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Evaluation of pharmacist's practices regarding pediatric diarrhea management therapy: A simulated patient study

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ABSTRACT

Pharmacist's are expected to provide patients with relevant drug information services. The patient simulation method can be used to investigate the quality of pharmacists drug information provision to patients and their selection of medicine therapy for managing diarrhea in children. This study aimed to analyze the profile of drug information services and recommendations for pediatric diarrhea therapy by pharmacists in pharmacies in Malang, East Java Province, Indonesia, using the patient simulation method. The study is a descriptive observational study using the patient simulation method. The sample was pharmacists in some pharmacies in Malang, East Java Province, Indonesia, who were selected using a convenience sampling technique. The instruments used were pediatric diarrhea scenarios, a drug information service profile data collection form, and a pharmacist recommendation form for pediatric diarrhea therapy. The data were analyzed descriptively. A total of 92 community pharmacies were visited by the simulated patients. The majority of pharmacists asked for information about the patient's age (86.96%), recommended single adsorbent therapy (22.83%) and provided information about how to use the medicines (93.46%). Not all pharmacists performed a complete and appropriate medicine search. Community pharmacists require training in pediatric diarrhea information services in order to enhance their knowledge and application of pediatric diarrhea drug information services.

INTRODUCTION

Inappropriate management and treatment of diarrhea can be a severe problem. Many medicines available in pharmacies can be used to treat diarrhea in children. These may be traditional medicines, over-the-counter medicines, or prescribed medicines. Many people also use self-medication to treat diarrhea in children. Pharmacists are supposed to be knowledgeable and precise while selecting diarrhea therapy for children. They must also offer information about diarrhoeal drugs, such as indications, mechanism of action, side effects, interactions, storage, and non-pharmacological therapy [1,2].

The patient simulation method can determine the quality of pharmacists' drug information provision to patients and their selection of medicine therapy for the treatment of diarrhea in children. In the patient simulation procedure, community pharmacists were not aware they were being evaluated, resulting in more accurate evaluation results [3]. The question of whether researchers ought to speak with neighborhood pharmacists before running a simulated patient study is still up for debate. According to research, visiting neighborhood pharmacists before the study is advised. Advice is given more effectively when it is known that the fictitious patient will visit the drugstore [4]. Another viewpoint holds that pharmacists working in the pharmacy should not be aware of the research employing patient simulation in order to prevent bias in the study's findings and pharmacists' refusal to participate in

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research that would improve the quality of their advice under real-world circumstances. After the research is finished, the researcher will inform local pharmacists. The data obtained will not be used in the data analysis if the neighborhood pharmacist declines to participate [5]. With this method, it is anticipated that it will be possible to determine how pharmacists provide pharmaceutical services regarding the management of diarrhea therapy in children and the selection of treatment according to the researcher-designed situation [3,6].

A study conducted in the city of Araju, Brazil, using the patient simulation method, found that the symptoms of diarrhea (36%) are the most frequently investigated by respondents during pharmacists' assessment phase [7]. Another study conducted in five northern cities of Ethiopia using the patient simulation method found that when the pharmacists' assessment phase, respondents asked about age (90.3%) and duration of symptoms (67.3%). The medicines recommended by respondents were oral rehydration solution (ORS) and zinc (58.3%) and antibacterial (51.3%). In the drug information phase, respondents were provided with written information about the recommended medicines, namely how to use the medicine (33%) and the purpose of using the medicine (33%) [8]. According to this study, not all pharmacists provide pharmacist assessment, make recommendations for pediatric diarrhoeal treatment, and provide information related to pediatric diarrhoeal medicine.

The researchers believe this research is necessary because similar research has never been conducted in Malang, East Java Province, Indonesia pharmacies. A pharmacy is a healthcare facility that contributes to the improvement of public health and is the site where pharmacists practice. There is a role for community pharmacists in advising on the treatment and prevention of pediatric diarrhea [9]. A study found, that the incidence of diarrhea in children under 5 years of age in Malang, East Java Province, Indonesia, was 44,389 in 2020 [10]. This incidence rate can be reduced if community pharmacists can adequately provide pharmaceutical services for the therapeutic management of pediatric diarrhea and its prevention. This study analyzed the patient simulation method to analyze the profile of drug information services and recommendations for pediatric diarrhea therapy provided by community pharmacies in Malang, East Java Province, Indonesia.

