

Original Research

Clinical interventions of community pharmacies for diarrhea management: Evidences from developing countries

Mohammed Kanan, Arwa Alqhatani, Wajan Khalid, Salwa Alzuhairey, Sara Almohammadi, Majed Alsubaie, Raneem Baaqeel, Faisal Alshammari, Kholoud Alshammari, Haifa S. Albalawi, Abeer M. Albalawi, Zainab A. Alrashid, Maha Aloudah, Abdullah Alzayed, Nawaf M. Alotaibi

Received (first version): 30-Aug-2023

Accepted: 25-Oct-2023

Published online: 14-May-2024

Abstract

Diarrhea is a significant health concern in developing countries, particularly among children under the age of five. Community pharmacies (CPs) play a vital role in managing diarrhea by providing guidance and referrals. This study, conducted in accordance with PRISMA guidelines, aimed to assess the impact of CPs on diarrhea management. The research involved comprehensive database searches, with a specific focus on studies conducted in resource-limited settings. The analysis highlighted the active involvement of community pharmacists in collecting patient information and offering counseling, showcasing their commitment to delivering comprehensive care. While CPs hold a significant position in diarrhea management and extend beyond medication dispensing, the study identified crucial gaps. Notably, the absence of standardized protocols for diarrhea management led to inconsistent practices among pharmacists. Furthermore, economic assessments pertaining to CPs intervention were notably lacking. The study underscores the urgent need for further research to evaluate both the clinical and economic outcomes of CPs involvement in diarrhea management. Additionally, the establishment of standardized protocols is emphasized to ensure consistent and impactful care delivery within the community pharmacy setting. In conclusion, CPs hold immense potential in addressing diarrhea in developing countries, but the study underscores the necessity of systematic approaches to fully harness their benefits and optimize care delivery.

Keywords: developing countries; community pharmacies; diarrhea management; systematic review

Mohammed KANAN*. Department of Clinical Pharmacy, King Fahad medical city, Kingdom of Saudi Arabia, Riyadh, 12211. kanan101@outlook.com

Arwa ALQHATANI. Department of Clinical Pharmacy, King Khalid University, kingdom of Saudi Arabia, Abha, 62527. 439802350@kku.edu.sa

Wajan KHALID. Department of clinical pharmacy, King Khalid university, Abha, KSA. 62527. Wajankh0@gmail.com

Salwa ALZUHAIRY. Department of Clinical Pharmacy, Qassim University, Qassim, KSA. 51911. salwa1417@hotmail.com

Sara ALMOHAMMADI. Department of clinical pharmacy, Unaizah College, Qassim University, Kingdom of Saudi Arabia. Sara_7s7@outlook.sa

Majed ALSUBAIE. Department of Diagnostic Radiology, Northern Area Armed Forces hospital, Hafar Albatin 10018 Kingdom of Saudi Arabia. majed19937m@gmail.com

Raneem BAAQEEL. Department of Pharmacy, umm Al-Qura University, Makkah, Saudi Arabia, 24221. rennes.baaqeel777@gmail.com

Faisal ALSHAMMARI. Department of pharmaceutical Care, Northern Area Armed Forces hospital, Hafar Albatin 10018 Kingdom of Saudi Arabia. Faisal.alshammeri@gmail.com

Kholoud ALSHAMMARI. Department of Optometry, Northern Area Armed Forces hospital, Hafar Albatin 10018 Kingdom of Saudi Arabia. Kholoud2325@hotmail.com

Haifa S. ABALAWI. Department of pharmaceutical care, King Khaled Hospital, Kingdom of Saudi Arabia, Tabuk, 47717. Hasalbalawi@moh.gov.sa

Abeer M. ABALAWI. Department of Pharmaceutical Care, King Khalid Hospital, Tabuk, Kingdom of Saudi Arabia.

aalbalawi11@moh.gov.sa

Zainab A. ALRASHID. Department of Biochemistry, Qatif Central Hospital, Qatif, 44315 zalrashid@moh.gov.sa

Maha ALOUDAH. Department of pharmacy, University of Taif, Taif, Kingdom of Saudi Arabia, 26522. Mahanaloudah7@gmail.com

Abdullah ALZAYED. Department of medicine, Eradah Complex and Mental Health Hospital, Al- Baha, 65511. AbaAlzayed@moh.gov.sa

Nawaf M. ALOTAIBI. Department of Clinical Pharmacy, Northern Border University, Rafha, 73213. Saudi Arabia. nawaf.al-otaibi@nbu.edu.sa

INTRODUCTION

Diarrheal diseases continue to represent a significant global pediatric health concern, accounting for approximately 10% of the annual mortality among children under the age of five worldwide.^{1,3} A substantial portion of the morbidity and mortality associated with diarrhea is concentrated in developing countries, particularly within the regions of Africa and South East Asia.^{4,5} The cornerstone of diarrhea therapy revolves around the utilization of Oral Rehydration Solution (ORS), zinc therapy, and nutritional management, including sustained feeding. These approaches are widely regarded as the optimal choices for effectively managing diarrhea.⁶ ORS plays a pivotal role in averting dehydration and subsequently reducing the risk of mortality; however, it does not contribute



to diminishing the frequency or enhancing the consistency of stools.⁷

CP practice has evolved into a multifaceted role, transitioning beyond mere drug supply to encompass cognitive pharmaceutical services. Nonetheless, the integration of emerging activities varies across different countries, highlighting a divergent adoption pattern.⁸⁻¹² Within CPs, an expanding responsibility for pharmacy professionals involves facilitating self-care and assisting consumers in finding improved alternatives. CP professionals hold a distinct position to offer guidance and recommendations to the general public, setting them apart from other healthcare practitioners.¹³ Owing to their convenient accessibility, CPs are commonly frequented by the public seeking answers to health-related inquiries. CPs have emerged as the favored resource for health information, guidance, and services concerning prevalent health issues within local communities.^{13,14} Pharmacists and pharmacy technicians, collectively referred to as pharmacy professionals, hold a significant role within the community, offering vital health services for prevalent issues such as diarrhea.¹⁵ They assume a crucial role in managing diarrhea by providing self-treatment suggestions or facilitating referrals for medical assessment and care.¹⁶

