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Home Management Practices of Acute Respiratory Infections and Acute Diarrhea of Children in Sana'a, Yemen

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Abstract

Introduction: Acute Respiratory Infections, (ARI), and diarrhea represent major leading cause to under five morbidity and mortality all over the world. Majority of these cases occur in the poorest communities. This study aimed to assess different home management practices of pneumonia and diarrhea in Sana'a.

Methods: This is a hospital-based cross-sectional study with direct interview of Mothers recruited from major hospitals in Sana'a between January and May 2020.

Results Two hundred and six mothers were enrolled in this study. Hundred and sixty-six (80.6%) of mothers in this study used over-the-counter anti-cough preparations. The study reported 58.7% of mothers did not give their children Oral Rehydration Solution (ORS), during diarrhea. We found 45.1% and 35% gave antibiotics without prescription during ARI and acute diarrhea respectively. Majority of mothers continued breastfeeding. No association was detected between practices and demographic features or educational level of mothers.

Conclusion: Inappropriate self-medication practices regarding the management of acute diarrhea and ARI and under use of ORS for acute diarrhea were common home practices. There is a great need to increase awareness of mothers about home management through health education programs.

Keywords: Pneumonia, Diarrhea, Under 5 Children, Yemen

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الممارسات العلاجية المنزلية لأمراض الجهاز التنفسي الحادة والإسهال الحاد بين للأطفال دون سن الخامسة في صنعاء، اليمن

منى عبده محمد النمر[1] ، محمد علي سعيد الشهاب[2] ، فاروق عبدالرحمن القدسي[3] ، وفاء عبده مقبل الكامل[4] ، شيماء صلاح أحمد ناصر[4] ، هديل محمد أحمد مرشد[4]

ملخص الدراسة

المقدمة: يمثل الالتهاب الرئوي والإسهال أسبابًا رئيسية لمراضه ووفيات الأطفال دون سن الخامسة في جميع أنحاء العالم. وتحدث غالبية هذه الحالات في المجتمعات الأكثر فقرًا. هدفت هذه الدراسة تقييم الممارسات العلاجية المختلفة لأمراض الجهاز التنفسي الحادة والإسهال الحاد المقدمة في المنزل للأطفال دون الخامسة.

المنهجية: هذه دراسة وصفية مقطعية أجريت في الفترة بين يناير ومايو من العام 2020. تم أخذ عينة الأمهات من أقسام الرقود، الطوارئ والعيادات في أربعة مستشفيات رئيسيه في صنعاء.

النتائج: تم تسجيل مائتين وستة من الأمهات في هذه الدراسة. استخدم مائة وستة وستون (80.6٪) من الأمهات في هذه الدراسة مستحضرات مضادة للسعال دون وصفة طبية. في هذه الدراسه58.7٪ من الأمهات لم يعطين أطفالهن محلول معالجة الجفاف عن طريق الفم أثناء الإسهال. خمس وأربعون بالمائه و35٪ أعطين مضادات حيوية بدون وصفة طبية أثناء عدوى الجهاز التنفسي الحادة والإسهال الحاد على التوالي. استمرت غالبية الأمهات في الرضاعة الطبيعية. لم يتم الكشف عن أي ارتباط بين الممارسات والسمات الديموغرافية أو المستوى التعليمي للأمهات.

الاستنتاج: ممارسات العلاج الذاتي غير الملائمة فيما يتعلق بالإسهال الحاد والتهابات الجهاز التنفسي الحادة وقلة استخدام أملاح الإماهة الفموية للإسهال الحاد كانت من أهم الممارسات المنزلية في هذه الدراسة. هناك حاجة كبيرة لزيادة وعي الأمهات عن الرعاية المنزلية من خلال برامج التثقيف الصحي.

الكلمات المفتاحية: الإسهال الحاد، التهابات الجهاز التنفسي الحادة ، الأطفال دون الخامسة، اليمن.

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Introduction

Pneumonia and acute diarrhea represent the leading causes of under-five mortality worldwide. These two conditions represent 29% of child deaths accounting for around 2 million deaths/year. The majority of death from pneumonia and diarrhea occur in the poorest regions in the world [1]. In Ethiopia, a study of determinants of mortality among under five children found increased incidence of pneumonia among children with diarrhea, which indicate a relation between these two diseases [2].