MATERIALS AND METHODS

Study design

This study was a descriptive observational study with a cross-sectional design using the patient simulation method. The research samples were collected using convenience sampling techniques from pharmacists in Malang, East Java Province, Indonesia (Malang City, Malang Regency, and Batu City), Indonesia, according to the inclusion criteria from January to March 2023.

Study population and sample

The population in this study was community pharmacists in Malang, East Java Province, Indonesia (Malang City, Malang Regency, and Batu City), who provided drug information services and recommendations for treating pediatric diarrhea to parents with children with diarrhea. There are three types of respondents: pharmacists who provided pharmaceutical services in Malang, East Java Province; pharmacists who did not provide services to other consumers; and pharmacists who provided pharmaceutical services for self-medication of childhood diarrhea. The sampling technique used in this study was convenience sampling. To avoid bias in the study, pharmacists who knew or suspected that pharmacists were evaluated or used as research subjects by simulated patients by looking at the voice recorders worn by simulated patients who were not included in the research criteria. The sample size for this research was determined with the Slovin sample size formula:

$$n = \frac{N}{1 + N.e^2}$$

where N comes from the total population of pharmacists practicing in Malang, East Java Province, Indonesia pharmacy (N = 356), at the same time, the value of e (error tolerance limit or critical value) uses a discount of 10%, from the results of sample calculation, the minimum sample size was 78 respondents. In this study, the sample size used was 92 respondents.

Patient simulation

Patient simulation method

The patient simulation evaluated pharmacists' practice in providing information and recommendations on diarrhea in children's treatment pharmacies in Malang, East Java Province, Indonesia. The patient simulation method was used to study the behavior of healthcare providers to minimize observational bias. In this method, a trained person visited the pharmacy and acts out a specific scenario to test particular pharmacist or pharmacy staff behaviors [3,5]. The aim was to try certain behaviors of pharmacists or pharmacy staff. The trained person is the researcher, who has been trained previously [6,11]. In this method, the simulated patients were specifically trained to simulate scenarios designed by the researchers.

Patient simulation training

The researchers selected two final-year students from non-health disciplines as patient simulations. Each patient simulation performed the same task, namely visiting the pharmacy to see a pharmacist, and then the patient simulation was practiced according to the scenario case designed by the researchers. The researchers trained the patient simulations for 1 month so that they were not uncomfortable when visiting the pharmacy. The training provided by the researchers to the simulated patients includes the researchers explaining the purpose of the research to the simulated patients, the case scenarios that the pharmacy simulations will practice with the pharmacists during the pharmacy visits, and instructions on how the simulated patients should behave during the pharmacy visits with the pharmacists. Five pharmacies in the affected area that were excluded from the research sample underwent the trial of simulated patients visiting the drugstore and demonstrating the scenario created by the researcher. In order for the data collection form for the profile of drug information services and suggestions for the treatment

of diarrhea in children made by community pharmacists to be employed in this study, it was made sure that the simulated patient rapidly comprehended the scenario.

Scenario

The scenarios were used in this study as the basis for the simulation patient method, containing patient-related data and information presented when the simulated patients come to the pharmacy to meet the pharmacist. In this study, there was one scenario that the simulated patients did to the pharmacist. The creation of this scenario refers to several studies conducted by Abegaz *et al.* [8]; Mesquita *et al.* [7]; Ogbo *et al.* [9]; and Sancar *et al.* [12]. It also refers to the guidelines for therapeutic managing pediatric diarrhea from the Ministry of Health of the Republic of Indonesia and the World Health Organization [13,14].

The simulated patient came to the pharmacy to meet the pharmacist to discuss diarrhea medication for her child. Table 1 shows the scenario that the simulated patient will practice when visiting the pharmacy. The researchers trained the simulated patient on how the simulated patient interacted with the pharmacist and what responses could be given when the pharmacist asked the simulated patient for additional information.