Pharmacy professionals must engage in thorough questioning to establish a diagnosis and decide whether to administer treatment or advise medical intervention, along with determining the appropriate course of action. The prevailing guidelines for addressing diarrhea in developing regions are outlined by the United Nations International Children's Emergency Fund (UNICEF) and the World Health Organization (WHO) statement from 2004. This treatment strategy emphasizes fluid replacement to prevent dehydration, zinc supplementation, increased intake of suitable fluids, and consistent feeding. The routine use of antimicrobials for diarrhea management is cautioned against without a specific diagnosis of the underlying causative agent.^{17,18} In their capacity as health professionals, community pharmacists should actively engage in both the prevention and treatment of diarrhea, as well as addressing the issue of dehydration. This ensures that they are up-to-date with the latest information and equipped with the necessary skills to provide effective care.¹³ Till date no systematic review was conducted to find the working and standards of CPs about diarrhea. The current study was aimed to explore the clinical interventions of CPs in developing countries for diarrhea management.

METHODS

The review protocol, which adhered to the guidelines set forth by the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA), underwent thorough evaluation by the authors to ensure its clarity and alignment with the study's objectives.²³

Retrieval of literature

The systematic literature search involved querying three electronic databases—PubMed, Science Direct, and Cochrane Library—to identify pertinent studies. The choice of three

databases adhered to the guidelines set forth by the PRISMA statement of 2009 and the AMSTAR guidelines. These guidelines recommend either a comprehensive electronic search strategy within a single database or utilizing at least two bibliographic databases to ensure a robust search process.^{24,25} The primary search terms employed encompassed terms such as 'community pharmacy', 'community pharmacies', 'community pharmacist', 'community pharmacists', 'pharmacist', and 'pharmacists'. 'Diarrhoea', 'Diarrhea', 'stools', 'loose stools', 'stool', 'upset stomach', 'watery bowel movements', 'bowel looseness', 'stomach upset', 'gastrointestinal distress', 'gastroenteritis management', 'gastroenteritis', 'loose bowels', 'diarrheal illness', 'minor ailments': 'minor health issues', 'minor illnesses', 'mild ailment', 'slight sickness', 'self-care', 'blood in stool', 'mucus stool', 'personal health management', 'individual wellness', 'self-medication', 'self-administration of remedies', 'self-treatment', 'self-remedy', 'self-healing', 'information gathering', 'counseling': 'advising', 'guidance', 'consultation'. Boolean operators were strategically employed to explore a wide array of search term combinations. Moreover, a manual examination of the reference lists within all encompassed full-text articles was conducted to uncover potential additional pertinent studies. Additionally, a search was conducted within grey literature, encompassing publications from sources such as the WHO the International Pharmaceutical Federation (FIP) to ensure comprehensive coverage.^{28,29}

Data extraction

The identified studies underwent uploading to a citation management software to eliminate duplicates. The screening of titles and abstracts to exclude ineligible articles was conducted independently by two of the authors, while the third author verified the validity of this screening process. Full-text articles were individually read and assessed by all authors, leading to a consensus on inclusion. Any discrepancies in selections were addressed through discussion and resolution.

For data extraction, two authors worked independently using a standardized data extraction sheet developed for the review. The validity and completeness of this process were ensured by the third author. Extracted data encompassed methodological and participant characteristics, as well as details regarding diarrhea management, recommended medications, and the information gathering and counseling practices of community pharmacists.

Throughout the screening, data extraction, and presentation of results, adherence to the PRISMA statement and PRISMA checklist was maintained, guiding the entire process.

Inclusion criteria

The inclusion criteria for the systematic review are as follows: The review encompasses studies published in the English language from its inception up until 2022. It includes studies conducted in developing countries that surveyed community pharmacists and/or consumers regarding encounters linked to diarrhea. Additionally, the review addresses self-medication practices tied to diarrhea, which are managed by community pharmacists. Furthermore, the information gathering and



counseling practices of community pharmacists concerning the management of diarrhea in developing countries are considered. The United Nations' World Economic Situation and Prospects (WESP) is also taken into account. A classification system was employed to determine the developing countries encompassed in the systematic search. This classification relied on a model established by the Department of Economic and Social Affairs of the United Nations Secretariat. The WESP classified countries primarily according to fundamental economic indicators, dividing them into three primary categories: developed, developing, and those in transition.³⁰

Exclusion criteria

Exclusion criteria were applied to studies that met certain conditions. Studies were excluded if they were conducted in countries that were not classified as developing according to the WESP classification. Moreover, studies that concentrated on self-medication for diarrhea involving prescription-only medicines. Additionally, studies were omitted if they dealt with activities or interventions unrelated to diarrhea within the domain of community pharmacists. Interventions or practices concerning diarrhea conducted by clinical pharmacists or hospital pharmacists were also grounds for exclusion. Systematic reviews, editorials, and commentaries were likewise excluded from consideration.

Quality assessment

The articles included in the study underwent quality assessment using the Crowe Critical Appraisal Tool (CCAT). This tool focuses on eight domains for evaluating quality, encompassing preliminaries (title, abstract, and text), introduction (background and objective), design (research design, intervention, treatment, exposure, outcome, output, predictor, measure, and bias), sampling (sampling method, sample size, sampling protocol), data collection (collection method, collection protocol), ethical considerations (participant ethics, researcher ethics), results (analysis, integration, interpretation method, essential analysis, outcome, output, predictor analysis), and discussion (interpretation, generalization, and concluding remarks). The CCAT tool was utilized to evaluate the quality of all the included articles across these eight domains. A cumulative score was computed for each article and then converted into a percentage. The percentage scores were categorized into three groups: high quality ($\geq 80\%$), medium quality (60%-79%), and poor quality ($< 60\%$). This assessment of quality was carried out independently by the authors, with any disagreements being resolved through consensus.