In Yemen, pneumonia and diarrhea represent 27% of under-five mortality. Moreover, diarrhea and pneumonia were significantly associated with the presence of severe acute malnutrition (SAM) among those children [3, 4].

According to the World Health Organization (WHO) guidelines 2013, home management of pneumonia is based on oral antibiotics (Amoxycillin) for 5 days, while diarrhea with no dehydration could be managed at home by Oral Rehydration Solutions (ORS), by cup and spoon, 50-100 ml/ after each loose stool for those under 2 years and 100-200 ml after each loose stool for older children. In addition, Zinc tablets is recommended be given for 10-14 days [5, 6].

Prevention and control processes alone did not lead to the expected reduction in mortality associated with common childhood fatal illnesses. Therefore, these measures should be combined with good home management practices by mothers. Good home management practices reduced 57% of mortality related to diarrheal illnesses [7]. Moreover, cost effective interventions for the management and prevention of these two diseases by all countries is important to keep the rate of decline of mortality among children and consequently, achieving the goal of 2025 " ensure good healthy lives and wellbeing for all at all ages"[5].

The ongoing-armed conflict in Yemen since 2015, continued to put its serious effects on the health care system. It has led, as any other armed conflict in the world, to a restricted access to health care, safe and clean water and access to vaccination. Children are among the most vulnerable groups affected by this effect. In such circumstances, saving lives of sick children by receiving early appropriate treatment is an important issue since the reach to health facilities is restricted [3, 8, 9]. Appropriate preventive measures at home as well as prompt home management steps for common childhood illnesses are considered important step in reducing mortality of under -five 10].

In Yemen, studies that explore mothers' orientation regarding home management practices of diarrhea and ARI are limited. This study is aimed at exploring practices of mothers of under-five children regarding home management of these common causes of childhood morbidity and to determine the areas of health education that could decrease morbidity and mortality regarding ARI and diarrhea in children.

Methods

Study Design and setting

This is a hospital-based cross-sectional descriptive study. It was performed in Sana'a city; the largest city in Yemen Republic with 3,181,655 people according to the last estimate in 2022 (World population review.com). Participants were recruited from the outpatient, emergency, and inpatient departments of four major referral hospitals in Sana'a city, A l-Thawra, Al-Sabeen, Al-Kuwait and Al-Jomhoori hospitals.

S*tudy population* was mothers of children who developed acute respiratory infection (ARI) or acute diarrhea during the last 2 weeks prior to the enrollment throughout the study duration. The study was performed between January and May 2020

- ***Inclusion criteria*** were all mothers of children under 5 years of age attending the outpatient, inpatient, or emergency rooms of the above-mentioned hospitals due to acute diarrhea or ARI of their children during the study period, who accepted to participate after an oral consent.
- ***Exclusion criteria*** were mothers of infants with chronic diarrhea or respiratory condition, bloody diarrhea or co-infections.

Sample size was calculated using Open Epi version 3.01 (www.Open Epi.com) Assuming a power of 80% and a maximum allowable error of 0.05 and a confidence interval 95% and adding 10 % for possible drop. Two hundred and six was the calculated sample size. We used stage sampling where sampling was done from each hospital to collect the participants.

Study Definitions

- Acute diarrheal episode is defined as three or more loose/ liquid stools in a 24 hours period.[5]
- Normal mid upper arm circumference (MUAC), is defined as > 12.5 cm. [5]
- Socioeconomic level was reported according to monthly family income where high was considered as > 375 US$ per month), moderate: 75-375 US$ per month, and low: < 75 US$ per month.

Data collection tool was prepared following extensive literature review. The questionnaire composed of 27 questions covered different aspects of information such as age of the mother and child, education level of the mother, level of income. The questions also elicited responses about different practices of home management related to acute respiratory infections and acute diarrhea. The questionnaire was applied by direct (face-to-face) interviews.

Data analysis

Collected data were analyzed using IBM SPSS, version 21. Descriptive statistics (frequencies and percentages) were used to show the responses. Chi square test was used to detect the association between certain variables. Data were tabulated and presented in the suitable forms.