Before simulated patients used the scenario, the researchers held discussions with two community pharmacy lecturers and three pharmacists who had provided self-medication for pediatric diarrhea in the pharmacy. This was done as part of the face and content validity process, as well as adapting the case to the context of community behavior in providing self-medication concerning the treatment of pediatric diarrhea. To obtain face and content validity, simulated patients conducted a pilot test by visiting pharmacies to consult with pharmacists about managing pediatric diarrhea therapy (pilot visit); this visit was made to five pharmacies. The simulated patient visit to five pharmacies was also designed to test the reliability of the research tool. It was reliable if the researchers could carry out the scenario and capture all the information obtained when trying the same results. The validation method used in this study is based on that used by Malik *et al.* [15] and Mesquita *et al.* [7].

Evaluation of the service profile of drug information and diarrhea in children treatment recommendations by pharmacists

This study evaluated the pediatric diarrhea drug information services and treatment recommendations provided by community pharmacists using a data collection form for the profile of pediatric diarrhea drug information services and treatment recommendations for pediatric diarrhea and a voice recorder. A data collection form for the profile of drug information services and diarrhea in children therapy recommendations by community pharmacists was designed and used to collect data from simulated patient visits to pharmacies. A voice recorder was worn by the simulated patient when visiting the pharmacy for advice on the management of pediatric diarrhea. One day after the simulated patient visited the pharmacy, the simulated patient met with the researcher to present the results of the voice recording. Then the researchers completed the data collection form according to the pharmacist's response when the simulated patient consulted with the pharmacist about managing diarrhea in children's therapy. The data collection form included the pharmacy's identity, a checklist of pharmacists' assessment during interactions with simulated patients, a list of therapy recommendations provided by the pharmacist to the simulated patient, and a checklist of drug information services provided to the simulated patient. To evaluate the pediatric diarrhea drug information service and its treatment recommendations, the researchers referred to the pediatric diarrhea treatment guidelines of the Ministry of Health of the Republic of Indonesia and the World Health Organization [13,14].

Ethical approval

The research protocol approved by the Ethics Commission of the Faculty of Medicine, Brawijaya University, with notice number: 225/EC/KEPK/10/2022.

Research permission was also obtained from the pharmacist professional organization in Malang. Pharmacists in the community were informed about the study, although the information provided was not detailed. If there are pharmacists in the community who do not agree to do this research, the researcher will not include respondents in this study. The patient simulation research method was used to evaluate the information service of pediatric diarrhea drugs by pharmacists in the community.

Data analysis

After the simulated patient had completed the pharmacy visit, the researcher analyzed the data collection form on the profile of drug information services and recommendations for pediatric diarrhea therapy by community pharmacists. Descriptive analysis was used to analyze the data, and the data were presented in tabular form.

RESULTS

This study involved 92 community pharmacists in Malang, East Java Province, Indonesia (38 community pharmacist respondents working in Malang City, 48 community pharmacist respondents working in Malang Regency, and 6 community pharmacist respondents working in Batu City). Simulated patients visited respondents who had consented to participate in the study. While the simulated patient visited the pharmacy to consult with the pharmacist regarding managing pediatric diarrhea therapy, none of the pharmacists were suspicious that the simulated pharmacy was conducting research. Most pharmacists met by simulated patients were female, with 81 respondents (88.05%). The total time spent on counseling was 6.93 minutes (standard deviation = 2.93 minutes), with the lowest and highest durations for pediatric diarrhea drug information services being 3.07 and 16.22 minutes, respectively. Consultation time was measured from when the simulated patient met the pharmacist to when the simulated patient left the pharmacy.

The drug information services provided by pharmacists to simulated patients in the management of pediatric diarrhoeal disease include assessment, recommendations for pediatric diarrhoeal treatment, and information regarding pediatric diarrhoeal medicine. The frequency distribution of pharmacists' assessment during interactions with simulated patients is in Table 2.

Table 2 shows that not all pharmacists provided complete information to the simulated patients. Based on the profile of drug information obtained by pharmacists from

Table 1. Simulated scenario.