RESULTS

Screening and search

The initial search across three electronic databases yielded a total of 6513 studies. An additional 42 studies were discovered through grey literature and manual searches. Thus, a total of 6555 studies were initially identified, from which 2174 duplicates were removed. After screening titles and abstracts, 4381 studies were considered, and 4236 of these were deemed ineligible and subsequently excluded due to irrelevant title

and abstract. Remaining 145 studies for thorough full-text examination, leading to the exclusion of 114 studies based on defined criteria. Ultimately, 31 full-text studies were included in the systematic review (Figure 1).

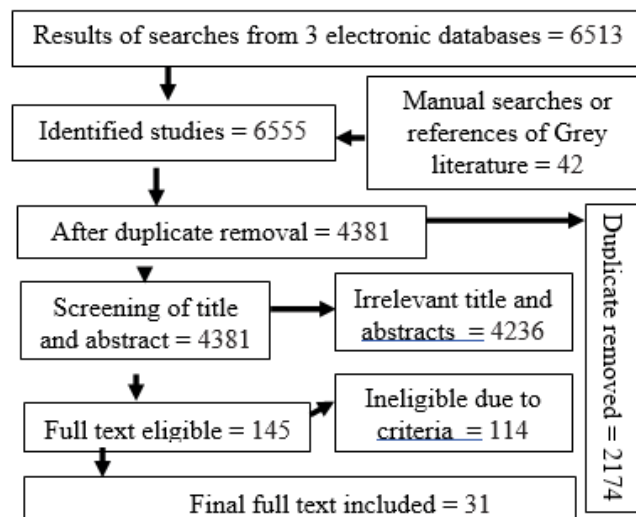


Figure 1. Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) flowchart of study selection and literature search

About half of studies are reported from the Asia including Kuwait, Singapore, Thailand, Malaysia, UAE, Palestine, India, Iran, Qatar, Thailand, Iraq, Pakistan, Saudi Arabia.^{39,42,22,37,41,48,49,51,50,52,54,57,21} About 33% studies are reported from Africa like Egypt, Ethiopia, South Africa, Sudan, Nigeria, Ghana.^{46,14,32,33,34,47,53,55,20,56} Only one study is reported from Europe and other are from Americas (Table 1).

Patient and staff interaction

Community pharmacists in developing countries exhibit substantial variation in the type and extent of information they gather and subsequently utilize for both planning and formulating recommendations, as well as providing counseling, during the process of managing diarrhea. Table 2 presents a comprehensive overview of the information gathering and counseling protocols employed by community pharmacists when addressing diarrhea within developing countries. No study has focus on the economical calculation.

Quality assessment

A total of thirteen studies were classified as high quality, achieving a score of 80% or higher.^{39,43,22,37,32,34,50-56} Similarly thirteen studies were categorized as having medium quality, falling within the range of 60% to 79%.^{45-49,14,41,42,57,33,19-21}

DISCUSSIONS

The findings from this systematic review indicate a prevalent occurrence of diarrhea cases, highlighting a promising avenue for community pharmacists to play a substantial role in alleviating disease impact within developing nations. Notably, the majority of reported diarrhea-related instances lacked proper guidance and predominantly consisted of verbal appeals

Table 1. Specification and characteristic of studies											
Sr.	Study	Study design	Country	Sampling method	Publication year	Participants and sample size	Year data collected	Data collection Method	Content validity	Sample size calculation	Reliability assessment
1	Barron 32	Cross-sectional	South Africa	Simple random	1989	Community pharmacists: 60	1987	Survey with questionnaire	Yes	No	No
2	Berih 33	Cross-sectional	Sudan	Purposive	1989	Community pharmacies : 63	1988	Simulated patients	Yes	No	Not applicable
3	Igun 34 Nigeria	Cross-sectional	Nigeria Nigeria	Purposive	1994	Community pharmacists: 58	Not stated	Survey with questionnaire and simulated patient	Yes	No	Not applicable
4	Gutierrez 35	Cross-sectional	Bolivia	Convenience	1995	Community pharmacists: 498	1993	Simulated patient	No	No	Not applicable
5	Karim 36	Cross-sectional	Trinidad and Tobago	Simple random	2004	Community pharmacists: 92	Not stated	Survey with questionnaire	Yes	No	No
6	Abahussain 37 Kuwait	Cross-sectional	Kuwait Kuwait	Single-stage cluster random	2005	Consumers: 1110	Not stated	Survey with questionnaire	Not stated	No	No
7	Chui 41	Cross-sectional	Singapore	Purposive	2005	Community pharmacists: 44 Consumers: 181	2003	Survey with questionnaire	Not stated	No	No
8	Fuentes 38 Chile	Cross-sectional	Chile Chile	Convenience	2008	Consumers: 909	2007	Survey with questionnaire	Not stated	Yes	No
9	Saengcharoen 22 Saengcharoen	Cross-sectional	Thailand	Convenience	2010	Community pharmacies: 115	2008	Simulated patient + Questionnaire survey	Yes	Yes	Yes
10	Hassali 42 Malaysia	Cross-sectional	Malaysia	Simple random	2011	Consumers: 314	2009	Survey with questionnaire	Yes	Yes	No
11	Mesquita 45	Cross-sectional	Brazil	Convenience	2013	Community pharmacists: 25	2010		Yes	No	Not applicable
12	Elhoseeny 46	Cross-sectional	Egypt	Purposive	2013	Community pharmacists: 335	Not stated	Survey with questionnaire	Yes	Yes	No

