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RESEARCH ARTICLE

Caregivers' self-medication practices for perceived febrile illnesses among under-five children in central river region, the Gambia

[version 1; peer review: 2 approved with reservations]

Haita Ndimballan[1-3], Ayo Adebowale[1,4], Ikeoluwapo Ajayi[1]

[1]Epidemiology and Medical Statistics, University of Ibadan Faculty of Public Health, Ibadan, Oyo, 200212, Nigeria
[2]Ministry of Health, Banjul, The Gambia
[3]Fellow, European and Developing Countries Clinical Trials Partnership (EDCTP), University of Ibadan, Ibadan, Nigeria
[4]Population and Health, North-West University Faculty of Humanities Mafikeng, Mmabatho, North West, 2520, South Africa

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Abstract

Background

Drug use for under-five children by their caregivers without professional advice constitutes a public health challenge due to its potential for drug-drug interactions, overdose, and antimicrobial resistance. In the Gambia, there are only a handful of programs that control self-medication despite its harmful effects on children. Self-medication of under-five children has been rarely reported in rural areas of the Gambia. Therefore, we assessed the knowledge, practices, and reasons for the self-medication of under-five children for perceived febrile illnesses by their caregivers in the Central River Region, the Gambia.

Methods

This cross-sectional study was conducted between September and October 2023 among caregivers (n=406) of under-five children from the Central River Region, The Gambia. A mixed-method approach was used to collect data. Knowledge of childhood febrile illnesses was assessed using 9-item questions. Focus group discussions and In-depth interviews were conducted using question guides. Data were analyzed using descriptive statistics, Chi-square test, and binary logistic regression (α=5%). Qualitative data were analyzed using Atlas Ti.

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1. **Anas Ali Alhur**, University of Hail College of Public Health and Health Informatics, Ha'il, Saudi Arabia

2. **Bisma Kiran**, University of the Punjab (Ringgold ID: 66906), Lahore, Pakistan
Arifa Saif, University of Veterinary and Animal Sciences, Lahore, Pakistan
Alia Saif, University of Veterinary and Animal Sciences (Ringgold ID: 66920), Lahore, Pakistan

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Results

The caregivers' mean age (SD) was 31.1±9.6 years and most 330(81.3%) were females. The prevalence of self-medication was 21.43% and 165(40.6%) of the caregivers had good knowledge of childhood febrile illnesses. Respondents who received information from friends (aOR=2.564; p=0.002) and those who got advice from neighbours (aOR=7.008; p=0.011) on childhood febrile illnesses were likelier to self-medicate than those who did not. Long waiting hours, lack of drugs at health facilities, and experience in self-medication were the reasons promoting self-medication in under-five children.

Conclusions

The prevalence of self-medication among caregivers of under-five children is low, and more than half of them had poor knowledge of childhood febrile illnesses. The practice of self-medication for under-five children was more common among younger caregivers. Caregivers of under-five children should be sensitized on the health implications of self-medication in The Gambia.

Plain language summary

Self-medication is the process of taking drugs without prescription or advice from a professional health care provider. The practice of self-medication has always been a problem worldwide, especially among caregivers of under-five children. A limited number of studies on self-medication have been conducted in rural areas of the Gambia. Therefore, this study was conducted in one of the rural regions (Central River Region) in the Gambia between September and October 2023. We assessed the knowledge, practices, and reasons for self-medication of under-five children in the region.

The study participants involved 406 caregivers of under-five children who were either their biological parents or guardians. Both quantitative and qualitative data were collected from the participants using questionnaires and interview guides.

In this study, we found that only 81 out of 406 participants practiced self-medication and the majority had poor knowledge of childhood febrile illnesses. The practice of self-medication was more common among caregivers who got advice from friends and neighbours on childhood febrile illnesses. The reasons that promoted self-medication of under-five children by their caregivers include: long waiting hours & lack of drugs at health facilities, and experience in self-medication. With these findings, it is crucial that caregivers of under-five children are sensitized on the dangers that come with self-medication.

Keywords

Caregivers, Self-medication practices, Under-five children, Rural area, The Gambia

This article is included in the European & Developing Countries Clinical Trials Partnership (EDCTP) gateway.

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Corresponding author: Haita Ndimballan (ndimballanhaita6@gmail.com)

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Background

Self-medication is the process of using drugs intending to treat self-recognized or medically diagnosed illnesses without advice or prescription from a health professional (Tsifiregna *et al.*, 2016). Common illnesses for which children are often self-medicated include diarrhoea, fever, cough, and acute upper respiratory tract infections (URTI) (Edessa *et al.*, 2022). Self-medication is a global problem, especially among caregivers of under-five children (Simon & Kazaura, 2020) and it is more prevalent in developing countries (Mahmood *et al.*, 2020) with Africa carrying the greatest burden (30–85%) (Ekambi *et al.*, 2019). Many countries around the world have policies regarding self-medication. However, the morbidity and mortality associated with self-medication for under-five children can make the achievement of theme 3 of the Sustainable Development Goals (SDGs) unrealizable if countries fail to either alleviate or eradicate self-medication.

One of the main consequences of self-medication is an increase in disease resistance to medications, which can lead to major health risks such as unpleasant reactions and protracted suffering. Antimicrobial resistance is an issue everywhere today, especially in underdeveloped nations where drugs are freely available. Self-medication in most situations offers partial treatment, thereby masking other diseases and resulting in multi-drug resistance. This phenomenon leads to high morbidity and mortality (Cruz *et al.*, 2022). While the information on self-medication is frequently sourced via friends, family, neighbours, chemists, previously prescribed prescriptions, and advertisements in popular publications or newspapers, self-medication should be understood as the elf-administration of prophylactic, diagnostic, and remedial tasks (Bennadi, 2014). Consequently, the use of self-medication particularly the use of antibiotics for under-five children around the world is most likely due to their vulnerability to infections, specifically upper respiratory tract infections (URTI) (Yu *et al.*, 2014). This raises great concerns about antibiotic abuse and its grave antimicrobial resistance effects, among children (Olmeda *et al.*, 2023). Over-the-counter (OTC) painkillers such as ibuprofen, aspirin, and paracetamol are used worldwide. These medications are mostly used to relieve minor pains, headaches, and menstrual cramps. If used as directed, painkillers are not harmful but can result in gastrointestinal infections and high blood pressure when abused. Due to their ease of access and lower costs, OTC drugs mainly serve as the first treatment option for febrile illnesses by many caregivers because of their easy access from small-scale vendors, family members, and friends, without professional advice (Kawuma *et al.*, 2021).

Globally, the prevalence of parental self-medication for children has been reported to be between 7 and 70% (Yuan *et al.*, 2022). Studies conducted in Madagascar, India, Greece, and Australia have reported prevalence rates of paediatric self-medication to be between 32 and 98% (Ukwishaka *et al.*, 2020). In Nigeria and Ghana, parents used home remedies and non-prescribed drugs (75%), respectively as the first option for managing childhood illnesses (Ahmed *et al.*, 2021).

