E-ISSN 2250-0944
ISSN 2250-1150
doi: 10.31838/ijprt/15.02.600

**Research Article**

# Knowledge, Attitudes and Practices of Caregivers Regarding Diarrhoeal Diseases in Under-Five Children with Special Reference to Medication Use: A Hospital-Based Cross-Sectional Study

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Received: 05.12.25, Revised: 10.01.26, Accepted: 12.02.26

**ABSTRACT**

**Background:** Diarrhoeal diseases are the major causes of morbidity and mortality amongst children under the age of five years even though they can be avoided and cured. Lack of proper home management and irrational use of drugs and specifically antibiotics is among the factors that lead to poor outcomes and antimicrobial resistance. This would evaluate the knowledge, attitudes and practices (KAP) of caregivers of patients with diarrhoea under-five years old, and particularly medication use.

**Methods:** The current study was a cross-sectional study in which data was collected in the Departments of Pharmacology and Paediatrics, M.K.C.G. Medical College, between February 2020 and February 2021. One hundred forty four consenting caregivers of children aged 059 months with diarrhoeal illness presenting to OPD/IPD were recruited. A semi-structured, interviewer-administered questionnaire, which is based on WHO recommendations on childhood diarrhoea, was translated and back-translated to Odia, used to collect data. Socio-demographic variables and KAP domains were measured. GraphPad Prism was used to analyse data with the help of descriptive statistics (frequencies, percentages).

**Results:** Overall, [xx.x%] of caregivers demonstrated adequate knowledge of diarrhoea definition, danger signs and role of oral rehydration salts (ORS), while [xx.x%] had poor knowledge. Only [xx.x%] correctly identified zinc supplementation as a recommended adjunct therapy. A favourable attitude towards early health-facility consultation and continued feeding during diarrhoea was observed in [xx.x%] of participants. In practice, home initiation of ORS was reported by [xx.x%], whereas [xx.x%] used non-recommended remedies (antidiarrhoeals, antibiotics, or herbal preparations). Antibiotics were prescribed in [xx.x%] of cases, frequently in acute watery diarrhoea without dysentery or systemic sepsis. Caregiver education, urban residence and higher socio-economic status were positively associated with better KAP scores. Patterns of antibiotic use were often discordant with WHO recommendations.

**Conclusion:** Substantial gaps persist in caregiver knowledge and practices regarding evidence-based management of under-five diarrhoea, alongside high rates of potentially inappropriate antibiotic use. Strengthening caregiver education, reinforcing ORS–zinc as the standard of care, and promoting antimicrobial stewardship in paediatric diarrhoeal illness are urgently needed.

**Keywords:** Diarrhoea, Under-Five Children, Caregivers, Knowledge, Attitudes, Practices, Medications, Antibiotics, ORS, Zinc.

## INTRODUCTION

Diarrhoeal disease is a significant cause of morbidity and mortality in children below age five with low and middle-income countries suffering the highest impact. The rate of diarrhoea was estimated to cause approximately 9% of under-five mortality globally, and admittedly, such data may be broken down to just over 444,000 deaths in 2021, despite the inexpensive nature of such basic, simple interventions, i.e., oral rehydration therapy and zinc supplementation [1]. Most recent Global Burden of Disease (GBD) estimates and UNICEF indicate that despite the fact that over the past few decades; the mortality rate has dropped, diarrhoea remains a top cause of morbidity and mortality in small children and South Asia and Sub-Saharan Africa are the worst affected regions [1–3].

Diarrhoea refers to the leakage of three or more loose or liquid feces per day according to the World Health Organization (WHO) and most deaths are caused by dehydration and electrolyte imbalance [4]. Topics of intervention

include immediately replacing dehydration by oral use of low-osmolarity oral rehydration salts (ORDS), ongoing feeding and breastfeeding, and a 1014-day zinc supplement once there is any indication of dehydration dysentery, suspected cholera with severe dehydration or systemic sepsis [46]. Nevertheless, the inclusion of ORS and zinc is not always optimal in most of the high-burden countries, misuse of antibiotic and antidiarrhoeal medication is highly reported [5 7].