13	Shehnaz 43 UAE	Cross-sectional	UAE UAE	Convenience	2013	Consumers: 324	Not stated	Survey with questionnaire	Yes	Yes	No
14	Al-Ramahi 39 Palestine	Cross-sectional	Palestine Palestine	Convenience	2013	Consumers: 400	2010	Survey with questionnaire	Not stated	Yes	No
15	Ogbo 47	Cross-sectional	Nigeria	Simple random	2014	Community pharmacists: 206	2008	Survey with questionnaire and simulated patient	Yes	Yes	No
16	Mohamad 40 Sudan	Cross-sectional	Sudan Sudan	Stratified random	2014	Community pharmacists: 183	2009	Survey with questionnaire	Yes	Yes	Yes
17	Da Rocha 44 Brazil	Cross-sectional	Brazil Brazil	Purposive	2014	Community pharmacists: 35	2012	Survey with questionnaire	Yes	Yes	No
18	Diwan 48 India	Cross-sectional	India India	Convenience	2015	Community pharmacists: 164	2012	Simulated patient	Yes	No	Not applicable
19	Foroughinia 49 Iran	Cross-sectional	Iran	Simple random	2016	Community pharmacists: 90	2015	Survey with questionnaire and simulated patient	Not stated	Yes	No
20	Ibrahim 51	Cross-sectional	Qatar	Simple random	2016	Community pharmacists: 30	Not stated	Simulated patient	Yes	No	Not applicable
21	Abegaz 14	Cross-sectional	Ethiopia	Convenience sampling	2016	Community pharmacies: 113	2015	Simulated client	Not applicable	Yes	Not applicable
22	Saramunee 50 Thailand	Cross-sectional	Thailand	Convenience	2017	Consumers: 759	2013	Survey with questionnaire	No	No	No
23	Ibrahim 52	Cross-sectional	Iraq	Convenience	2018	Community pharmacists: 75	2015	Simulated patient	Yes	No	Not applicable
24	Ayele 53	Cross-sectional and Qualitative	Ethiopia	Simple random	2018	Community pharmacists: 22	2016	Simulated patient and Semi-structured interviews	Yes	No	Not applicable
25	Albassam 54	Cross-sectional	Kuwait	Convenience	2018	Community pharmacists: 192 pharmacists: 67	2015	Survey with questionnaire	Yes	Yes	Yes

26	Mengistu 19	Cross-sectional	Ethiopia	Simple random	2019	Community pharmacies: 105	2017	Simulated patient + Structure questionnaire	Yes	Yes	Yes	Yes
27	Khan 57	Cross-sectional	Pakistan	Simple random	2019	Community pharmacies: 155	2018	Simulated patient	Not stated	Not stated	Not stated	Not stated
28	Okai 55	Cross-sectional	Ghana	Three-stage cluster random	2019	pharmacists: 50 Consumers: 497, pharmacists: 80	Not stated	Survey with questionnaire	Not stated	No	No	No
29	Wondimsigegn 20	Cross-sectional	Ethiopia	Convenience	2021	Community pharmacies: 60	2020	Simulated clients	Yes	Yes	Yes	Yes
30	Ali 21	Cross-sectional	Saudi Arabia	Convenience sampling	2022	Community pharmacies: 303	2021	Simulated clients + questionnaire	Yes	Not applicable	Yes	Yes
31	Hamadouk 56	Cross-sectional	Sudan	--	2022	community pharmacies : 235	2021	Simulated customer	Yes	Yes	Yes	Yes

Table 2. Patient and staff interaction

Study	Provided Medicines	Duration of Interaction	Outcomes measurement	Information gathered	Standard Protocol of country	Information provided to patients
Saengcharoen 22	Antibiotics + ORS	Not found	Appropriateness of therapy	Medical and medication history	National recommendation about the use of ORS in viral diarrhoea	Advice for medication
Ali 21	ORS + Zinc+ Antispasmodics+ Antimicrobials+ Kaolin	Not found	Not found	Fever, Diarrheal episodes, Duration, Mucus or blood in stools,	Not available	Advice for medication
Wondimsigegn 20	ORS+ Anti-amoebic + Anti-microbial	Not found	Medication dispensed+ Referral	Medical and medication history	Adopted from WHO	Advice on medication
Mengistu 19	ORS+ Zinc + Anti-microbial	Not found	Not found	Child weight, Nutrition Medication history	Adopted from WHO	Dose (96%), Frequency (98%), Preparation of ORS (98%), Duration (98%)
Abegaz 18	ORS+ Zinc	1.9 min	Not found	Frequently asked, (90.3%), Chief complaint (23%)	Not available	Dose, frequency, duration, drug action, and adverse drug reactions
Ibrahim 51	Anti-spasmodic, Anti-biotic, Anti-amoebic, ORS	Not found	Not found	Duration of symptoms = 78.7%; episodes = 82.7%; previous history = 77.3%, Medication Used = 77.3%; Blood pressure monitoring = 42.75; fever reported = 46.7%	Not available	Dose and frequency = 44%; recommended lab test = 2.7%; refer to physician = 2.7%
Ayele 53	Anti-amoebic, Anti-biotic, Analgesics, NSAIDs, ORS +Zinc	3 min	Not found	Symptoms = 26.2%; allergy to drug = 9.8%; medical history = 26.2%; medication history = 26.2%	Not available	Dose and duration = 73.9%; Side effects = 36.1%; nonpharmacological advice = 2.7%; refer to physician = 36.3%
Mesquita 45	Anti-spasmodic, Analgesics, ORS	1.5 min	Not found	Signs and symptoms = 53%; allergies = 70.8%; medical history = 20.8%	Not available	Indication = 60.8%; dose = 34.3%; frequency = 36.7%; contraindication = 37.4%; refer to physician = 8%
Okai	Anti-diarrheal, Anti-spasmodic, Antacids,	6.9 min	Not found	Not stated	Not available	Not stated
Albassam 54	Anti-spasmodic, Analgesics, ORS	Not found	Not found	Symptoms = 67.7%	Not available	Nonpharmacological advice = 61.8%; refer to physicians = 67.7%
Elhoseeny 46	Antispasmodic Antacids, Anti-diarrheal,	Not found	Not found	Not stated	Not available	Dose and frequency = 79.4; drug interactions = 16.1%
Ibrahim 52	Anti-bacterial, Anti-diarrheal, Analgesic Anti-emetic, ORS, Adsorbent, , Anti-bacterial + Amoebicidal, Vitamin, Anti-muscarinic Agent, H2 Receptor Blocker,	2 Min	Not found	Not stated	Not available	Name and indication = 34%, route of administration = 34%; dose = 34%; duration = 3.45%; onset of action = 1.65%