Self-medication has been reported in The Gambia among students (Oriavwote & Ikwuka, 2022). A similar study reported that 19% of women living in Farafenni, the Gambia, and diagnosed with Malaria preferred to treat their symptoms at home instead of seeking professional treatment (Wiseman *et al.*, 2008). Self-medication for malaria has been observed among caregivers of under-five children in the urban areas of the Gambia (Clarke *et al.*, 2003).

In the Gambia, the death rate per 1,000 is 8, the infant mortality rate is 31 per 1000 live births, and the life expectancy of 62 years for the total population (World Population Data Sheet, 2018). These high demographic indices in The Gambia to some extent could be traced to self-medication thus contributing to poor health indicators in the country. In the Gambia, more than 80 under-five children were recently hospitalized as a result of drug-induced Acute Kidney Injury (AKI), with a case-fatality rate (CFR) of 90% on account of self-medication (Bastani *et al.*, 2023).

Despite the health hazards of self-medication, a few research had examined self-medication and the practice for under-five children in Sub-Saharan Africa is not well documented in the literature parents self-medicating their under-five children especially when it comes to antibiotic self-medication (Simon & Kazaura, 2020). The practice of self-medication for under-five children in Sub-Saharan Africa is not well-documented in the literature (Ukwishaka *et al.*, 2020). A study conducted among caregivers of under-five children in urban areas of the Gambia found that about 60% of women used paracetamol to self-medicate their children against malaria, while 16% used herbal remedies (Clarke *et al.*, 2003) to achieve the same goals. However, studies on self-medication in rural areas of the Gambia are scares in the literature. This study aimed to assess the knowledge, practices, and reasons for the self-medication of under-five children for perceived febrile illnesses by their caregivers in the Central River Region, the Gambia.

Methods

Study setting and design

The cross-sectional study was conducted between September and October 2023, within households in Central River Region (CRR) (Figure 1). The region is rural and one of the seven regions of the Gambia. The region constitutes two local government areas and ten districts with a total of 28 health facilities, which include both government and private facilities, health posts, and community clinics. The health system operates from the Regional Health Directorate (RHD) to health facilities and then to the community. The RHD monitors and manages the activities of all health facilities within the region. The health facilities are responsible for implementing preventive and curative medicine such as antenatal clinics, and routine immunization clinics for children. The health facilities supervise all community engagements and activities and then report to the RHD. Community-level stakeholders involve specific people who are selected and trained in basic health service delivery. They report all their activities to health facilities.

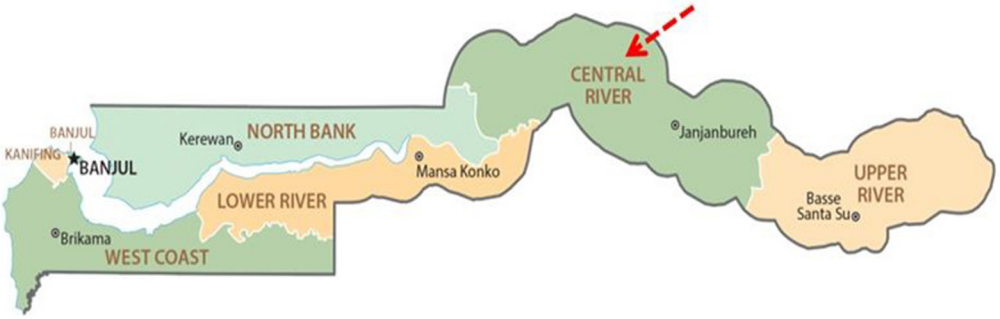

Figure 1. Map of The Gambia showing the administrative regions. Showing the study site (Central River Region). **Note:** This figure has been reproduced with permission from https://gisgeography.com/gambia-map/ (GISgeography.com, 2024).

Study population

Eligible study participants comprised 406 caregivers of under-five children who were either the biological parents or any individual directly involved in the care of an under-five child. All participants were selected on the condition that the child in focus had symptoms of a febrile illness four weeks before the study. If a caregiver had more than one under-five child who had a febrile illness in the past four weeks before the data for this study was collected, the focus child was randomly picked among the children.

Sample size and sampling procedure

We used a three-stage sampling method to recruit eligible participants for the study. Central River Region (CRR) was purposively selected out of the seven health regions of the Gambia because its settlements are mostly rural and a considerable number of under-five children were recently hospitalized in the region as a result of drug-induced Acute Kidney Injury (AKI), on account of self-medication (Bastani *et al.*, 2023). The region was stratified into three units with each unit demarcated into non-overlapping subsets called districts. One district was therefore randomly selected from each of the three units. The sampling frame for the selection of the participants for this study consists of all the eligible respondents that were listed in each of the units.

The sample size was calculated using the single proportion formula for cross-sectional studies.

$$\mathbf{n} = \frac{\mathbf{z}^2_{(1-\alpha/2)}\mathbf{pq}}{\mathbf{d}^2}$$

Zα = standard normal deviate corresponding with a confidence level of 95% = 1.96

p = prevalence of self-medication among caregivers of under-five children in rural areas, Ferlo, Senegal = 61.2% (0.612) (Sougou, 2017)

q = (1-p) = 0.388

d = margin of error = 0.05

$n = (1.96^2)\ 0.612 \times 0.388 \div (0.05^2)$

n = 365

After adjusting for a non-response rate (f) of 10%, the final sample size was (n × 1/1-f)

Therefore, the minimum sample size was, N = 406

Data Collection and Instruments

Quantitative data were collected using a pre-tested semi-structured interview The questionnaire should be provided as extended data The questionnaire contains questions on socio-demographics, knowledge of self-medication, self-medication practices, and factors influencing self-medication practice. The interviews were conducted using Kobo Collect data collection software (Available here, Kobotoolbox). The interview tool was prepared in English but administered in the three major local languages within the study site. Research assistants who were fluent in all three local languages were recruited and trained on the quantitative questionnaire. To validate the questionnaire, it was pre-tested among 20 caregivers of under-five children in a different region, among its rural dwellers. The qualitative arm of the study included three focus group discussions and three in-depth interviews among caregivers of under-five children who practiced self-medication four weeks before the study.

Variable measures

The dependent variable for the study was self-medication practice which was determined by asking each caregiver questions about the first action taken to treat the illness the child suffered from during the past four weeks. All the respondents who either visited a health facility or sought services from a skilled health provider were considered not to have self-medicated for their under-five children, while those who bought drugs from a pharmacy without consulting a skilled health provider or gave the child leftover drugs or sought advice from non-health

professionals were considered to have self-medicated. The knowledge of caregivers was determined by assigning scores to all 9 questions under the knowledge section of the questionnaire, some of which were multiple-response questions. Each correct option was scored as "1" while a wrong option was scored as "0".