Ethical considerations; the ethical committee of the Faculty of Medicine and Health Sciences gave the ethical approval. The ethical committee agreed for the verbal consent because there are no interventional procedures in the study.

Results

Demographic and social characteristics of the interviewed mothers/ Mothers

The number of completed questionnaires was 206. Table 1 illustrates the demographic and socioeconomic data of the participated mothers and their children. Mean age of the enrolled mothers was 28 (± 6.55) year. Mean age of the children was 21.66 (±16.39) months, with 107 (53%) males and 47% females. The majority (64%) were under 3 years of age. Regarding residence, 53.9% were residing in urban areas, and 92.2% of mothers were housewives. Only 13.1% of Mothers were university educated, 31.1% had secondary school education, while 55.8%, were illiterate or primary school educated. Majority of families, (93%), were at moderate to low income. About sixty-four percent (64.6%) of children have (Z score ≥ -1). Whereas 72.7% of children have normal mid upper arm circumference (MUAC) (12.5 cm).

Table (1): Demographic and Social Characteristics of the Participants (n=206)

Variable	Mean	SD	No.	%
Age of the mother (year)	28	6.55		
Gender of the child/ infant				
Male			107	53.0
Female			95	47.0
Age of the child/ infant (months)	21.66	16.39		
Mother education				
University education			27	13.1
Secondary school			64	31.1
Primary school			55	26.7
Illiterate			60	29.1
Mother Residence				
Urban			111	53.9
Rural			95	46.1
Mother occupation				
Housewife			190	92.2
Part-time worker			11	5.3
Fulltime worker			5	2.4
Family income per month				
High			14	7.0
Moderate			80	40.2
Low			105	52.8
Weight of child (kg)	8.57	3.4		
Length/Height of child (cm)	72.5	14.08		
Z-Score				
<-3			28	13.6
<-2 to -3			19	9.2
<-1 to -2			26	12.6
≥ -1			133	64.6
MUAC (cm)	13.97	2.34		
SAM (< 11.5)			22	12.5
MAM (11.5 - 12.5)			26	14.8
Normal (> 12.5)			128	72.7

Mothers / Mothers responses regarding home management practices during acute respiratory tract infection

Table 2 shows that 101 (49 %) of the interviewed mothers used pharmacological saline nasal drops to treat nasal obstruction during ARI, while 25.7% used some common oils dropped to the nose, 10.7% administered drops of breastmilk to the nose, 4.9% used oral decongestants. On the other hand, 26% of mothers did not use any therapy for nasal congestion. Minor fraction, 0.5% used Vicks (menthol) and 0.5% used manual suction.

Regarding home management of fever, the majority of mothers (88.3%), used oral antipyretic, paracetamol or ibuprofen preparations. Tap water pads was the option in 61.2% ,with or without oral antipyretics, 17.5% used cold water pads, 40.3% preferred to use rectal antipyretic preparations, while 4.9% has used intramuscular antipyretics.

When the child developed cough during ARI, the majority of mothers (80%) preferred to use one of the over-the-counter pharmacological anti cough preparations, whereas 29.6% used Sesame oil ingestion. Massage of the chest with Vicks was the preferred choice in 19.4% of mothers and drinking warm herbs such as Thyme and Mint was the preferred choice in 12% of mothers, 9.7% used mainly Petroleum Jelly massage of the chest area while 8.3% of mothers used Honey –containing drinks and only 1 % used raw egg ingestion.

Regarding the decision to start antibiotics at home without prescription, 45.1% of mothers started antibiotics by their own without medical advice; 93.5% of them used oral antibiotic preparation (Ampicillin or Amoxycillin) and 5.4% of mothers took the decision of giving intramuscular injections form of antibiotics.