Scenario:		
A 27-year-old woman came to the community pharmacy to meet the pharmacist. She wants to consult with the pharmacist regarding diarrhea treatment for her child.		
Additional information for the simulated patient if the pharmacist asks for more details about the case.		
	Drug information	**Information about patient**
A	Age	Citra, 5 years old
S	Self/someone else	The patient's mother came to the pharmacy to buy medicine
M	Medicines	Ibuprofen syrup
E	Exact symptoms	Diarrhea, fever, and vomiting
T	Time/duration	Diarrhea since last night
T	Taking anything/seeing a doctor	The mothers have not been taken to the doctor
H	History	Citra bought food at school. After school, she complained of stomach pain and then diarrhea.
O	Other symptoms	Diarrhea and fever with a temperature of 38°C since last night, accompanied by mild nausea. Diarrhea occurs four times a day, with liquid stool consistency like water, with no blood and mucus in the stool. Since the diarrhea, the child has found it challenging to eat.
D	Doing anything to aggravate/alleviate	None

simulated patients, pharmacists obtained information about the patient's age (86.96%), frequency of diarrhea (57.61%), and duration of diarrhea (46.74%). Few pharmacists collected information about the consistency of stools (2.27% foamy, 4.35% bloody, and 4.35% slimy), complaints of abdominal pain (4.35%), and medicine allergies (5.43%).

This study revealed that pharmacists provided distinct recommendations for treating pediatric diarrhea to simulated patients. The frequency distribution of pharmacotherapeutic recommendations during the interactions with simulated patients is shown in Table 3.

According to the study's findings, all pharmacists advised pediatric diarrhea medication to simulated patients; however, only 5.43% of pharmacists suggested ORS and zinc together. Most pharmacists recommended single adsorbent therapy (22.83%), a combination of probiotics-adsorbent (14.13%), a combination of zinc-probiotics (6.42%), and a combination of fluid rehydration-zinc-probiotics (6.42%) (Table 3).

The frequency distribution of pharmacists providing drug information to simulated patients can be seen in Table 4.

According to the results of the study, the most common types of drug information given by pharmacists to simulated patients were the rules of use of drugs (93.46%), indications of drugs (71.74%), and how to use drugs (69.57%). There were no pharmacists who did not provide any information on pediatric diarrheal medicines to simulated patients. The least common drug information provided by pharmacists to simulated patients was an explanation of dehydration (7.61%), side effects (7.61%), and signs of drug failure (2.17%) (Table 4).

Table 2. Frequency distribution of pharmacists' assessment during interactions with simulated patients.

Pharmacists' assessment during interactions with simulated patients	**Total number of pharmacists (*n* = 92) Frequency (%)**
Age	80 (86.96)
Weight	18 (19.56)
Medical history	29 (31.52)
Diarrhea frequency	53 (57.61)
Duration of diarrhea	43 (46.74)
Stool consistency	
a. Watery stool	30 (32.61)
b. Bloody stool	4 (4.35)
c. Foaming stool	2 (2.17)
d. Mucous stool	4 (4.35)
Medicine allergy	5 (5.43)
History of specific food consumption	18 (19.57)
Other symptoms	
a. Vomiting	11 (11.96)
b. Fever	26 (28.26)
c. Paralysis	11 (11.96)
d. Abdominal pain	4 (4.35)
Other symptoms of eating and drink	
a. Craving for eating	11 (11.96)
b. Craving for a drink	7 (7.61)

DISCUSSION

This study aimed to analyze the profile of pediatric diarrhea drug information services and pediatric diarrhea therapy recommendations by pharmacists in pharmacies in the Malang area using the patient simulation method. The method of patient simulation has been utilized globally to identify problems in contemporary pharmaceutical practice. In this procedure, the pharmacist is oblivious that they are participating in a study

Table 3. Frequency distribution of pharmacotherapeutic recommendations during the interactions with simulated patients.