Quantitative data analysis

Data were cleaned and analyzed using the Statistical Package for Social Science (SPSS) version 20 and Stata version 12. The knowledge of caregivers on childhood febrile illnesses was assessed on 9 questions and each question contained multiple choice options. Based on these, the overall knowledge score of caregivers was calculated by summing the scores for all correct responses. A correct response was scored as "1" and an incorrect response as "0". The highest possible knowledge score was 37. A score ≤18 was graded as poor knowledge, while a score ≥19 was graded as good knowledge. The scoring system was adopted from a study by (Hareed, 2018). Descriptive statistics such as frequency tables, proportions, and charts were used to summarize the data. Chi-square test was used to determine the association between the outcome (Self-medication practice) variable and explanatory (socio-economic factors) variables. Logistic regression was carried out to determine the participants' socio-demographic and socio-economic factors that influence their self-medication practice. Odds ratios and confidence intervals were used to summarize the relationship between the independent variables and the dependent variable. Statistical tests were conducted at 95% confidence level.

Qualitative data analysis

Qualitative data comprised 3 focus group discussions with 8 questions each and 3 in-depth interviews with 11 questions each. The respondents comprised both males and females who were asked questions about their opinions and experiences about self-medicating their children. The sessions were audio-recorded using a Nokia phone and all individual responses were also noted with pen and paper and categorized into themes based on the questions and similarities in responses. Each focus group recording was coded and analyzed separately before a final analysis was conducted combining all three focus group results. All the audio recordings from the focus group discussions and in-depth interviews were transcribed into verbatim texts, coded, and grouped into themes based on the objectives of the study. Each theme contained similar questions in the same category and all similar responses were analysed as a single code. Atlas Ti. qualitative data analysis software package was used to sort all codes into appropriate themes. The themes were then used to report the findings in narratives supported by quotes from the respondents.

Results

Table 1 shows the socio-demographic characteristics of the respondents. Of the total participants, 372 (91.6%) were the biological parents of the under-five children sampled for the study. The mean age of the participants was 31.1±9.6 years. The mean age of their children was 20.1±15.4 months.

Table 1. Socio-demographic characteristics of the respondents.

Variable	Frequency	Percentage
Sex of caregiver		
Female	330	81.3
Male	76	18.7
Age of caregiver (Years)		
15–24	81	20.0
25–34	215	53.0
≥35	110	27.1
Sex of child		
Female	193	47.5
Male	213	52.5
Age of child (Months)		
1–11	149	36.7
12–35	176	43.3
36–59	81	20.0
Marital Status		
Single	73	18
Currently married	333	82.0
Relationship of caregiver with child		
Mother	303	74.6
Father	69	17.0
Guardian	34	8.4
Ethnicity		
Wolof	145	35.7
Mandinka	115	28.3
Fula	102	25.1
[1]Others	44	10.8
Level of education		
No formal education	177	43.6
Primary	75	18.5
Secondary	86	21.2
Tertiary	68	16.7
Work status		
Not Employed	304	74.9
Employed	102	25.1

Variable	Frequency	Percentage
Occupation		
Civil servant	78	19.2
Business	68	16.7
Housewife/stay-at-home parent	182	44.8
[2]Others	78	19.2
Caregiver income per month (In Dalasi)		
<1500	86	29.2
1500–3000	61	20.7
≥3001	148	509

[1]Others (Ethnicity): Serahuli, Jola, Serer, and Balanta

[2]Others (Occupation): Farming, Student, House help, and Nanny;

The majority 330(81.3%) of the participants were females, 333(82.0%) were currently married, and the dominant ethnic group was Wolof, 145(35.7%), followed by Mandinka, 115(28.3%) and Fula 102(25.1%). A total of 177(43.6%) respondents had no formal education, 304(74.9%) were unemployed and 148(50.2%) earned more than the monthly minimum wage.

Figure 2 shows the respondents' sources of information on childhood febrile illnesses. The majority 208(51.2%) of the caregivers heard information from friends, followed by family members 147(36.2%), and doctor 94(23.2%).

The mean knowledge score of the caregivers on childhood febrile illnesses was 12.7 (SD=3.5) and about 165 (40.6%) had good knowledge while 241 (59.4%) had poor knowledge.

Table 2 shows caregivers' self-medication practices. The proportion of caregivers who practiced self-medication for their under-five children was **21.43%** (87/406). Paracetamol/Ibuprofen was given to 38(9.4%) of the children, cough syrup to 37(9.1%) and antibiotics 19(4.7%). The sources of medications mostly mentioned by caregivers were pharmacy 65(15.0%) and leftover drugs 20(4.9%). Cough/runny nose was self-medicated the most 45(11.1%), followed by fever 30(7.4%) and then diarrhoea 21(5.2%). When the respondents were asked how they normally determine the appropriate dosage of medication before administering it, 33(8.1%) said they usually read the label instructions, 22(5. 4%) said they will ask a family member, friend, or neighbour, and 18(4.4%) mentioned asking a pharmacist.

Table 3 shows the association between socio-demographic factors and self-medication. The age of a caregiver ($\chi2$=17.546; p=<0.001) and the age of a child ($\chi2$=43.121; p=<0.001) were significantly associated with self-medication.

Table 4 shows all the selected variables that were significantly associated with self-medication practice. Self-medication was associated with obtaining information on childhood illnesses from Friends ($\chi2$=17.785; P=<0.001), Family members ($\chi2$=5.397; p=0.020), Neighbours ($\chi2$=5.397; p=0.020) and Radio ($\chi2$=4.968; p=0.026). The reasons associated with self-medication include knowledge of symptoms of an illness ($\chi2$=12.315; p=<0.001), long waiting hours at the health facility ($\chi2$=13.417; p=<0.001), and bad attitude of healthcare workers ($\chi2$=5.396; p=0.020). The sources of self-mediation information found to be associated with self-medication practice were Friends ($\chi2$=12.172; p=<0.001), Family members ($\chi2$=13.685; p=<0.001), Pharmacist ($\chi2$=5.995; p=0.014), neighbours ($\chi2$=18.932; p=<0.001) community/online groups of parents ($\chi2$=10.315; p=0.001), and traditional healer/marabout ($\chi2$=10.315; p=0.001).

Table 5 shows the factors found to be associated with self-medication practice at Chi-square analysis inputted into the binary logistic regression. It was found that caregivers within the age category 25–34 were less likely to practice self-medication than the younger category (aOR=0.394; CI=0.183 - 0.849; P=0.017). The odds of self-medication were higher among children who are ≥ 3 years old than those who are younger (aOR=9.435; CI=3.886 - 22.904; p=<0.001). Respondents who received information from Friends on childhood illnesses were more likely to self-medicate than those who did not (aOR=2.564; CI=1.406 - 4.672; P=0.002).