Karim 36	ORS, Adsorbent, Anti-spasmodic, Antimicrobial, Anti-motility	Not found	Not found	Age = 98.95; medication history = 87%; symptoms and duration = 98.9%; recent diet = 96.7%; recent travel = 43.5%	Not available	Preparation (ORS) = 97.8%; dose and regimen = 96.7%; storage = 91.3%; when to stop ORS = 355; refer to physician = 25%
Ogbo 47	ORS, Adsorbent, Anti-spasmodic, Anti-microbial, Anti-motility	Not found	Not found	Age = 76.7%; symptoms and duration = 76/7%; frequency of stooling = 76.7%;	Not available	Preparation and use of ORS = 26.4%; instruction on food and fluids intakes = 23.8%
Chui 41	- Medications Recommended to 54.5% Patients but not enlisted	~10 min	Not found	Age = 95.5%; symptoms = 88.6%; medical history = 86.3%; medication history = 84.1%	Not available	Dose and frequency = 97.7%; side effect = 72.7%
Gutierrez 35	Anti-spasmodic, Anti-diarrheal, ORS, Anti-biotic	Not found	Not found	Not stated	Not available	Increase fluid intake = 12.4%
Barron 32	Anti-diarrheal, ORS	Not found	Not found	Not stated	Not available	Not stated
Berih 33	Anti-diarrheal, ORS, Anti-biotic	Not found	Not stated	Symptoms = 36.5%;	Not available	Not stated
Igun 34	Anti-diarrheal, ORS, Anti-biotic	Not found	Not found	Not stated	Not available	Not stated
Saramunee 50	Anti-diarrheal, Antacids,	Not found	Symptom resolved & unit costs	Not stated	Not available	Not stated
Hassali 42	Anti-diarrheal, Anti-histamines, Antacids	Not found	Not found	Medication history = 59.9%	Not available	Name of medication = 89.8%; side effects = 88.5%; drug interactions = 19.4%
Shehnaz 43	Anti-spasmodic, Anti-diarrheal,	Not found	Not found	Not mentioned	Not available	Not stated
Abahussain 37	Anti-spasmodic, Anti-diarrheal,	Not found	Not stated	Not mentioned	Not available	Not stated
Fuentes 38	Anti-spasmodic, Anti-biotic	Not found	Not stated	Not mentioned	Not available	Not stated
Al-Ramahi 39	Antacids, Anti-diarrheal, Anti-spasmodic	Not stated	Not found	Not mentioned	Not available	Not stated
Mohamad 40	Anti-spasmodic, Anti-diarrheal	Not found	Not found	Symptoms = 93.7%, age = 78.2%; medical history = 29.75; medication history = 32.85; allergies = 45.3%; side effects = 34.4%	None for list of diarrhea, medications and counseling	Dose and duration = 78.2%
Da Rocha 44	Antispasmodic, Anti-diarrheal	Not found	Not found	Age = 19.6%; symptoms and duration = 19.6%	Not available	Mechanism of action = 21.7%; allergies = 21.7%; dose = 21.7%; refer to physician = 6.5%
Diwan 48	Antibiotic, Anti-motility, Lactobacillus Acidophilus, ORS, Lactulose	1.3 min	Not found	Age = 98.2%; symptoms and duration = 87.2%; presence of fever = 29.3%; presence of vomiting = 25.6%; blood or mucus = 9.1%	Not available	Not stated, refer to physicians = 29.9%

Hamadouk 56	Loperamide, ORS, Antibiotic	Not found	Symptom resolved	History taken	American College of Gastroenterology Clinical Guidelines+ Recommendations adopted from WHO	Duration of medications and advice about fluid intake
Foroughinia 49	ORS, Antibiotic	20.5 min	Not found	Age = 67.8%; symptoms and duration = 72.2%	Not available	Not stated, refer to physicians = 27.8%
Khan 57	Probiotics, ORS, Antibiotic, Anti-diarrheal	1-4 min	Not found	Not found	Not available	Not found

for specific medications. This underscores the urgent need for the engagement of primary healthcare experts possessing aptitudes in medication-related matters and hands-on patient care, exemplified by community pharmacists. By intervening in such scenarios, community pharmacists have the potential to augment favorable results and contribute to the enhancement of public health on a broader scale.^{58,59}

The frequency of patients’ requests related to diarrhea encountered by community pharmacists in developing countries appears to align with patterns observed in developed nations. Furthermore, the spectrum of diarrhea addressed by community pharmacists in developing regions shows similarities, although it may not be as exhaustive when compared to developed counterparts. This suggests a degree of consistency in the types of cases and recommended medications, while acknowledging that the range of services offered might not be as comprehensive in developing settings as it is in more developed ones.⁶⁰⁻⁶²

This implies that diarrhea likely remain a significant contributor to the clinical workload in both developed and developing regions. Nevertheless, the absence of published evidence concerning the existence or utilization of a dedicated protocol to direct the management of diarrhea by community pharmacists contrasts with the trends observed in developed nations.⁴⁷⁻⁵⁸ The absence of recorded records detailing the actions and referrals undertaken by community pharmacists while managing diarrhea could be attributed to the potential unavailability or lack of utilization of a dedicated diarrhea-specific protocol. Such a protocol would define predetermined standards for service provision. As a consequence, there exists little incentive or obligation for community pharmacists to document their interventions. Hence, a conspicuous requirement arises for the creation and implementation of a protocol exclusively designed for diarrhea. This protocol would

offer guidance and serve as a constant reminder to community pharmacists, potentially mitigating disparities in service delivery and enhancing overall efficacy.