Table (2): Home Management Practices of Participants during ARI

Variable	No.	%
What do you give to your child when he is having nasal obstruction		
Pharmacological saline drops	101	49.0
Nothing	54	26.2
Nasal drops of oil	53	25.7
Breast milk nasal drops	22	10.7
Oral decongestant preparations	10	4.9
Suctioning	1	0.5
Vicks	1	0.5
What do you give your child when he has fever		
Oral preparations	182	88.3
Pads(tap water)	126	61.2
Rectal preparations	83	40.3
Pads(cold water)	36	17.5
Paracetamol injections	10	4.9
Olive oil	1	0.5
Nothing	1	0.5
What do you give your child if he has cough		
Cough medications from the pharmacy	166	80.6
Sesame oil or any oil ingestion	61	29.6
Vicks massage	40	19.4
Warm herbs	27	13.1
Honey preparation	17	8.3
Vaseline massage	20	9.7
Eggs	2	1.0
Nothing	16	7.8
Do you start antibiotic at home (without prescription)?		
Yes	93	45.1
No	113	54.9
IF yes, what type of antibiotic?		
Oral antibiotics	87	93.5
Parenteral antibiotics	5	5.4
Oral and parenteral antibiotics	1	1.1

Mothers responses regarding home management practices during acute diarrhea

Table 3 shows that the highest percentage of mothers (58.7%) did not give their children ORS during acute diarrhea. Among the 85 mothers who used ORS, majority used it correctly in terms of dilution and dose (81.2%). Of the 16 with incorrect ORS, 75% use it in a concentrated form and 25% in a diluted form. Regarding ORS, 40% of those mothers who gave it incorrectly (34) used to give it in overdose (14.7%) or under-dose (85.3%). Concerning nutritional practices during acute diarrhea, 14.6% did not give any solid food whereas 85.4% of mothers continued feeding during diarrhea. They mostly gave yoghurt (70.9%), mashed potatoes (32%), rice or rice water (29.6%) and vegetable soup (12%). Majority (88.8%) continued breastfeeding and/or formula as usual. However, 35%, of admitted they started antibiotics for episodes of acute diarrhea without a medical

prescription; the majority of them gave oral antibiotics.

Table 3 : Home Management Practices of Participants during Acute Diarrhea

Variable		No.	%
If your child developed acute diarrhea, do you give him ORS?			
	Yes	85	41.3
	No	121	58.7
If yes: describe the method of preparation (n=85)			
	Correct	69	81.2
	Incorrect	16	18.8
If incorrect	**(n=16)**		
	More quantity of water	4	25.0
	Less quantity of water	12	75.0
What dose of ORS you use: (considering there is no dehydration) (n=85)?			
	Correct	51	60.0
	Incorrect	34	40.0
If incorrect:	**(n=34)**		
	Overdose	5	14.7
	Under dose	29	85.3
What do you give your child as food when he is having acute diarrhea			
	Yoghurt	46	70.9
	Potato	66	32.0
	Rice or rice water	61	29.6
	Zinc supplementation	13	6.3
	Banana/banana juice	12	5.8
	Apple/apple juice	18	8.7
	Vegetable soup	25	12.1
	Canned juice	17	8.3
	Pomegranate peel	1	0.5
	Bread	3	1.5
	Starch	2	1.0
	Peppermint/Mint	7	3.4
	Garlic	2	1.0
	Biscuit	1	0.5
	Cheese	2	1
	Egg	1	0.5
	Shabisa	2	1.0
	Nothing	30	14.6
Do you continue to give breast milk/ formula /food during acute diarrhea?			
	Yes	183	88.8
	No	23	11.2
Do you give antibiotics without prescription in acute diarrhea?			
	Yes	72	35.0
	No	134	65.0
If yes, what do you give?			
	Oral preparations	71	98.6
	Oral and/or parenteral	1	1.4

Table 4 revealed no significant association between home practices and some demographic characteristics except for using pharmacological nasal saline in case of nasal congestion where less educated mothers (illiterate and primary school) had not used it for their children at a significantly higher number

(p=0.045) compared to more educated mothers

Table 4: Factors Influencing Certain Home Management Practices of Acute Diarrhea and ARI