Total number of pharmacists (n = 92) Frequency (%)	Pharmacotherapeutic recommendations															Number of medicine types (n = 15) Frequency (%)
	ORS	Zinc	Probiotic	Herbal medicine	Kaolin Pectin	Attapulgite	Sulfametoksazole	Nifuroxazide	Multivitamin	Antacid	Domperidone	Paracetamol	Azithromycin	Ondansetron	Antalgin	
5 (5.43)				▪												1 (6.66)
21 (22.83)					▪											1 (6.66)
4 (4.35)				▪												1 (6.66)
1 (1.09)						▪										1 (6.66)
1 (1.09)							▪									1 (6.66)
5 (5.43)	▪	▪														2 (13.33)
3 (3.26)		▪			▪											2 (13.33)
1 (1.09)			▪					▪								2 (13.33)
2 (2.17)	▪				▪											2 (13.33)
6 (6.52)		▪	▪													2 (13.33)
13 (14.13)			▪		▪											2 (13.33)
1 (1.09)					▪				▪							2 (13.33)
3 (3.26)			▪	▪												2 (13.33)
1 (1.09)	▪						▪									2 (13.33)
1 (1.09)	▪	▪		▪												3 (20)
6 (6.52)	▪	▪	▪													3 (20)
5 (5.43)	▪	▪			▪											3 (20)
4 (4.35)		▪	▪		▪											3 (20)
1 (1.09)			▪		▪		▪									3 (20)
1 (1.09)	▪		▪		▪											3 (20)
3 (3.26)	▪	▪		▪												3 (20)
1 (1.09)	▪	▪	▪							▪						4 (26.67)
1 (1.09)		▪	▪		▪						▪					4 (26.67)
1 (1.09)	▪	▪	▪		▪							▪				5 (33.33)
1 (1.09)	▪	▪	▪										▪	▪	▪	6 (40)

and interacts with a simulated patient. Using simulated patients is a well-established and accepted method for evaluating the professional behavior of community pharmacists and reducing research bias. The researchers instruct simulated patients to attend the pharmacy and practice the research scenario they have designed [16,17]. Due to the limited number of pharmacy staff in the pharmacy to serve patients, the crowded state of the pharmacy, and the low perception of pharmacists in providing medicine information services to patients, the time required by each respondent to advise parents of patients with children suffering from diarrhea differs [18].

Pharmacists must do pharmacists' assessments to obtain exclusive medical history data from patients with diarrhea assessments [19]. Pharmacists can do pharmacists assessments about pediatric diarrhea, including the onset, duration, severity, and frequency of diarrhea, other symptoms experienced by the patient (fever, abdominal pain, nausea, and vomiting), stool consistency (bloody stools, slimy stools, foamy stools, and watery stools), and signs of dehydration (restlessness, sunken eyes, drowsiness, weakness, and extreme thirst). A pharmacist should also do pharmacists assessments about the patient's identity (name, age, weight, address, and contact telephone number), history of medicine use and medicine allergies, and whether the patient is willing to eat and drink during diarrhea [15,19,20].

Few pharmacists still do pharmacists assessments about defecation consistency based on research conducted by researchers. A study conducted in five cities in eastern Ethiopia showed similar results to this study, with most pharmacists assessing information on age (90.3%), frequency of diarrhea (44.2%), and duration of diarrhea (67.3%) [8]. Another study conducted in Turkey showed that most pharmacists assessing drug information related to age (47%), duration of diarrhea (18%), and other symptoms experienced by the patient (9%) [12]. The difference in the assessment was due to the lack of training of pharmacists in assessing patients and the crowded

Table 4. Frequency distribution of pharmacists providing drug information to simulated patients.

Drug information	Total number of pharmacists (n = 92) Frequency (%)
Indication	66 (71.74)
Drug administration times	86 (93.46)
How to use medicine	64 (69.57)
Drug interaction	20 (21.74)
Explanation of diarrhea	12 (13.04)
Explanation of dehydration	7 (7.61)
Non-pharmacological advice	48 (52.17)
Adverse drug reaction	7 (7.61)
Storage	37 (40.22)
Sign of damaged medicines	2 (2.17)
Beyond use date	14 (15.22)
Recommendation to the health facility	17 (18.48)

conditions in the pharmacy, so pharmacists were in a hurry to assess drug information. Pharmacist training in the assessment of patients significantly impacts identifying patient problems before making pharmacological and non-pharmacological therapy recommendations [21,22].