However, it is of paramount importance to ensure the active engagement of community pharmacists right from the inception phase of this standard protocol’s development. This inclusive approach is more likely to instill a sense of ownership among community pharmacists, thereby increasing the likelihood of their embracing and utilizing the protocol to steer their management of diarrhea effectively. Nevertheless, it is important to highlight that a significant majority of community pharmacists were observed to gather patient information and engage in counseling to varying extents while managing cases of diarrhea.^{14,17,21,27-51}

This inclination is likely attributed to the pharmaceutical care-oriented proficiencies possessed by pharmacists, alongside their possible recognition of professional responsibilities guided by the standards associated with exemplary pharmacy practices.⁵⁸⁻⁶²

Finally, the insufficiency of substantial published evidence concerning the evaluation of outcomes stemming from the management of diarrhea by community pharmacists in developing nations diverges from the patterns observed in more developed contexts

CONCLUSION

In developing countries, community pharmacists play a significant role in managing diarrhea, which could greatly impact public health. However, it emphasizes the need for standardized protocols to enhance care quality, given the current unstructured approach. Community pharmacists play a vital role in managing diarrhea, especially among children, due to their accessibility and expertise.

References

1. Black RE. Zinc deficiency, infectious disease and mortality in the developing world. *Journal of Nutrition* 2003; 133(5):1485S-9S. <https://doi.org/10.1093/jn/133.5.1485s>

2. Liu L, Johnson HL, Cousens S, et al. Global, regional, and national causes of child mortality: an updated systematic analysis for 2010 with time trends since 2000. *Lancet*. 2012;379:2151-2161. [https://doi.org/10.1016/s0140-6736\(12\)60560-1](https://doi.org/10.1016/s0140-6736(12)60560-1)

3. Fischer Walker CL, Perin J, Aryee M, et al. Diarrhea incidence in low- and middle-income countries in 1990 and 2010: a systematic review. *BMC Public Health*. 2012;12:220. <https://doi.org/10.1186/1471-2458-12-220>

4. Jennifer Bryce CB-P, Shibuya K, et al. WHO estimates of the causes of death in children. *Lancet*. 2005;365(9465):1147-52.



- [https://doi.org/10.1016/s0140-6736\(05\)71877-8](https://doi.org/10.1016/s0140-6736(05)71877-8)
5. LA-Murray CJ. Alternative projections of mortality and disability by cause 1990-2020. *Lancet*. 1997;349:1498-504. [https://doi.org/10.1016/s0140-6736\(96\)07492-2](https://doi.org/10.1016/s0140-6736(96)07492-2)
6. World Health Organization DoCHaD. Integrated Management of Childhood Illness. Geneva. World Health Organization; 1997.
7. Victora CGBJ, Fontaine O. Reducing deaths from diarrhoea through oral rehydration therapy. *Bull World Health Organization*. 2000;78:1246-55. <http://www.ncbi.nlm.nih.gov/pmc/articles/pmc2560623/>
8. Melton BL, Lai Z. Review of community pharmacy services: what is being performed, and where are the opportunities for improvement? *Integr Pharm Res Pract*. 2017;6:79-89. <https://doi.org/10.2147/iprp.s107612>
9. George PP, Molina JA, Cheah J, et al. The evolving role of the community pharmacist in chronic disease management - a literature review. *Ann Acad Med Singap*. 2010;39(11):861-7.
10. Davies JE, Barber N, Taylor D. What do community pharmacists do? Results from a work sampling study in London. *Int J Pharm Pract*. 2014;22(5):309-18. <https://doi.org/10.1111/ijpp.12083>
11. International Pharmaceutical Federation, World Health Organization. Joint FIP/WHO guidelines on good pharmacy practice: standards for quality of pharmacy services. 2010. https://www.fp.org/fles/fp/WHO/GPP%2520guidelines%2520FIP%2520publication_fnal.pdf. Accessed 08 April 2023
12. . International Pharmaceutical Federation. Good pharmacy practice in developing countries: recommendations for step-wise implementation.1998. <https://www.fp.org/fles/fp/Statements/GPP%20recommendations.pdf>. Accessed 09 Jul 2020.
13. . World Health Organization. The Role of the pharmacist in self-care and self-medication : report of the 4th WHO Consultative Group on the Role of the Pharmacist, The Hague, The Netherlands, 26-28 August 1998.1998.
14. Abegaz TM, Belachew SA, Abebe TB, et al. Management of children's acute diarrhea by community pharmacies in five towns of Ethiopia: simulated client case study. *Ther Clin Risk Manag*. 2016;12: 515-526. <https://doi.org/10.2147/tcrm.s98474>
15. Vaseghi G, Eshraghi A, Eslami N, et al. Management of acute diarrhea: a study on community pharmacists' attitudes in Iran. *Rev Recent Clin Trials*. 2015;10:155-160. <https://doi.org/10.2174/1574887110666150416104745>
16. Carlson AA, Rose TN, Gelinas A. The rundown: management of acute and chronic diarrhea. https://pdfs.semanticscholar.org/d729/e543e225985ca1c4f14e4_83bfd2fe050b437.pdf. Up-dated 2016
17. Abbaher SA, Elnimia EI. Role of community pharmacists in treatment of childhood diarrhea. *Sudan J Rational Use Med*. 2013;5:10-11
18. Madden JM, Quick JD, Ross-Degnan D, et al. Undercover careseekers: simulated clients in the study of health provider behavior in developing countries. *Soc Sci Med*. 1997;45:1465-1482. [https://doi.org/10.1016/s0277-9536\(97\)00076-2](https://doi.org/10.1016/s0277-9536(97)00076-2)
19. Abegaz TM, Belachew SA, Abebe TB, et al. Self-reported and actual involvement of community pharmacy professionals in the management of childhood diarrhea: A cross-sectional and simulated patient study at two towns of eastern Ethiopia. *Ther Clin Risk Manag*. 2016; 12: 515-526. <https://doi.org/10.1177/1179556519855380>
20. Wondimsiegn D, Woldegerima B, Taddese AA. History taking and response to an adult diarrheal case among community drug retail outlets in Gondar town, north-west Ethiopia: a simulated-client survey. *J Pharm Policy Pract*. 2021 1;14(1): 1-16. <https://doi.org/10.1186/s40545-021-00310-1>
21. Ali ME, Alqahtani SS, Syed NK, et al. Self-reported and the actual involvement of community pharmacy professionals in the management of acute childhood diarrhea in Jazan Province, Saudi Arabia: Simulated patient visits and survey study. *Saudi Pharm J*. 2022;30(10):1497-1506. <https://doi.org/10.1016/j.jsps.2022.07.012>
22. Saengcharoen W, Lerkiatbundit S. Practice and attitudes regarding the management of childhood diarrhoea among pharmacies in Thailand. *Int J Pharm Pract*. 2010;18(6):323-31. <https://doi.org/10.1111/j.2042-7174.2010.00066.x>
23. Moher D, Liberati A, Tetzlaff J, et al. The PRISMA Group. Preferred reporting items for systematic reviews and meta- analyses: the PRISMA statement. *PLoS Medicine*. 2009;6:e1000097. <https://doi.org/10.1371/journal.pmed.1000097>
24. Moher D. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *Ann Intern Med*. 2009;151:264-269.
25. Shea BJ, Reeves BC, Wells G, et al. AMSTAR 2: a critical appraisal tool for systematic reviews that include randomised or non-randomised studies of healthcare interventions, or both. *BMJ*. 2017;358: 4008. <https://doi.org/10.1136/bmj.j4008>
26. FIP. Standards for Quality of Pharmacy Services. The Hague, the Netherlands: International Pharmaceutical Federation; 1993.
27. FIP. Good Pharmacy Practice in Developing Countries: Recommendations for Stepwise Implementation. The Hague, the Netherlands: International Pharmaceutical Federation; 1998.
28. WHO. The Role of the Pharmacist in the Health Care System. Geneva, Switzerland: World Health Organization; 1988.
29. WHO. Good Pharmacy Practice: Guidelines in Community and Hospital Settings. Geneva, Switzerland: World Health Organization; 1996
30. The United Nations (UN). World Economic Situation and Prospects 2019. United Nations, New York; 2019:164-171. https://www.un.org/development/desa/dpad/wp-content/uploads/sites/45/WESP2019_BOOK-web.pdf. eISBN: 978-92-1- 047611-9
31. Crowe M, Sheppard L, Campbell A. Comparison of the effects of using the Crowe Critical Appraisal Tool versus informal appraisal in assessing health research: a randomised trial. *Int J Evid Based Health*. 2011;9:1-12. <https://doi.org/10.1111/j.1744-1609.2011.00237.x>
32. Barron PM, Ephraim G, Hira M, et al. Dispensing habits of Johannesburg pharmacists in treating acute infantile diarrhea. *S Afr*