Table 6 shows the factors found to be associated with self-medication practice at Chi-square analysis inputted into the binary logistic regression. Respondents who received Information on self-medication from neighbours (aOR=7.008; CI=1.554 - 31.591; P=0.011) and pharmacist (aOR=4.746; CI=1.085 - 20.756; P=0.039) were more likely to self-medicate their under-five children.

Findings from qualitative interviews

Focus group discussions

A total of 24 participants (21 Females and 3 Males) were interviewed from three villages for the focus group discussions. Each of the 3 groups consisted of 8 participants. The mean age of the respondents was 31 years.

Key findings

Theme 1: Knowledge of signs/symptoms of childhood febrile illnesses

Participants gave their responses on the most common signs/symptoms that under-five children often present with. The majority stated that fever, cough, runny nose, and diarrhoea were the most common conditions faced by under-five children.

Children in our village always have fever and diarrhoea (Female, 20 years).

My child had a cold with a dry cough. The nose was getting blocked, and she had a high fever too (Female, 40 years).

Theme 2: Self-medication practices

Subtheme: Sources of medications

When the participants were asked about where they usually obtain the drugs to treat their children's illnesses, the majority said that their first line of treatment is to give leftover drugs.

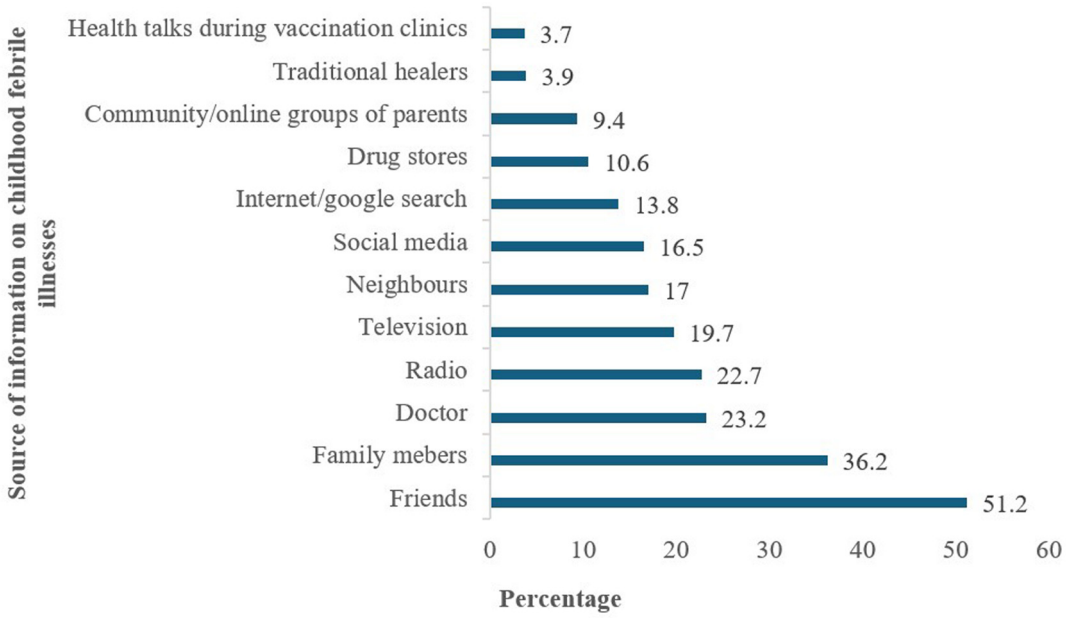

Figure 2. Caregivers' sources of information on childhood febrile illnesses. About half of the participants obtained information on childhood febrile illnesses from friends followed by family members.

Table 2. Caregivers' self-medication practices for the perceived febrile illness in the child.

Variable	Frequency	Percentage
Medications administered to child		
Paracetamol/Ibuprofen	38	9.4
Cough syrup	37	9.1
Antibiotics	19	4.7
Oral rehydration solution	13	3.2
Teething syrup	9	2.2
Traditional/herbal remedies	5	1.2
Antimalarial drugs	4	1
*Others	4	1
Sources of medications		
Pharmacy	65	16
Leftover drugs	20	4.9
Neighbours	4	1
Family members	3	0.7
Friends	3	0.7
Drug hawkers	2	0.5
Traditional healer/marabout	2	0.5
Signs/symptoms self-medicated most		
Cough/runny nose	45	11.1
Fever	30	7.4
Diarrhoea	21	5.2
Rash	14	3.4
Vomiting	12	3.0
Difficulty in breathing	1	0.2
Weakness	1	0.2
Sneazing	1	0.2
Determining the appropriate dosage of medication for the child		
Reading the label instructions	33	8.1
Asking a family member, friend, or neighbour	22	5.4
Asking a pharmacist	18	4.4
Guess the dosage based on previous use	13	3.2
Consulting a healthcare professional	1	0.2

***Others (Medications administered): Cotrimazole cream**

Paracetamol/Ibuprofen and Cough Syrup were the most used drugs by the caregivers

Table 3. Bivariate analysis between socio-demographic factors and self-medication practice.

Variable	Self-medication		χ^2	p-value
	No n (%)	Yes n (%)		
Gender of caregiver				
Female	263 (82.4)	67 (77.0)	1.326	0.249
Male	56 (17.6)	20 (23.0)		
Gender of child				
Female	146 (45.8)	47 (54.0)	1.858	0.172
Male	173 (54.2)	40 (46.0)		
Age of caregiver (Years)				
15 – 24	63 (19.7)	18 (20.7)	17.546	<0.001*
25 – 34	184 (57.7)	31 (35.6)		
≥35	72 (22.6)	38 (43.70		
Age of child (Months)				
0–11	138 (43.3)	11 (12.6)	43.121	<0.001*
12–35	136 (42.6)	40 (46.0)		
36 – 59	45 (14.1)	36 (41.4)		
Level of education				
No formal education	142 (44.5)	35 (40.2)	5.804	0.122
Primary	54 (16.9)	21 (24.1)		
Secondary	64 (20.1)	22 (25.3)		
Tertiary	59 (18.5)	9 (10.3)		

***Significant at p<0.05**

The age of a caregiver and the age of a child were significantly associated with self-medication practice

Table 4. Bivariate analysis between selected variables and self-medication practice.