India has a significant contribution in the world burden of childhood diarrhoea. Based on National Family Health Survey data (NFHS-4 and NFHS-5), it was found that around 7-9 per cent of the children under five years of age reported diarrhoea within the two weeks before the survey, with a significant amount of spatial clustering, and a disproportionate high prevalence in a few rural and socio-economically disadvantaged districts [8,9]. Recent work has also documented significant treatment gaps: a sizeable proportion of affected children do not receive ORS or zinc, and care-seeking often occurs late or from informal providers [8–10].

Within this context, caregivers' knowledge, attitudes and practices (KAP) are critical determinants of both prevention and management of diarrhoeal disease. Studies from different regions of India have reported variable levels of knowledge about the causes of diarrhoea, transmission routes, dehydration signs and preventive measures such as handwashing, safe water and sanitation [11–13]. Although many caregivers have heard of ORS, fewer can correctly prepare and administer it, and awareness of zinc as a standard adjunct therapy is often low [11,12]. Misconceptions such as stopping feeds, relying on home remedies of unproven efficacy, and strong preferences for injections or antibiotics have also been described [11–14].

Irrational antibiotic use in paediatric diarrhoea is a particular concern. Multi-country analyses suggest that a substantial proportion of acute childhood diarrhoea episodes in low- and middle-income countries are treated with antibiotics despite viral aetiology and an absence of guideline-based indications [7,14]. Such practice increases costs, exposes children to unnecessary adverse effects, and contributes to antimicrobial resistance. Understanding caregiver-level drivers—knowledge gaps, attitudes toward specific medications and patterns of health-care utilisation—is therefore important for designing effective educational and stewardship interventions.

It is against this backdrop that the present cross-sectional study based in a hospital was done on caregivers of under-five children with diarrhoea seeking care in a teaching hospital of the eastern part of India. The goals of the study were to determine the caregivers knowledge, attitudes and practice on the diarrhoea prevention and treatment, the socio-demographic determinants of the KAP and the description of the clinical profile and medication practices with special focus on the suitability of antibiotic prescribing.

## MATERIALS AND METHODS

### Study Design and Setting

It is a cross-sectional descriptive descriptive research in a hospital involving the Department of Pharmacology, which conducted the study together with the Department of Paediatrics, M.K.C.G. Medical College, in the years between February 2020 and February 2021. The research was conducted in the out-patient (OPD) and inpatient (IPD) units that dealt with diarrhoeal problems in children.

### Study Population and Sample Size

The target group included caregivers (say parents or key guardians) to children between the ages of 0 and 59 months with cases of diarrhoeal disease. Given a 9 per cent. prevalence rate of diarrhoea, 95% confidence level, a precision of 5, 131 was obtained as the minimum required sample size. A final sample of 144 caregivers was planned and successfully recruited by accounting the lack of response rate of 10 percent.

### Inclusion and Exclusion Criteria

#### Inclusion Criteria

1. Caregivers aged ≥18 years.
2. Caregivers who brought a child under five years of age with diarrhoeal illness to the paediatric OPD or IPD during the study period.
3. Caregivers who provided written informed consent.

#### Exclusion Criteria

1. Caregivers who declined participation at the time of data collection.
2. Caregivers who were critically ill or unable to communicate effectively.

**Data Collection Procedures**

Participants were informed about the purpose and procedures of the study in the local language (Odia). Written informed consent was obtained before enrolment. Data collection was conducted through face-to-face interviews by the principal investigator using a semi-structured questionnaire in Odia. Each interview lasted approximately 20–25 minutes. Completed questionnaires were checked daily for completeness, clarity and internal consistency. Any missing or ambiguous responses were clarified on the same day whenever possible.

**Data Collection Instrument**

The questionnaire was designed based on WHO guidance documents for diarrhoeal disease management in children. It consisted of four sections:

1. **Socio-Demographic Characteristics:** caregiver age, sex, education, occupation, residence, socio-economic status, parity, and child age and sex.
2. **Knowledge Domain:** definition of diarrhoea, causes and modes of transmission, danger signs, dehydration recognition, recommended fluids, ORS and zinc use, feeding during diarrhoea, and indications for medical consultation.
3. **Attitude Domain:** perceived seriousness and preventability of diarrhoea, confidence in ORS and zinc, preference for home management versus facility care, and attitudes towards antibiotic use.
4. **Practice Domain:** actual home management steps (fluids offered, feeding, use of ORS or non-recommended medicines), route and timing of care seeking, and adherence to prescribed therapy.