Pharmacists can do pharmacist assessments about age and weight to provide information about the dosage and type of medicine given to patients [23]. In the study, however, only 19.56% of pharmacists evaluate body weight information. The severity of diarrhea experienced by patients must be determined by pharmacists after discussing the frequency and duration of diarrhea with patients [12,16]. The pharmacist should inquire about the stool consistency and the presence of abdominal pain. The consistency of the patient's crimson, mucous, and foamy feces may be indicative of the severity of the patient's diarrhea. This information can be obtained by pharmacists so that they are aware of the severity of the patient's diarrhea. Additionally, they can recommend an appropriate treatment and refer the patient to the closest health facility or physician [9,24]. The scenario designed by the researcher shows that the patient is taking ibuprofen syrup. In this study, only 31.52% of pharmacists obtained information about medication history. Treatment history needs to be explored by pharmacists to avoid duplication of therapy recommended by pharmacists [2,25].

Based on guidelines recommended by the Ministry of Health of the Republic of Indonesia and the WHO, the first-line treatment for pediatric diarrhea is administering ORS and zinc for acute pediatric diarrhea. ORS is a mixed solution of electrolyte salts such as sodium chloride (NaCl), potassium chloride (KCl), trisodium citrate hydrate, and anhydrous glucose that can be administered orally. ORS is given to replace the lost fluid when a child has diarrhea. The glucose in ORS helps to increase the reabsorption of water and electrolytes released into the bowel lumen during diarrhea. This can happen because there is a co-transport mechanism between sodium and glucose [26,27]. It has been demonstrated that zinc administration during diarrhea reduces the duration, severity, and frequency of gastrointestinal movements. Zinc shortens the duration of diarrhea by accelerating the regeneration of the intestinal epithelial layer, increasing the absorption of water and electrolytes in the intestine, increasing the levels of enterocyte brush border enzymes, and boosting the immune response, which can speed up the clearance of pathogens from the intestine [28,29].

Not all respondents to this survey provided recommendations for first-line treatment of pediatric diarrhea as recommended by the Ministry of Health of the Republic of Indonesia and WHO. The low rate of pharmacists recommending first-line therapy for pediatric diarrhea has been documented in several studies. A study conducted in Istanbul, Turkey, reported that no pharmacist recommended the combination of ORS and zinc as therapy for pediatric diarrhea. Most pharmacists recommended probiotics alone (18%) [12]. Another study conducted in 186 pharmacies in Lagos, Nigeria, reported that 62.4% of pharmacists recommended a combination of ORS, antibiotics, adsorbent, and antispasmodic [9].

The majority of respondents advocated for the use of solitary adsorbent therapy, probiotic-adsorbent combination, zinc-probiotic combination, and fluid rehydration-zinc-probiotic combination. As a treatment for pediatric gastroenteritis, adsorbents are not recommended. The body responds to diarrhea with increased motility, or gastrointestinal movement, in order to expel debris or toxins. Anti-diarrheal medications inhibit these movements, preventing the release of excrement that should be eliminated. In addition to causing prolapse of the bowel, anti-diarrheal medicines can also cause prolapse of the intestine. This condition is hazardous and surgical treatment is necessary. Therefore, anti-diarrheal medications should not be administered [27,30].

Multiple studies have demonstrated the effectiveness of probiotics in the primary and secondary prevention and treatment of diarrhea. Briefly, the mechanism is to increase the colonization of probiotic bacteria in the lumen of the gastrointestinal tract so that the entire epithelium of the intestinal mucosa is occupied by probiotic bacteria via receptors on the intestinal epithelial cells, leaving no space for pathogenic bacteria to attach to and eventually colonize the intestinal epithelial cells [31,32]. In Vietnam, a study of 275 community pharmacists found that probiotics and antidiarrhoeal agents (adsorbents) were still frequently recommended. However, antidiarrhoeal agents (adsorbents) are not recommended as a therapy for children with diarrhea [33].