Variable	Self-medication		χ^2	p-value
	No n (%)	Yes n (%)		
Source of information on childhood febrile illnesses				
Friends				
No	239 (76.1)	25 (12.6)	17.785	<0.001*
Yes	80 (87.0)	62 (29.8)		
Family members				
No	214 (82.6	45 (17.4)	6.983	0.008*
Yes	105 (71.4)	42 (28.6)		
Neighbours				
No	272 (80.7)	65 (19.3)	5.397	0.020*
Yes	47 (68.1)	22 (31.9)		
Radio				
No	239 (76.1)	75 (23.9)	4.968	0.026*
Yes	80 (87.0)	12 (13.0)		
Reasons for self-medication				
Knowledge of symptoms				
No	301 (80.7)	72 (19.3)	12.315	<0.001*
Yes	18 (54.5)	15 (45.5)		

Variable	Self-medication		χ^2	p-value
	No n (%)	Yes n (%)		
Long waiting hours at the health facility				
No	300 (80.9)	71 (19.1)	13.417	<0.001*
Yes	19 (54.3)	16 (45.7)		
Bad attitude of healthcare workers				
No	316 (79.2)	83 (20.8)	5.396	0.020*
Yes	3 (42.9)	4 (57.1)		
Source of information on self-medication				
Friends				
No	292 (81.1)	68 (18.9)	12.172	<0.001*
Yes	27 (58.7)	19 (41.3)		
Pharmacist				
No	313 (79.4)	81 (20.6)	5.995	0.014*
Yes	6 (50.0)	6 (50.0)		
Neighbours				
No	314 (80.3)	77 (19.7)	18.932	<0.001*
Yes	5 (33.3)	10 (66.7)		
Traditional healer/marabout				
No	318 (99.7)	83 (95.4)	10.315	0.001*
Yes	1 (0.3)	4 (4.6)		
Community/Online groups of parents from forums				
No	318 (99.7)	83 (95.4)	10.315	0.001*
Yes	1 (0.3)	4 (4.6)		
Family members				
No	282 (81.7)	83 (20.7)	13.685	<0.001*
Yes	37 (60.7)	4 (80.0)		

***Significant at p<0.05**

All selected variables found to be significantly associated with self-medication

Table 5. Predictors of self-medication practice among caregivers of under-five children.

Variables	aOR	p-Value	95% Confidence Interval (CI)
Age of caregiver (Years)			
15 -24 (ref)	1		
25 -34	0.394	0.017*	0.183 - 0.849
35 above	0.805	0.596	0.849 - 1.793
Age of child (Months)			
0 – 11 (ref)	1		
12 – 35	3.087	0.006*	1.381 - 6.897
36 – 59	9.435	<0.001*	3.886 - 22.904

Variables	aOR	p-Value	95% Confidence Interval (CI)
Source of information on childhood febrile illnesses			
Radio			
No (ref)	1		
Yes	0.7946	0.550	0.374 - 1.689
Family members			
No (ref)	1		
Yes	0.938	0.839	0.507 - 1.735
Neighbours			
No (ref)	1		
Yes	1.516	0.264	0.729 - 3.150
Friends			
No (ref)	1		
Yes	2.564	0.002*	1.406 - 4.672

***Significant at p<0.05**

The predictors of self-medication include: age of a caregiver, age of a child and information from friends on childhood febrile illnesses

Table 6. Predictors of self-medication practice among caregivers of under-five children.

Variable	aOR	p-value	95% Confidence interval (CI)
Sources of Self-medication information			
Neighbours			
No (ref)	1		
Yes	7.008	0.011*	1.554 - 31.591
Friends			
No (ref)	1		
Yes	0.715	0.519	0.2582 - 1.981
Pharmacist			
No (ref)	1		
Yes	4.746	0.039*	1.085 - 20.756
Traditional healer			
No (ref)	1		
Yes	4.277	0.247	0.364 - 50.191
Community/online groups of parents			
No (ref)	1		
Yes	4.229	0.247	0.368 - 48.612
Family members			
No (ref)	1		
Yes	0.744	0.580	0.261 - 2.121

***Significant at p<0.05**

The predictors of self-medication include: information on self-medication from neighbours and pharmacist

And if the illness persists, some said they will buy drugs from a pharmacy while others said that they will visit a health facility.

Most of the caregivers in this village never run out of drugs. We always make sure to keep them in case a child suddenly falls ill. It helps before you prepare to go to a health center or pharmacy (Female, 55 years).

Sometimes if a child gets ill and the caregiver is too busy, she will just rush to a neighbour whose child had been suffering from a similar condition to beg for leftover drugs (Female, 37 years).

Subtheme: Sources of Information on self-medication

The most frequently named sources of information of the caregivers when it comes to self-medicating their children were family members and friends. A few mentioned neighbours and pharmacists

I usually seek information from family members, friends, and neighbours (Male, 33 years).

My family always advises me on what treatment to give my child whenever he is sick. Sometimes I ask my friends what to do (Female, 31 years).

Theme 4: Reasons/motivation for Self-Medication

Subtheme: No drugs at the health facilities

Almost all participants pointed out that it is pointless to visit a health facility when your child is ill since you will end up buying drugs from a pharmacy/drugstore.

The health center is far and whenever you go there, they will refer you to the pharmacy to buy medications (Male, 29 years).

I hate going to a health facility whenever my child is ill because the nurses will waste my time and then ask me to buy the drugs at a drugstore (Female, 29 years).

Subtheme: Long waiting hours at health facilities
The majority of the participants expressed their dissatisfaction concerning the waiting time at the health facilities, stating that some people will be in the queue for hours while their children are suffering.

Your child will be so sick and crying all through just for you to visit a health facility and spend the whole day waiting to be attended to (Female, 32 years).

We often do not have a choice except to go to drug stores or use leftover drugs when our children are sick because going to a health facility will even make the child's condition worse due to the amount of time you wait before you are attended to (Female, 37 years).

Subtheme: Experience in self-medication
Some of the respondents pointed out that the reason why they are self-medicating their under-five children is because they have been doing it over the years and they always succeed in treating the supposed illnesses.

I have been treating my children at home for years now and I know a lot of medications used to treat childhood illnesses (Female, 40 years).

When it comes to children and their illnesses, I am very good at treating them because I have been doing it even before I got my children (Female, 34 years).

Theme 5: Knowledge of potential risks of self-medication
Subtheme: Self-medication can cause drug addiction
The participants stated that those who are too engaged in self-medication of children to some extent perceive it as a way of life and will treat every unusual sign/symptom as an illness, consequently leading to frequent self-medication.

Too much self-medication is not the best practice because when a child's body gets used to medicines, it will be very difficult to treat their illnesses. After all, the blood will recognize the medicine and reject it (Female, 40 years).

What I know is that some women will even deliberately drug their children to sleep when they want to attend functions because of ignorance and as the child grows, they become drug-resistant and suffer from a lot of sicknesses (Male, 35 years).

Theme 6: Experience in potential risks of self-medication
Subtheme: Overdose of child
Some of the participants shared their opinions and experiences about the negative effects of self-medicating a child. Among these include overdosing a child due to lack of prescription or one's belief that they possess good knowledge of self-medication.