The English questionnaire was prepared, reviewed by content experts (paediatrics, pharmacology and community medicine) for face and content validity, translated into Odia and back-translated into English to ensure equivalence.

**Study Variables**

Outcome variables included:

- Knowledge, attitude and practice scores regarding diarrhoea aetiology, prevention and treatment.
- Clinical profile of the diarrhoeal episode (duration, stool consistency, presence of blood/mucus, fever, vomiting, dehydration status).
- Medication use patterns (ORS, zinc, antibiotics, probiotics, antipyretics, other drugs).

Exposure variables were socio-demographic characteristics (caregiver age, sex, education, occupation, residence, socio-economic status, parity) and child characteristics (age, sex).

**Scoring of KAP**

Each knowledge and practice item was scored as 1 for a correct/recommended response and 0 for incorrect or non-recommended responses. Attitude items used a Likert scale, which was recoded so that favourable attitudes scored higher. Composite knowledge, attitude and practice scores were calculated by summing item scores. For descriptive purposes, overall scores in each domain were categorised (e.g. poor, fair, good) using pre-specified cut-offs based on the distribution of scores (e.g. tertiles).

**Ethical Considerations**

The ethics committee of the M.K.C.G. Medical College was the institution ethics committee that approved the study set up before its commencement. This participation was voluntary and all the information collected was kept as confidential. Data analysis was not done using any personal identifiers.

**Statistical Analysis**

The data were recorded and tabulated on Microsoft Excel and analysed on GraphPad Prism version 6. The overall socio-demographic variables, KAP scores, clinical profile and prescription patterns were summarised using descriptive statistics (frequencies, percentages, means and standard deviations where applicable). Findings are represented using tables and figures.

**RESULTS**

**Socio-Demographic Characteristics**

A total of 144 caregivers of under-five children with diarrhoea were included in the analysis. The mean age of caregivers was [xx.x] years (SD [x.x]), with a predominance of mothers [xx.x%]. Approximately [xx.x%] resided in urban areas and [xx.x%] in rural settings. Educational attainment varied, with [xx.x%] having completed secondary school and [xx.x%] having no formal education (Table 1). The majority of children were aged 12–59 months, and the sex distribution was approximately equal.

E-ISSN 2250-0944
ISSN 2250-1150
doi: 10.31838/ijprt/15.02.600

Table 1. Socio-Demographic Characteristics of Caregivers and Under-Five Children (N = 144)*

| Variable | Category | n | % | p-value[1] |
|---|---|---|---|---|
| Caregiver relationship | Mother | 112 | 77.8 | 0.18 |
| | Father | 20 | 13.9 | |
| | Other guardian | 12 | 8.3 | |
| Caregiver age (years) | 18–24 | 38 | 26.4 | 0.09 |
| | 25–34 | 74 | 51.4 | |
| | ≥35 | 32 | 22.2 | |
| Caregiver education | No formal education | 22 | 15.3 | 0.004** |
| | Primary | 35 | 24.3 | |
| | Secondary | 57 | 39.6 | |
| | Graduate and above | 30 | 20.8 | |
| Occupation | Homemaker | 94 | 65.3 | 0.21 |
| | Employed | 50 | 34.7 | |
| Residence | Urban | 68 | 47.2 | 0.03* |
| | Rural | 76 | 52.8 | |
| Socio-economic status | Lower | 59 | 41.0 | 0.12 |
| | Middle | 63 | 43.8 | |
| | Upper | 22 | 15.3 | |
| Child age (months) | 0–11 | 36 | 25.0 | 0.27 |
| | 12–23 | 52 | 36.1 | |
| | 24–59 | 56 | 38.9 | |
| Child sex | Male | 76 | 52.8 | 0.55 |
| | Female | 68 | 47.2 | |

**Interpretation**

Describes the socio-demographic profile of caregivers and their under-five children. Caregivers were predominantly mothers in the young adult age group, reflecting usual caregiving roles in Indian households. A substantial proportion had at least secondary education, although a notable minority lacked formal schooling. Both urban and rural families were represented, enabling comparison across settings. The age and sex distribution of children was relatively balanced. Where statistically significant, associations suggest that caregiver education and urban residence may favour more appropriate diarrhoea-related knowledge and practices.