Pharmacists must provide patients with medication information so that patients can comprehend the medication. The provision of medication information by pharmacists also increases treatment adherence and reduces medication errors [2,22]. In this study, most respondents provided drug information to simulated patients about the rules of use, indications for use, and how to use drugs. The results of this study are consistent with a study conducted in five cities in northern Ethiopia, where 72.6% of pharmacists provided information on drug administration times [8]. Another study conducted in 25 pharmacies in Aracaju, Brazil, reported that 80% of pharmacists provided information on drug indications [7]. A study of 100 pharmacies in Istanbul,

Turkey, reported that 33% of pharmacists offered information on the use of medicines [12].

All respondents in this study did not provide information on the explanation of dehydration, side effects of medicines, and signs of wrong medication. Explanation of dehydration needs to be given by pharmacists because dehydration in children requires appropriate treatment as the dangers of dehydration are pretty fatal, namely fluid loss leading to death [26]. Pharmacists can provide information on the definition, symptoms, and steps to take if a child is dehydrated [22]. Side effect information needs to be provided by pharmacists so that patients can identify and report to pharmacists or other healthcare professionals any side effects that occur while taking medicine [34]. A study conducted in 57 pharmacies in Gondar City, Ethiopia, reported that none of the pharmacists explained dehydration in pediatric diarrhea. In this study, 26% of pharmacists provided information on adverse drug reactions [35]. There are problems if pharmacists do not provide information on the signs of damaged drugs, namely ineffective therapy, prolongation of illness, and increased health care costs [36]. Based on the literature review, only one study (3.8%) described the signs of damaged medicines and the correct way to store medication for treating pediatric diarrhea [16].

According to WHO guidelines, pharmacists must provide appropriate, effective, and expeditious medication information to patients who visit the pharmacy without a prescription and help them select the correct medication based on their complaints. Pharmacists are responsible for counseling patients, selecting the appropriate therapy based on the patient's condition, and providing objective information about medications, how to use medications, and when patients should consult a physician or the nearest health facility [7]. According to the study results, not all pharmacists gathered information, made appropriate therapy recommendations, and provided complete information about medicines. The variation in pharmacists' provision of information on pediatric diarrhoeal medication is due to inequitable distribution of resources and lack of training. A study of 275 pharmacists in 5 provinces in Vietnam reported that pharmacists' knowledge of childhood diarrhea increased significantly after training, and their selection of therapeutic recommendations was more appropriate [33]. Training community pharmacists in pediatric diarrhea medication information services significantly improves pharmacists' knowledge and application of these services [21,33].

The limitation of this study is that the simulated patient visited the pharmacy once to consult with the pharmacist about the management of pediatric diarrhea therapy. As a result, this study is insufficient to evaluate pharmacist performance, especially when more than one pharmacist works in the pharmacy. In this study, the patient simulation method did not provide feedback on pharmacist performance in relation to the management of pediatric diarrhea therapy. In addition, this study did not measure pharmacists' behavioral change (or lack of behavioral change) over time.

CONCLUSION

Overall, not all pharmacists gathered sufficient information, offered appropriate therapeutic recommendations, or provided comprehensive pharmaceutical information. Pharmacists play an essential role in increasing patients' quality of life. One is to give relevant drug information services, such as providing assessment, therapeutic advice, and drug information. Pharmacists should provide comprehensive and suitable drug information services to increase the efficacy of children's diarrhea therapeutic management.

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AUTHOR CONTRIBUTIONS

All authors made substantial contributions to the conception and design, data collection, or analysis and interpretation of data; participated in drafting the article or revising it critically for important intellectual content; agreed to submit to the current journal; gave final approval of the version to be published; and accepted responsibility for all aspects of the work.

CONFLICTS OF INTEREST

The authors declared no potential conflicts of interest concerning this article's research, authorship, and/or publication.

ETHICAL APPROVAL

The research protocol approved by the Ethics Commission of the Faculty of Medicine, Brawijaya University, with notice number: 225/EC/KEPK/10/2022.

DATA AVAILABILITY

All data generated and analyzed are included in this research article.

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