Overdosing a child is something I will never repeat because it almost cost my child's life. I gave him more than the doses that the pharmacist prescribed because his symptoms were getting worse, not knowing that it would harm him (Female, 25 years).

My niece once fell ill and her mother left her in my care but she was crying too much and the mom did not tell me she had already given the child medicine, so I decided to give her but after some time white liquid started to come out from her mouth and when we took her to the hospital the nurse checked her and said it was an overdose of medicine (Female, 30 years).

Subtheme: Complications from drug interactions
When the participants were asked about their past negative experiences with regards to self-medicating their children, about half said that their children's conditions got worse after self-medication with more than one drug which was bought from drug stores.

There was a time I gave my son two syrups at once and it caused his body temperature to increase (Female, 25 years).

Mixing different medications at once can be dangerous because the last time I did it when my child fell ill, she was vomiting very seriously (Female, 30 years).

In-depth interviews
A total of 3 Participants picked from the focus group participants, (2 females, and a male) were interviewed one-on-one to get the final insights on their self-medication practices. Their ages were 29, 31, and 40 years.

Key findings
Theme 1: Knowledge of signs /symptoms of childhood febrile illnesses
Subtheme: Common signs/symptoms of childhood febrile illnesses
My child suffered from Fever, diarrhoea, Vomiting, and general body weakness. He refused to breastfeed or eat anything. He also had a runny nose lately (Male, 29 years).

My child suffered from fever and vomiting. His behaviour pattern changed. He was also inactive (Female, 40 years).

Theme 2: Self-medication practices
Subtheme: Source of medications
I rushed him to the drugstore and bought teething syrup for him (Female, 40 years).

I bought Piriton and Vitamin C from the pharmacy and administered them to the child (Female, 31 years).

I first had to look closely at the signs and symptoms my child manifested before I rushed him to the pharmacy (Male, 29 years).

I usually obtain medications from family members who bought and used them but did not finish them. Sometimes I buy from the drugstore (Female, 40 years).

I bought ORS and Zinc tablets from a pharmacy (Male, 29 years).

Subtheme: Medications given to the child
I gave him teething syrup three times a day using the small cup inside the drug box, but if he is crying constantly, I usually give him the drugs more than three times a day (Female, 40 years).

I gave her vitamin C tablet. One tablet per day. I also gave her piriton syrup, one spoonful every four to six hours (Female, 31 years).

I gave him ORS to be used for two days and Zinc tablets to use for fourteen days (Male, 29 years).

Theme 3: Sources of information on self-medication
Subtheme: Obtaining information from social media
From Google and WhatsApp groups. We have a WhatsApp group where parents discuss issues about their children (Female, 40 years).

I often rely on phone calls and social media. I will call my friends and seek advice. I also use social media platforms such as WhatsApp group chats and Google to seek for advice (Female, 31 years).

Theme 4: Reasons/motivation for Self-Medication
Subtheme: Long waiting hours at health facility
The queue is usually too long at the health center and I cannot wait because I have household chores to do at home (Female, 40 years).

There is a nearby pharmacy that is cheap, and the waiting period is shorter than that of the health facility (Female, 31 years).

Subtheme: Experience in self-medication
I have four children and I have been the one treating them whenever they are ill (Male, 45 years).

I grew up with my grandmother and due to her traditional healing powers, I was able to learn a few ways of treating sick children and I have been doing it for years now (Female, 54 years).

Theme 5: Knowledge of potential risks of self-medication
Subtheme: Self-medication can kill
Self-medication can kill especially in instances of overdose (Female, 31 years).

Self-medication is unsafe and deadly (Male, 29 years).

Theme 6: Experience in potential risks of self-medication
Subtheme: Wrong diagnosis can lead to wrong treatment
There was a time when I was treating the wrong illness for my child. And that kept my child suffering for a long time (Female, 40 years).

I had once taken my child to a drugstore where she was diagnosed wrongly, and the treatment process was unnecessarily delayed (Female, 31 years)

Discussion

Self-medication is characterized as taking prescription drugs for recurrent or chronic illnesses on an intermittent or continuous basis, or as using medication to treat symptoms based on self-diagnosis. In both industrialized and developing nations, antibiotics are among the most often utilized drugs; nonetheless, they are frequently abused, particularly in environments with limited resources. Adverse effects and allergic reactions are more likely when patients are unaware of dosages, treatment plans, and other pharmaceutical characteristics (Cruz *et al.*, 2022). This study examined the knowledge, practices, and reasons for self-medication of under-five children by their caregivers in Central River Region, The Gambia. We found a low prevalence of self-medication of under-five children by their caregivers. The low prevalence of self-medication among the respondents in this study could be due to poor knowledge of childhood febrile illnesses because more than half of the respondents had poor knowledge of childhood febrile illnesses. This finding is similar to the prevalence found in a population-based study conducted among caregivers of under-five children in Brazil (da Silva Pons *et al.*, 2023) and Nigeria (Babalola *et al.*, 2020). However, our finding is considerably lower than that of a Gambian study conducted in urban areas (Clarke *et al.*, 2003), comprising the use of both modern medicines and herbal remedies.

The majority of respondents had poor knowledge of childhood febrile illnesses, which can be explained by their low literacy level as some of them believed that fever can be transmitted from one child to another, and about four-fifths believed that all febrile illnesses can be treated with antibiotic. These findings are in agreement with the outcome of a study conducted in the Bagamoyo district, Tanzania, and Riyadh City, Saudi Arabia where the parents/caregivers of under-five children had poor knowledge of antibiotic use (Abu-Shaheen *et al.*, 2019; Simon & Kazaura, 2020). However, our findings are at variance with that of a study conducted in Southwestern Nigeria, which reported that the caregivers of under-five children demonstrated an excellent broad understanding of common childhood illnesses (Okunola *et al.*, 2023). The differences between the Nigerian study and ours might be a result of disparities in health education and literacy programs between Nigeria and the Gambia. It is also not impossible that the low level of knowledge could be a result of poor access to information on childhood illnesses from health talks as shown in the current study.

The sources of medications frequently mentioned by the caregivers in this study include pharmacies, leftover drugs, and neighbours. Studies conducted in Tanzania, Nigeria, and among university students in the Gambia found that most of the caregivers of under-five children purchased drugs from drug stores (Omale *et al.*, 2021; Oriavwote & Ikwuka, 2022; Simon & Kazaura, 2020). Studies conducted in several sub-Saharan African countries have reported wide use of amoxicillin bought

from drug stores to treat childhood illnesses (Ateshim *et al.*, 2019; Kibuule *et al.*, 2016; Nepal & Bhatta, 2018; Horumpende *et al.*, 2018). Paracetamol has been reported in a qualitative study conducted in Southwestern Nigeria to be the first line of treatment for most caregivers before seeking professional care for under-five children (Okunola, 2020). This conforms with a study conducted among university students in the Gambia where paracetamol was used by almost half of the participants to treat minor ailments (Oriavwote & Ikwuka, 2022). In this study, the frequently used drugs for self-medication included analgesics (mainly paracetamol syrup or Ibuprofen syrup), antibiotics (amoxicillin), antimalarial (eCoartem®), anti-inflammatory (piriton®), and herbal remedies.