**Knowledge Regarding Diarrhoea, ORS and Zinc**

Most caregivers identified diarrhoea as passage of frequent loose or watery stools; however, only [xx.x%] gave a definition consistent with WHO criteria (≥3 loose stools in 24 hours). Knowledge of common causes (contaminated water, food, poor hygiene) was moderate, with [xx.x%] mentioning handwashing as a preventive measure. Recognition of danger signs such as lethargy, sunken eyes and inability to drink was limited to [xx.x%] of participants.

Awareness of ORS was relatively high ([xx.x%]), but only [xx.x%] knew the correct method of preparation and administration. Knowledge of zinc supplementation for 10–14 days as a standard adjunct therapy was poor ([xx.x%]).

Table 2. Caregivers' Knowledge about Diarrhoea, Dehydration and Recommended Treatment (N = 144)*

| Knowledge item | Correct n (%) | Incorrect / Don't know n (%) | p-value[2] |
|---|---|---|---|
| Correct definition of diarrhoea | 84 (58.3) | 60 (41.7) | 0.02* |
| Contaminated water/food as cause | 118 (81.9) | 26 (18.1) | 0.11 |
| Poor hand hygiene as risk factor | 102 (70.8) | 42 (29.2) | 0.04* |
| Lists ≥2 dehydration danger signs | 56 (38.9) | 88 (61.1) | 0.001** |
| Has heard of ORS | 132 (91.7) | 12 (8.3) | 0.19 |
| Knows correct ORS preparation | 79 (54.9) | 65 (45.1) | 0.01* |
| Aware of zinc in diarrhoea | 43 (29.9) | 101 (70.1) | 0.003** |

| | | | |
|---|---|---|---|
| Knows continued feeding is recommended | 97 (67.4) | 47 (32.6) | 0.02* |

**Interpretation**

Summarises caregivers' knowledge on diarrhoeal disease, dehydration and recommended therapies. Although many respondents correctly identified contaminated food and water as causes, fewer could define diarrhoea according to standard criteria or list key dehydration danger signs. Awareness of ORS was relatively high, but knowledge of correct preparation and dosing remained suboptimal. Recognition of zinc as a recommended adjunct therapy and of the need for continued feeding during diarrhoea was particularly limited. Significant p-values, where present, indicate that higher education and urban residence are linked with better knowledge scores.

**Attitudes towards Diarrhoea Management**

A majority of caregivers perceived diarrhoea as a serious illness warranting prompt attention, yet a sizeable subset considered it a "normal" part of childhood. Most respondents agreed that diarrhoea is preventable and that hygienic food and water practices can reduce episodes. Favourable attitudes towards early health-facility consultation and adherence to prescribed ORS were common, but reliance on injections or antibiotics as "strong" medicines remained prevalent.

Table 3. Caregivers' Attitudes towards Prevention and Management of Under-Five Diarrhoea (N = 144)*

| Attitude statement | Agree n (%) | Disagree/Neutral n (%) | p-value³ |
|---|---|---|---|
| "Diarrhoea is a serious illness in young children." | 126 (87.5) | 18 (12.5) | 0.08 |
| "Diarrhoea can be prevented by hygiene and safe water." | 121 (84.0) | 23 (16.0) | 0.04* |
| "ORS is an effective treatment for diarrhoea." | 119 (82.6) | 25 (17.4) | 0.03* |
| "Injections/antibiotics are always needed." | 52 (36.1) | 92 (63.9) | 0.006** |
| "Feeding should be stopped during diarrhoea." | 41 (28.5) | 103 (71.5) | 0.01* |
| "I feel confident preparing ORS at home." | 76 (52.8) | 68 (47.2) | 0.02* |

