6)	29 (33.0)	
D1 (1-year associate degree)	18 (7.8)	10 (7.0)	8 (9.1)	
D3 (3-year associate degree)	41 (17.8)	25 (17.6)	16 (18.2)	
Bachelor degree	56 (24.3)	37 (26.1)	19 (21.6)	
Master degree	3 (1.3)	3 (2.1)	0 (0.0)	

D= diploma: † *p*-value from Kruskall-Wallis test (for interval or ordinal data) or chi-square test (for gender)

Table 5. Information recalled by patients

Information items	Total (N= 230) n (%)	Patient provided information by		p-value†
		pharmacist (n= 142) n (%)	pharmacy technician (n= 88) n (%)	
Antibiotics identification¶				0.166
Recalled	176 (76.5)	113 (79.6)	63 (71.6)	
Missed	37 (16.1)	25 (17.6)	10 (11.4)	
Not given	19 (7.4)	4 (2.8)	15 (17.0)	
Indication				0.929
Recalled	177 (77.0)	109 (76.8)	68 (77.3)	
Missed	49 (21.3)	33 (23.2)	16 (18.2)	
Not given	4 (1.7)	0 (0.0)	4 (2.8)	
Route of administration				0.593
Recalled	223 (97.0)	137 (96.5)	86 (97.7)	
Missed	6 (2.5)	5 (3.5)	1 (1.4)	
Not given	1 (0.4)	0 (0.0)	1 (1.4)	
Frequency (number of administration per day)				0.256
Recalled	219 (95.2)	137 (96.5)	82 (93.2)	
Missed	11 (4.8)	5 (3.5)	6 (6.8)	
Not given	0 (0.0)	0 (0.0)	0 (0.0)	
Dosage (each administration)				0.423
Recalled	213 (92.6)	130 (91.5)	83 (94.3)	
Missed	17 (7.4)	10 (7.0)	5 (5.7)	
Not given	0 (0.0)	0 (0.0)	0 (0.0)	
Time (hour) of administration				0.091
Recalled	197 (85.7)	126 (88.7)	71 (80.7)	
Missed	32 (13.9)	16 (11.3)	17 (19.3)	
Not given	1 (0.4)	0 (0.0)	1 (1.4)	
Time of administration (before/after meal)				0.316
Recalled	205 (89.1)	124 (87.3)	81 (92.0)	
Missed	16 (6.9)	13 (9.2)	3 (3.4)	
Not given	9 (4.0)	5 (3.5)	4 (4.5)	
Duration of drug use				0.650
Recalled	209 (90.9)	130 (91.5)	79 (89.8)	
Missed	16 (6.9)	12 (8.5)	4 (4.5)	
Not given	5 (2.2)	0 (0.0)	5 (5.7)	
Actions taken when missing/omitting a dose				N/A
Missed	3 (1.3)	2 (1.4)	1 (1.4)	
Not given	227 (98.7)	140 (98.6)	87 (98.6)	
Drug-drug interaction				N/A
Not given	230 (100.0)	142 (100.0)	88 (100.0)	
Drug-food interaction				N/A
Not given	230 (100.0)	142 (100.0)	88 (100.0)	
Potential side effects				
Not given	230 (100.0)	142 (100.0)	88 (100.0)	
Actions taken when side effects occur				N/A
Missed	2 (0.9)	2 (1.4)	0 (0.0)	
Not given	228 (99.1)	140 (98.6)	88 (100.0)	
Storage				N/A
Not given	230 (100.0)	142 (100.0)	88 (100.0)	
Number of information items recalled				<0.001*
mean (SD)	7.06 (1.45)	7.11 (1.45)	6.98 (1.35)	
Range (possible range 0-14)	(2-8)	(2-8)	(3-8)	

†p-value from Kruskall-Wallis tests; *p-value significant; ¶Indicating which medications are antibiotics

from pharmacy technicians. There were no significant differences in the characteristics of patients receiving information from pharmacists or from pharmacy technicians. Details on patient characteristics can be seen in Table 4.

From the essential information provided, almost all patients could recall the information items relating to administration directions [including: "route of administration" (97%), "frequency" (95.2%), "dosage" (92.6%), "hour of administration (85.7%), and "administration before/after meal" (89.1%)] as well as "duration of use" (90.9%). Fewer patients are able to recall "antibiotic identification" (76.5%) or "indication" (77%). The average items of information recalled by patients was 7.09 (SD 1.45), with significantly higher recall of information provided by pharmacists compared to that provided by technicians (p<0.001). The profile of patient information recalled is detailed in Table 5.

DISCUSSION

This study has examined the quality of antibiotic information given by pharmacy staff and level of recall by patients in an Indonesian outpatient setting. In general, pharmacy staff have provided limited essential information which mainly related to antibiotic identification, indication, and administration directions. From the information given,

however, patients showed an adequate ability to recall that information. This study findings might indicate that pharmacy staff – as the last healthcare personnel interacting with patients before they use their medications – provide an essential role in optimising the process of information transmission in order to ensure patients' understanding towards their use of antibiotics.[36,37]

Of the 230 patient encounters in this study, information was provided most frequently by pharmacists (n=142). Pharmacists also generally provided more of the defined essential information compared to pharmacy technicians, particularly verbal information. It should be acknowledged that verbal communication is required to complement written information; previous studies have reported that some patients preferred verbal counselling, and there were individuals who have had difficulty understanding the information written on the medication label.[41-43] Other studies conducted in the USA have indicated that approximately 50% of patients misunderstood one of more instructions listed on the medication label; types of information often misunderstood by patients were frequency and dosage.[41,42] The common causes for misunderstanding included label language – poor word recognition (for example: tablespoon versus teaspoon) or using language not in normal usage (for example: administered orally), and complexity of instructions.[42] Similarly, a study in Indonesia reported that failure to understand written information regarding route of administration, frequency, dosage, and time of administration have been one of the contributing factors to the inappropriate use of antibiotics.[44] It should be noted that the effectiveness of antibiotics is partially determined by the appropriateness of the route of administration, frequency, dosage, and time of administration.