The most common illnesses self-medicated by caregivers in this study were fresh cold/upper respiratory tract infections, malaria, chest infection/pneumonia, gastroenteritis, and skin infection. The study site is rural and has numerous mosquito breeding sites making malaria very common, especially among children. Malaria is endemic in most Sub-Saharan countries including the Gambia; hence, it is no longer seen as a serious illness leading to an increase in self-medication practice among children (Apetoh *et al.*, 2018; Clarke *et al.*, 2003). The most common sources of advice on self-medication in this study were family members and friends. Family members and friends are the closest and strongest social networks that largely influence most decisions an individual makes. A study conducted in Delhi, India, reported that caregivers of under-five children often seek information on childhood illness from online sources, family members, neighbours, health care providers, both professional and unprofessional, and pharmacists (da Silva Pons *et al.*, 2023). A Gambian study (Oriavwote & Ikwuka, 2022) found that the most common source of self-medication information for the participants was online sources. In this study, online sources of self-medication information were not frequently mentioned by the caregivers, and this might be a result of low literacy, and inadequate or poor internet connectivity in rural areas. This conforms with a study conducted in China where caregivers living in central towns were more likely to obtain self-medication information from the Internet, newspapers, and books, compared to those living in rural areas (Yu *et al.*, 2014).

From the multivariate analysis, it was revealed that the age of a caregiver, the age of a child, information from friends on childhood febrile illnesses, and advice from neighbours and pharmacists to self-medicate under-five children are the predictors of self-medication. These findings are supported by that of another study which found that children under the age of five were more likely to receive antibiotics than other drugs because they are more vulnerable to common respiratory, urinary tract, and diarrheal illnesses than children in other age groups. The study also found that the age of a caregiver was significantly associated with self-medication practice, especially among younger caregivers. (Simon & Kazaura, 2020). The reasons for self-medication from the focus group discussions and In-depth interviews were long waiting hours, lack of drugs in health facilities, and experience in self-medication. Participants were also asked about their perceptions and past experiences regarding the potential risks associated with self-medication. From the interviews, some of the caregivers' said that too much self-medication to some extent will result in drug resistance causing the body to be highly vulnerable to more infections. Other perceived risks of self-medication mentioned by the caregivers were the fact that self-medication is unsafe and deadly. The past negative experiences that caregivers mentioned include overdoses of children, complications from drug interactions, and wrong diagnoses. This conforms with a Nigerian study that showed that about 82.3% of adult patients attending scheduled clinic appointments at a particular hospital possessed a high level of awareness of the risks associated with self-medication (Oyediran *et al.*, 2019). These findings are supported by that of (Ruiz, 2010) whose study found that misdiagnosis, overdose, and dangerous drug interactions are the most common risks associated with self-medication.

The limitation of the study was the high level of illiteracy among the caregivers resulting in the difficulty to recall or mention the names of medications they administered to their children four weeks before the study. However, we were able to use pictorials of commonly used medications in the country and probe more to help them recall or mention the local names commonly used to refer to the medications.

Conclusion

In this study, the prevalence of self-medication was low, and most caregivers had poor knowledge of childhood febrile illnesses. The most common medications used by caregivers to self-medicate their under-five children include Paracetamol/Ibuprofen, cough syrup, and amoxicillin which were mostly over-the-counter drugs. These medications were mostly used to treat common conditions such as fresh cold, malaria, chest infection/pneumonia, gastroenteritis, and skin infections. Family members and friends were the most usual sources of self-medication information. The primary factors of self-medication by the caregivers were advice from friends, neighbours and pharmacists. The practice of self-medication for under-five children was more common among younger caregivers. Caregivers of under-five children should be sensitized on the health implications of self-medication, especially for childhood febrile illnesses in The Gambia. These findings suggest that with more health education programs on childhood febrile illness, caregivers will be more knowledgeable about when to seek professional treatment for a sick child and consequently eliminate self-medication in the region.

Ethics approval and consent to participate

Ethical approval was obtained from the Gambia government/MRC joint Ethics Committee through the Scientific Coordinating Committee (SCC), on the 23rd of October, 2023. The project ID was 29505. No harm was caused to the participants during the study. The results were also disseminated to both the participants and key stakeholders. A written informed consent was obtained from all participants. Participants were informed about the choice to participate or withdraw from the study at any time with no consequences.

Consent to participate

A written informed consent was obtained from all participants and this document was approved by the ethics committee before the study was implemented.

A written informed consent for publication of the participants' details was also obtained from the participants.

List of abbreviations

AKI Acute Kidney Injury

CFR Case Fatality Rate

CRR Central River Region

OTC Over-the-counter-drugs

RHD Regional Health Directorate

URTI Upper Respiratory Tract Infections

Data availability statement

Underlying data

Zenodo: Caregivers' self-medication practices for perceived febrile illnesses among under-five children in Central River Region, The Gambia, https://doi.org/10.5281/zenodo.13936897 (Ndimballan *et al.*, 2024)

This project contains the following underlying data:

- Raw Project data.xlsx

Data are available under the terms Creative Commons Attribution 4.0 International (CC BY 4.0)

Extended data

Zenodo: Caregivers' self-medication practices for perceived febrile illnesses among under-five children in Central River Region, The Gambia, https://doi.org/10.5281/zenodo.13936897 (Ndimballan *et al.*, 2024)

This project contains the following underlying data:

- Dessertation project report.pdf
- Focus Group.docx
- Indepth Interview.docx
- Information sheets and Informed consent form.docx
- Quantitative Questionnaire.docx

Data are available under the terms Creative Commons Attribution 4.0 International (CC BY 4.0)

Software availability statement

- All softwares used to analyse data in this article are open access. The Statistical Package for Social Sciences (SPSS) version 20 and Stata version 12.1 were licensed to and provided by the Department of Epidemiology and Medical Statistics, University of Ibadan, Nigeria (Serial Number: 40120576630). Atlas ti version 9 software was used offline and it was freely available for download.
- **Data Citation:** Ndimballan, H., Adebowale, A., & Ajayi, I. (2024). Caregivers' self-medication practices for perceived febrile illnesses among under-five children in Central River Region, The Gambia. https://doi.org/10.5281/zenodo.13936897

Authors' contributions

HN, ASA, and IOA contributed to the conception, design, and implementation of the study. HN produced the first draft, and this was reviewed by ASA and IOA. All authors read and approved the final manuscript.