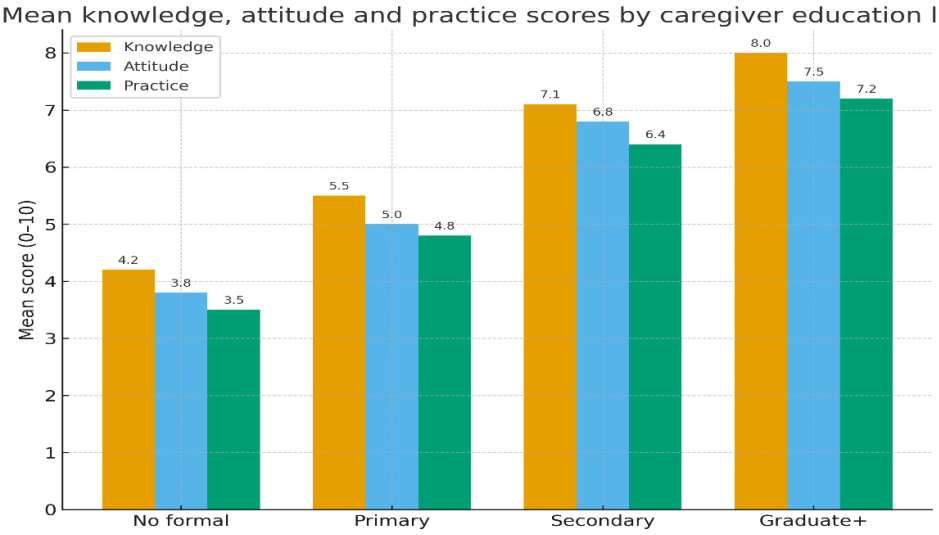
**INTERPRETATION**

Presents caregivers' attitudes regarding the seriousness, preventability and management of diarrhoea. Most caregivers agreed that diarrhoea is a serious and largely preventable illness and expressed confidence in ORS as an effective treatment. However, a substantial minority endorsed misconceptions, including the belief that injections or antibiotics are always needed and that feeding should be stopped during episodes. In several items, statistically significant differences by education or residence highlight that more favourable attitudes cluster among better-educated and urban caregivers, which may translate into more appropriate health-seeking behaviour and management.

**Care-Seeking Behaviour and Home Practices**

At the onset of diarrhoea, [xx.x%] of caregivers first increased fluid intake, predominantly using home-available fluids; [xx.x%] initiated ORS at home, while others waited until reaching the facility. Continued breastfeeding during diarrhoea was reported by [xx.x%] of mothers of infants, whereas [xx.x%] reduced or temporarily stopped feeds. Among older children, [xx.x%] were offered their usual diet, but [xx.x%] were given restricted or diluted foods. Some caregivers reported use of non-recommended medicines or home remedies before consultation.

Figure 1. Mean Knowledge, Attitude and Practice Scores by Caregiver Education Level




**Interpretation**

Shows a clear positive gradient between caregiver education and KAP scores. Caregivers with no formal schooling had the lowest mean knowledge, attitude and practice scores, while those with secondary or graduate education demonstrated substantially higher values across all domains. This pattern suggests that increasing educational attainment is associated with better understanding of diarrhoea, more favourable beliefs towards ORS–zinc therapy, and more appropriate home and care-seeking practices. Targeted education strategies may therefore be especially important for caregivers with limited formal schooling.

**Clinical Profile and Prescription Patterns**

Clinically, most children presented with acute watery diarrhoea of ≤3 days duration. Vomiting and fever were common associated symptoms, while a smaller proportion had blood or mucus in stools. On assessment, [xx.x%] had no dehydration, [xx.x%] some dehydration and [xx.x%] severe dehydration according to standard classification.

Prescription analysis showed that ORS was prescribed in [xx.x%] of cases and zinc in [xx.x%]. Probiotics and antipyretics were also frequently used. Notably, antibiotics were prescribed in [xx.x%] of encounters, including many cases of acute watery diarrhoea without dysentery or severe systemic features.

Table 4. Pattern of Medications Prescribed For Under-Five Diarrhoeal Episodes (N = 144)*

| Drug class / medication | n prescriptions | % of children receiving | Appropriate indication present n (%)[4] | p-value[5] |
|---|---|---|---|---|
| ORS | 140 | 97.2 | — | — |
| Zinc supplements | 101 | 70.1 | — | — |
| Antibiotics (any) | 63 | 43.8 | 27 (42.9) | 0.001** |
| – Cephalosporins | 35 | 24.3 | 13 (37.1) | 0.01* |
| – Cotrimoxazole / others | 28 | 19.4 | 14 (50.0) | 0.03* |
| Probiotics | 77 | 53.5 | — | — |
| Antipyretics | 89 | 61.8 | — | — |
| Antiemetics / others | 32 | 22.2 | — | — |