Secondly, pharmacists in this study were found to provide more written or verbal information items regarding "antibiotic identification", "indication", and "duration of use". It is important to counsel patients on which of their medications are antibiotics and what are the indications, since antibiotics have different characteristics compared to other drug classifications, such as medications for chronic diseases. One such characteristic is related to "duration of use", which was mentioned less frequently by pharmacy technicians in this study. Antibiotics should be taken according to the recommended duration (finishing 'a course'), which is different from some symptomatic medications which are only administered when the symptoms occur.[45] The better performance by pharmacists in providing antibiotic information in this study might be because the Indonesian competence standards for pharmacists are focusing more on the professional skills, while the standards for pharmacy technicians concentrate more on the technical skills of dispensing.[46] This is also supported with the introduction of standards of pharmacy practice in hospitals as well as in community pharmacies in 2016 by the Indonesian Government; the standards clearly state that it is a pharmacists' responsibility to dispense prescription medications and to provide appropriate information to ensure quality use of medications.[36,37] Findings in this study, therefore, suggest that pharmacists are expected to do more counselling rather than pharmacy technicians, thus optimising patients' understanding and appropriate use of medications.

Of the essential information given by the pharmacy staff, participating patients generally performed adequately in recalling information on route of administration (97%), frequency (95.2%), dosage (92.6%), duration of use (90.9%), and time of administration (hour of administration, 85.7%, and administration before/after meal, 89.1%). This is potentially because information pertaining to administration directions is directly related to the technical aspects on how patients use their medications. Fewer patients were able to recall "antibiotic identification" (76.5%) and "indication" (77%). This is in parallel with the fact that less written information was given with regards to "antibiotic identification", particularly by pharmacy technicians. It should be noted that antibiotics have specific directions for use to optimise its effectiveness, hence, written information can be used to help patients to identify which of their medications are antibiotics.[45] Similarly, with information on "indication", only approximately 40% of pharmacists or pharmacy technicians provided written information (they tended to provide the information verbally). It should be noted that the Indonesian standards for medication labels are limited to patients' name and individual administration directions with the addition of general information, such as date of dispensing and the pharmacy details).[37] Thus, the use of written information (such as included on the attached label on the medication container) with regard to antibiotic identification and indication should be encouraged. The FIP Working Group for Labelling has recommended the inclusion of generic names (product names), in addition to administration directions, as the minimum information for labels of prescribed medicines.[47] Whenever necessary, the use of ancillary labels can be considered to provide specific information, such as antibiotic indication. Ancillary labels have been used in the UK and Australia, and have been reported to conveniently and effectively reinforce pharmacists' verbal consultations in providing information on the correct use of medications.[48,49]

About half of the defined essential information items were not communicated by pharmacists or pharmacy technicians, either verbally or written on the label; this included: drug interactions, side effects, storage, and disposal (for dry syrup). In line with a study by Koster *et al*. (2015) in outpatients pharmacies in Netherlands, information relating to storage and disposal was never provided to patients.[50] Meanwhile, information on side effects and interactions were communicated only to a small proportion of patients (22% and 4%, respectively).[50] It should be acknowledged that patient needs for information relating to side effects and drug interactions have been relatively high, especially during first prescription encounters.[8,51,52] One study has suggested that the low rates of information provision relating to side effects and interactions might be due the pharmacy staff concerns that patients might fear to take their medications and thus hamper their adherence.[43] Therefore, the provision of comprehensive information - which is also includes interactions, side effects, storage, and disposal - warrants special attention, particularly with regard to when and how the information should be provided.

This study has some limitations. Firstly, this study was conducted during clinic's specific operating times, when they were busier, so that the results should be generalised with caution. However, a response rate of 80% (of the patients approached) or 51% (of the total patients prescribed antibiotics and presented in the clinic) was achieved, thus suggesting that this study should provide adequate insight regarding the information transmission process in this outpatient setting. Secondly, there was a risk of observation bias (Hawthorne effect) while observing the information provision by the pharmacy staff. The data collectors, however, were pharmacy technician interns who were already assigned to the study setting (covert approach), thus it was expected that the pharmacy staff could maintain their normal behaviour since they would consider interns were observing for their own learning.[38] In addition, pharmacy staff were asked for their consent at the beginning of the study while they were not informed when the actual observation might take place. Finally, data on patients' recall of information was collected directly after the information was provided; hence, it does not provide data on patients' ability to retain the information over a longer period of time. However, antibiotics are generally taken for a short period of time, thus issues with information retention might be minimal.[45]

CONCLUSIONS

This study has provided a preliminary mapping of antibiotic information transmission between pharmacy staff and patients in an Indonesian hospital outpatient setting. While pharmacy staff tended to provide information to a limited extent, patients generally showed an adequate ability to recall the information provided. Further research is required to explore the process of information transmission and the contributing factors, such as patient interaction, pharmacist professionalism, time allocation, and pharmacy internal factors. This should provide a basis for developing appropriate interventions and defining the scope of information to be provided, to facilitate an effective information transmission, thus improving patients' understanding and quality use of antibiotics in Indonesia.

CONFLICT OF INTEREST

Authors declared none.

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