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Bisma Kiran
University of the Punjab (Ringgold ID: 66906), Lahore, Punjab, Pakistan
Arifa Saif
University of Veterinary and Animal Sciences, Lahore, Pakistan
Alia Saif
University of Veterinary and Animal Sciences (Ringgold ID: 66920), Lahore, Punjab, Pakistan

Article Summary
This study investigates self-medication practices among caregivers of under-five children in the Central River Region of The Gambia, a rural and under-researched area. Using a mixed-methods design, the authors surveyed 406 caregivers and conducted focus group discussions and in-depth interviews. The prevalence of self-medication was found to be 21.43%, with most caregivers demonstrating poor knowledge of febrile illnesses. Key factors influencing self-medication included informal advice from friends, neighbours, and pharmacists, as well as systemic issues such as long waiting times and drug stockouts at health facilities. The authors conclude that caregiver sensitization is needed to reduce self-medication risks.

Strengths
- **Relevance**: The study addresses a critical public health issue in a low-resource setting, contributing to the limited literature on rural self-medication practices in The Gambia.
- **Design**: The mixed-methods approach enhances the depth and contextual understanding of the findings.
- **Sample Size**: The sample is statistically justified and appropriate for the study design.
- **Policy Implications**: The findings have clear relevance for health system strengthening and community education.

Points for Improvement
1. **Language and Clarity** — *Must Address*
The manuscript requires substantial language editing. Several sections contain grammatical errors, awkward phrasing, and repetitive sentence structures that obscure meaning. For example:
- Typographical errors such as “elf-administration” instead of “self-administration.”

- Disjointed transitions between ideas, especially in the background and results sections.

Recommendation: A professional language edit is essential to improve readability and ensure academic tone.

2. **Internal Consistency in Qualitative Data** — *Must Address*
There is a discrepancy in the reported ages of in-depth interview participants. The methods section states interviews were conducted with individuals aged 29, 31, and 40, yet quotes are attributed to participants aged 45 and 54.
Recommendation: Please clarify the number and age range of interviewees. If additional interviews were conducted, this should be reflected in both the methods and results sections.

3. **Referencing** — *Should Address*
Some references are incomplete or inconsistently cited. For example, "Sougou, 2017" is not fully referenced, and several citations lack full bibliographic details.
Recommendation: Ensure all references are complete, properly formatted, and traceable.

4. **Statistical Interpretation** — *Should Address*
While the statistical methods are generally sound, some adjusted odds ratios (e.g., aOR=7.008 for advice from neighbours) appear unusually high and may reflect small subgroup sizes or residual confounding.
Recommendation: Consider discussing the potential for inflated odds ratios and limitations of the regression model. Clarify whether multicollinearity or sparse data may have influenced these estimates.

5. **Knowledge Scoring Justification** — *Should Address*
The cut-off for "good" vs. "poor" knowledge (≥19 out of 37) should be better justified, ideally with a validation reference or rationale for the threshold.
Recommendation: Cite the original source or explain why this scoring system is appropriate for the study population.

6. **Qualitative Analysis Transparency** — *Should Address*
The use of Atlas Ti is appropriate, but the coding process could be described with more rigor. For instance, was inter-coder reliability assessed? Was thematic saturation achieved?
Recommendation: Expand the qualitative methods section to include coding procedures, validation steps, and how themes were finalized.

7. **Limitations** — *Should Address*
The discussion would benefit from a more explicit acknowledgment of study limitations, such as:

- Potential recall bias in self-reported practices
- Social desirability bias in interviews
- Generalizability beyond the Central River Region

Recommendation: Add a limitations subsection to the discussion to strengthen transparency and contextualize the findings.

8. **Pilot Study Reporting** — *Should Address*
The manuscript mentions that the questionnaire was pre-tested among 20 caregivers in a different region, implying a pilot study was conducted. However, no results or insights from this

pilot are reported. It is unclear whether any modifications were made to the instrument or whether the pilot confirmed its validity and usability.
Recommendation: Include a brief summary of the pilot study findings, including any changes made to the questionnaire or data collection process. If no changes were necessary, clarify how the pilot confirmed the tool's clarity and contextual appropriateness.

Recommendation
Minor Revision
The study is methodologically sound and addresses a critical public health issue. However, improvements in language, referencing, and data clarity are necessary to meet publication standards. Addressing the points marked "Must Address" is essential for scientific soundness.

Is the work clearly and accurately presented and does it cite the current literature?
Yes

Is the study design appropriate and does the work have academic merit?
Yes

Are sufficient details of methods and analysis provided to allow replication by others?
Yes

If applicable, is the statistical analysis and its interpretation appropriate?
Partly

Are all the source data underlying the results available to ensure full reproducibility?
Partly

Are the conclusions drawn adequately supported by the results?
Yes

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Public Health, Health Behavior and Self-Medication Practices, Community Health in Low-Resource Settings, Mixed-Methods Research, Health Systems and Policy, Epidemiology and Biostatistics, Rural Health Studies, Health Communication and Caregiver Education, Pharmaceutical Sciences, Drug Delivery Systems.

We confirm that we have read this submission and believe that we have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however we have significant reservations, as outlined above.

Reviewer Report 24 March 2025

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Anas Ali Alhur
University of Hail College of Public Health and Health Informatics, Ha'il, Saudi Arabia

Peer Review Report
Title: *Caregivers' self-medication practices for perceived febrile illnesses among under-five children in Central River Region, The Gambia*

Summary:
This study investigates self-medication practices among caregivers of under-five children in a rural Gambian region using a mixed-methods approach. The prevalence of self-medication was 21.43%, with most caregivers demonstrating poor knowledge of febrile illnesses. Key factors influencing self-medication included advice from friends, neighbours, and pharmacists, as well as systemic issues such as long waiting times and drug stock outs at health facilities

Strengths:
- **Relevance:** The study addresses an important public health issue in a low-resource setting.
- **Design:** Mixed-methods enhance the depth of findings.
- **Sample Size:** Adequate and statistically justified.

Points for Improvement:
1. **Clarity and Language** *(Must Address)*:
   - Several sections contain grammatical errors and long, repetitive sentences. A thorough language edit is needed for clarity.
2. **Literature Citations** *(Should Address)*:
   - Some references (e.g., "Sougou, 2017") are not fully cited. Please ensure complete and accurate referencing.

.**Recommendation:**
Minor revision is required before acceptance. The study is valuable and methodologically sound but requires improvements in language, referencing, and data clarity to meet publication standards.

Is the work clearly and accurately presented and does it cite the current literature?
Yes

Is the study design appropriate and does the work have academic merit?
Yes

Are sufficient details of methods and analysis provided to allow replication by others?
Yes

If applicable, is the statistical analysis and its interpretation appropriate?

No

Are all the source data underlying the results available to ensure full reproducibility?
Partly

Are the conclusions drawn adequately supported by the results?
Yes

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Health Informatics, Health Information, Public Health

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.