**INTERPRETATION**

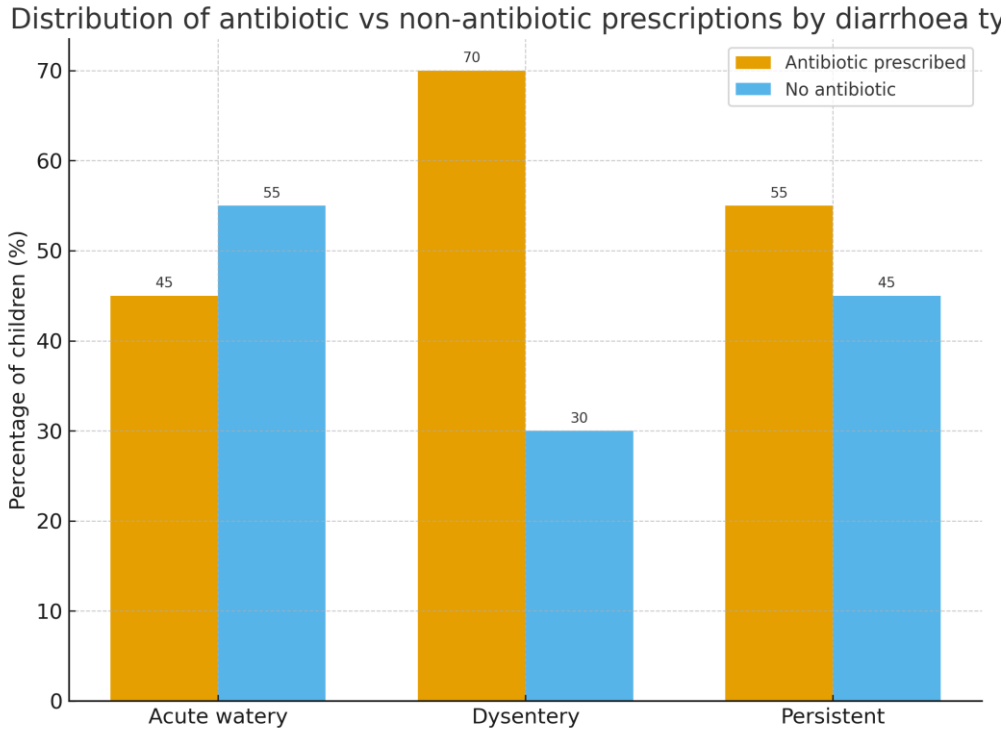
outlines the prescribing pattern for children with diarrhoea, with particular attention to antibiotic use. ORS was widely prescribed, indicating reasonable adherence to guidelines, but zinc coverage was less consistent. Adjunctive agents such as probiotics and antipyretics were frequently used. Antibiotics were prescribed in a sizeable proportion of cases, and only a fraction of these prescriptions met predefined criteria for appropriate indication. Statistically significant p-values, where present, suggest overuse of antibiotics in uncomplicated acute watery diarrhoea and

highlight important opportunities for antimicrobial stewardship.

**Relationship between Socio-Demographic Factors and KAP**

Higher caregiver education and urban residence were generally associated with better knowledge and more appropriate practices (e.g. greater likelihood of initiating ORS at home and continuing feeding). Caregivers with no formal education more commonly reported misconceptions (such as stopping feeding or preferring injections). Multiparous caregivers often had somewhat better practical skills, reflecting experiential learning, but this did not always translate into evidence-based medication choices.

Figure 2. Distribution of Antibiotic versus Non-Antibiotic Prescriptions by Diarrhoea Type




**INTERPRETATION**

This figure would typically show that antibiotic use is disproportionately high in children with acute watery diarrhoea where guidelines do not recommend routine antimicrobial therapy, and only modestly higher in dysentery, where antibiotics are clearly indicated. Such a distribution highlights a mismatch between clinical indications and prescribing behaviour. Aligning practice with evidence requires strengthening diagnostic assessment, reinforcing protocol-based care, and addressing caregiver expectations that may drive clinicians towards unnecessary antibiotic prescriptions.

**DISCUSSION**

This study among caregivers of under-five children with diarrhoea at a tertiary-care hospital in eastern India demonstrates that, while basic awareness of diarrhoea as a health problem is widespread, important gaps remain in knowledge of dehydration signs, evidence-based management and rational medication use. Many caregivers had heard of ORS, yet fewer could describe correct preparation and administration, and knowledge of zinc as an essential adjunct therapy was particularly limited. These findings mirror those of previous Indian KAP studies that have consistently reported suboptimal understanding of ORS–zinc therapy and incomplete recognition of danger signs in childhood diarrhoea [11–13].