- Med J. 1989;76:487-489
33. Berih AA, McIntyre L, Lynk AD. Pharmacy dispensing practices for Sudanese children with diarrhoea. *Public Health*. 1989;103:455-458. [https://doi.org/10.1016/s0033-3506\(89\)80056-3](https://doi.org/10.1016/s0033-3506(89)80056-3)
 34. Igun UA. Reported and actual prescription of oral rehydration therapy for childhood diarrhoeas by retail pharmacists in Nigeria. *Soc Sci Med*. 1994;39:797-806. [https://doi.org/10.1016/0277-9536\(94\)90041-8](https://doi.org/10.1016/0277-9536(94)90041-8)
 35. Gutierrez ADM, Liendo AMA, Vladivia DC. Attitudes of Bolivian pharmacists in dealing with diarrhea cases. *Bull PAHO*. 1995;29:322-327.
 36. Karim P, Ramadhin P, Boodoo JR, et al. Community pharmacists' knowledge and dispensing recommendations for treatment of acute diarrhoea in Trinidad. *West Indies. Int J Clin Pract*. 2004;58:264-267. <https://doi.org/10.1111/j.1368-5031.2004.0095.x>
 37. Abahussain E, Matowe LK, Nicholls PJ. Self-reported medication use among adolescents in Kuwait. *Med Princ Pract*. 2005;14:161-164. <https://doi.org/10.1159/000084633>
 38. Fuentes Albarrán K, Villa ZL. Analysis and quantification of self-medication patterns of customers in community pharmacies in southern Chile. *Pharm World Sci [Internet]*. 2008;30:863-868. <https://doi.org/10.1007/s11096-008-9241-4>
 39. Al-RR. Patterns and attitudes of self-medication practices and possible role of community pharmacists in Palestine. *Int J Clin Pharmacol Ther*. 2013;51:562-567. <https://doi.org/10.5414/cp201814>
 40. Mohamad SS, Mahmoud AA, Ali AA. The role of Sudanese community pharmacists in patients' self-care. *Int J Clin Pharm*. 2014;36:412-419. <https://doi.org/10.1007/s11096-013-9911-8>
 41. Chui WK, Li SC. Advice-giving on self-medication: perspectives of community pharmacists and consumers in Singapore. *J Clin Pharm Ther*. 2005;30:225-231. <https://doi.org/10.1111/j.1365-2710.2005.00637.x>
 42. Hassali MA, Shafie AA, Al-Qazaz H, et al. Self-medication practices among adult population attending community pharmacies in Malaysia: an exploratory study. *Int J Clin Pharm*. 2011;33:794-799. <https://doi.org/10.1007/s11096-011-9539-5>
 43. Shehnaz SI, Khan N, Sreedharan J, et al. Self-medication and related health complaints among expatriate high school students in the United Arab Emirates. *Pharm Pract*. 2013;11:211-218. <https://doi.org/10.4321/s1886-36552013000400006>
 44. da Rocha CE, Bispo ML, dos Santos AC, et al. Assessment of community pharmacists' counseling practices with simulated patients who have minor illness: a pilot study. *Simul Healthcare*. 2015;10:227-238. <https://doi.org/10.1097/sih.0000000000000100>
 45. Mesquita AR, Oliveira Sa DAB, Lima Santos APA, et al. Assessment of pharmacist's recommendation of non-prescription medicines in Brazil: a simulated patient study. *Int J Clin Pharm*. 2013;35:647-655. <https://doi.org/10.1007/s11096-013-9787-7>
 46. Elhoseeny TA, Ibrahema SZ, Abo el Ela AM. Opinion of community pharmacists on use of nonprescription medications in Alexandria, Egypt. *J Egypt Public Health Assoc*. 2013;88:79-84. <https://doi.org/10.1097/01.epx.0000430954.20897.2d>
 47. Ogbo PU, Aina BA, Aderemi-Williams RI. Management of acute diarrhea in children by community pharmacists in Lagos, Nigeria. *Pharm Pract*. 2014;12:376. <https://doi.org/10.4321/s1886-36552014000100002>
 48. Diwan V, Sabde YD, Byström E, et al. Treatment of pediatric diarrhea: a simulated client study at private pharmacies of Ujjain, Madhya Pradesh, India. *J Infect Dev Countries*. 2015;9:505-511. <https://doi.org/10.3855/jidc.5694>
 49. Foroughinia F, Zarei P. Evaluation of knowledge, attitude, and practice of community pharmacists toward administration of over-the-counter drugs for the treatment of diarrhea in children: a pretest-posttest survey. *J Res Pharm Pract*. 2016;5:200-204. <https://doi.org/10.4103/2279-042x.185735>
 50. Saramunee K, Ploylearmsang C, Chaiyasong S, et al. Unit cost of common illness management: a comparison between a primary care unit and a community pharmacy in Thailand. *Prim Health Care Res Dev*. 2017;18:376-385. <https://doi.org/10.1017/s1463423617000172>
 51. Ibrahim MI, Palaian S, Al-Sulaiti F, et al. Evaluating community pharmacy practice in Qatar using simulated patient method: acute gastroenteritis management. *Pharm Pract*. 2016;14:800. <https://doi.org/10.18549/pharmpract.2016.04.800>
 52. Ibrahim IR, Palaian S, Ibrahim MI. Assessment of diarrhea treatment and counselling in community pharmacies in Baghdad, Iraq: a simulated patient study. *Pharm Pract*. 2018;16:1313. <https://doi.org/10.18549/pharmpract.2018.04.1313>
 53. Ayele AA, Mekuria AB, Tegegn HG, et al. Management of minor ailments in a community pharmacy setting: Findings from simulated visits and qualitative study in Gondar town, Ethiopia. *PLoS One*. 2018;13:e0190583. <https://doi.org/10.1371/journal.pone.0190583>
 54. Albassam A, Awad A. Community pharmacists' services for women during pregnancy and breast feeding in Kuwait: a cross-sectional study. *BMJ Open*. 2018;8:e018980. <https://doi.org/10.1136/bmjopen-2017-018980>
 55. Okai GA, Abekah-Nkrumah G, Asuming PO. Perceptions and trends in the use of community pharmacies in Ghana. *J Pharm Policy Pract*. 2019;12:25. <https://doi.org/10.1186/s40545-019-0186-x>
 56. Hamadouk RM, Arbab AH, Yousef BA. Assessment of Community Pharmacist's Practice and Patient Counselling Toward Acute Diarrhea Treatment in Khartoum Locality: A Simulated Patient Study. *Integr Pharm Res Pract*. 2021;10:145-152. <https://doi.org/10.2147/iprp.s340528>
 57. Khan A, Iqbal Q, Haider S, et al. Acute diarrheal management in adults: A simulated client study at community pharmacies of Quetta city, Pakistan. *J Pharm Pract Community Med*. 2019, 5(1):13-17.
 58. Alhomoud F, Aljamea Z, Almahasnah R, et al. Self-medication and self-prescription with antibiotics in the Middle East—do they really happen? A systematic review of the prevalence, possible reasons, and outcomes. *Int J of Infect Dis*. 2017;57:3-12. <https://doi.org/10.1016/j.ijid.2017.01.014>



Kanan M, Alqhatani A, Khalid W, Alzuhairy S, Almohammadi S, Alsubaie M, Baaqeel R, Alshammari F, Alshammari K, Albalawi HS, Albalawi AM, Alrashid ZA, Aloudah M, Alzayed A, Alotaibi NM. Clinical interventions of community pharmacies for diarrhea management: Evidences from developing countries. *Pharmacy Practice* 2024 Apr-Jun;22(2):2962.

<https://doi.org/10.18549/PharmPract.2024.2.2962>

59. Brata C, Gudka S, Schneider CR, et al. A review of the provision of appropriate advice by pharmacy staff for self-medication in developing countries. *Res Soc Adm Pharm*. 2015;11:136-153. <https://doi.org/10.1016/j.sapharm.2014.07.003>
60. Watson MC, Ferguson J, Barton GR. A cohort study of influences, health outcomes and costs of patients' health-seeking behaviour for minor ailments from primary and emergency care settings. *BMJ Open*. 2015;5:e006261. <https://doi.org/10.1136/bmjopen-2014-006261>
61. Watson MC, Holland R, Ferguson J. *Community Pharmacy Management of Minor Illness (The MINA Study)*. London: Pharmacy Research UK; 2014.
62. Paudyal V, Watson MC, Sach T. Are pharmacy-based minor ailment schemes a substitute for other service providers? A systematic review. *Br J Gen Pract*. 2013;63:e472-e481. <https://doi.org/10.3399/bjgp13x669194>
63. Mansell K, Bootsman N, Kunyz A, et al. Evaluating pharmacist prescribing for minor ailments. *Int J of Pharm Pract*. 2015;23:95-101. <https://doi.org/10.1111/ijpp.12128>
64. Porteous T, Ryan M, Bond CM, et al. Preferences for self-care or professional advice for minor illness: a discrete choice experiment. *Br J Gen Pract*. 2006;56:911-917. <http://www.ncbi.nlm.nih.gov/pmc/articles/pmc1934050/>
65. Yusuff KB, Makhoulf AM, Ibrahim MI. Community pharmacists' management of minor ailments in developing countries: A systematic review of types, recommendations, information gathering and counselling practices. *Int J Clin Pract*. 2021;75(10): 1-16. <https://doi.org/10.1111/ijcp.14424>