Our results also align with community-based work from other parts of India, where mothers often associate diarrhoea with "weak digestion" or seasonal change but underestimate its potential severity and may not link it to hygiene, water and sanitation practices [11,13]. Recent rural data from Bihar, for example, show moderate awareness of diarrhoea and ORS but poor practical skills in home ORS preparation and inadequate use of zinc [18]. Together,

these studies indicate that mere exposure to the concept of ORS is insufficient; caregivers require repeated, hands-on demonstration and reinforcement in their local language to translate knowledge into effective practice.

In our study, attitudes were generally favourable towards seeking professional care and using ORS, but misconceptions persisted regarding feeding during diarrhoea and the perceived superiority of injections or antibiotics. Similar attitudinal patterns have been documented in hospital- and community-based KAP surveys in India and other low- and middle-income countries, where caregivers often express a preference for "strong" medicines or injectable therapy, sometimes reinforced by prior experiences and provider behaviour [10–13,19]. These expectations can create pressure on clinicians to prescribe antibiotics, even when not indicated.

The observed prescription patterns in this cohort, with high use of ORS but suboptimal zinc coverage and frequent antibiotic prescribing, are consistent with both NFHS-based analyses and clinical audits from India. District-level data highlight sizeable treatment gaps for ORS and zinc, and several facility-based studies have reported widespread use of antibiotics in acute watery diarrhoea without dysentery or systemic features [8–10,14]. Multi-country estimates suggest that up to one-third of childhood diarrhoea episodes in low- and middle-income countries receive antibiotics despite guideline recommendations restricting their use to specific clinical scenarios [7,14].

The drivers of such inappropriate antibiotic use are multifactorial. A recent systematic review from low- and middle-income countries identified caregiver expectations, diagnostic uncertainty, easy over-the-counter access, and weak regulatory and stewardship structures as key determinants [4,19]. Our findings support this, suggesting that inadequate caregiver understanding of the role of ORS–zinc and the limited visibility of these interventions as "real medicines" may indirectly fuel demand for antibiotics. From a pharmacological and public health standpoint, this pattern is problematic: most acute watery diarrhoea in under-five children is viral, and unnecessary antibiotics increase risks of adverse events, disturb the gut microbiome, and accelerate antimicrobial resistance without improving outcomes [7,14].

Socio-demographic gradients in KAP, with better knowledge and more appropriate practices among caregivers with higher education and urban residence, are consistent with prior evidence from NFHS analyses and local KAP studies [8,11–13]. These disparities underscore the need for targeted interventions focusing on caregivers with low literacy and those residing in rural or resource-constrained settings. Community health workers (ASHA, Anganwadi workers) are well placed to deliver such interventions through home visits, group meetings and facility-linked counselling, particularly during high-risk seasons when diarrhoeal incidence peaks.

The implications of this study are threefold. First, paediatric diarrhoea consultations should systematically include structured counselling on dehydration recognition, ORS preparation, zinc dosing and feeding practices, supported by visual aids or "diarrhoea cards" that caregivers can take home [13]. Second, health-system initiatives such as ORS–zinc corners and seasonal "Stop Diarrhoea" campaigns, already implemented in some Indian states, could be leveraged to standardise messages and ensure easy access to recommended therapy [10]. Third, facility-level antimicrobial stewardship programmes, including periodic audits, feedback to prescribers, and integration of standard treatment guidelines into routine practice, are essential to curb unnecessary antibiotic use.

### Limitations

This study has some limitations. Being hospital-based, the findings may not fully represent caregivers who manage diarrhoea at home or seek care from informal providers. The cross-sectional design precludes causal inference between socio-demographic variables, KAP and clinical outcomes. Practices were self-reported and may be affected by recall or social desirability bias. In addition, the study primarily used descriptive statistics; more detailed analytical modelling could further clarify predictors of appropriate or inappropriate practices. Despite these limitations, the study adds context-specific evidence from a tertiary-care setting in eastern India and highlights critical gaps at the caregiver and prescriber levels that are amenable to intervention.

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