		Method of ORS preparation		Total	*p*
		Correct	**Incorrect**		
Education	University education	8	19	27	0.725
	Secondary school	19	45	64	
	Primary school	23	32	55	
	illiterate	19	41	60	
Total		69	137	206	
Residence	Urban	34	77	111	0.285
	Rural	35	60	95	
Total		69	137	206	
		Using pharmacological saline drops for nasal congestion		**Total**	***p***
		Yes	**No**		
Education	University Education	16	11	27	0.045
	Secondary School	14	50	64	
	Primary School	16	39	55	
	Illiterate	17	43	60	
Total		63	143	206	
		Using anti-cough drugs		**Total**	***p***
		Yes	**No**		
Education	University Education	5	22	27	0.436
	Secondary school	22	42	64	
	Primary school	14	41	55	
	illiterate	24	36	60	
Total		65	141	206	
Residence	Urban	29	82	111	0.309
	Rural	36	59	95	
Total		65	141	206	

Discussion

This study has interviewed 206 mothers to assess their home practices regarding two of the most common morbidities in Yemen, diarrhea and ARI.

In this study, the mean age of mothers was 28 (± 6.55) years, while the mean age of children was 21.66 (±16.39) months, the majority were less than 3 years, with male gender preponderance. In a similar survey to assess mothers' knowledge, attitudes and practices of childhood diarrhea performed in Saudi Arabia in 2021, 61% of enrolled children were more than 3 years of age with female preponderance [11]. In Ethiopia, 2019, another survey was performed

and found a near mean child age (26 ±3.4 months), and maternal mean age (27±6 years) with mild male preponderance (50.4%) [12]. In contrast, a prospective cohort study in Philippines revealed majority of children were at an older age (47.2% between 3-5 years), as well as older maternal age (mean 31.9%) [13].

In this study, the majority of mothers were residing in urban areas. This is in contrast to a study in Ethiopia where majority of mothers were from rural areas [12], as well as a study in Palestine, 2013, which reported 86% of families in the study were from rural areas [14]. This may be explained by the difficult outreach of rural families to major hospitals because of the current armed conflict in Yemen.

The highest percentage of mothers in this study were housewives with no or primary school education. This is similar to the study in Saudi Arabia where majority of mothers were housewives (52%) although with good education (42% with university education) [11], and in Ethiopia where 40.3% of mothers were housewives and only 4.5% were with university education [12]. In contrast, a higher educational level was reported in similar surveys in Philippines [13], and Palestine [14]. In this study, 93% of mothers were at low-moderate socioeconomic level. This is slightly worse than that in Palestine were about 78% of mothers were reported to be at low-moderate socioeconomic level [14]. However, no clear association was detected between these two factors and the practice of mothers

Using hypertonic saline as nasal irrigation or drops 3-6 times per day is commonly recommended, for its mucolytic effect as well as antiviral effect because Na Cl in the epithelial cells boosts innate immunity, although more research should be done to prove that [15]. In this study, 49% of mothers used pharmacological nasal saline in case their children suffered nasal obstruction. This is a good percentage. Moreover, a minor percentage of mothers used menthol-based ointment to decrease nasal congestion, which is proved effective in children [16]. On the contrary, a considerable proportion of mothers have used different oils as nasal drops for nasal congestion. Although an evidence is available that Eucalyptus oil is considered effective in common cold [16], using common animal fats and olive oils and other oils, which is part of culture in Yemen, Saudi Arabia, India and other countries, can lead to a serious effect and persistent ARI [17].

Fever is one of the main annoying symptoms for the mothers since they link fever, especially high grade, with serious neurological conditions. In this study, the majority of mothers used common oral antipyretic preparations when their children developed fever, while more than 40% preferred rectal antipyretic preparations. Although it is good to use oral antipyretic preparation to reduce fever, using them without a medical prescription may be risky if dose and duration was not clearly defined. This is also reported in a cross-sectional study in Saudi Arabia where 75% of interviewed mothers used over-the counter fever medications to manage fever [18]. Meanwhile, a similar study in Palestine reported only 34.8% of mothers have used pharmacological

antipyretic preparation [14]. Other non-pharmacological measures used by the Mothers in this study were tap water sponges in 61% and cold water sponges in 17.5%. In a randomized clinical trial comparing the effect of cold sponges and paracetamol in reducing fever, the authors concluded that although cold water sponges have rapid initial effect in reducing temperature, but this effect lasts for a shorter period compared to oral paracetamol [19]. The same was concluded regarding tepid water sponging. [20]. Tepid and or cold water sponging was reported in 49.8% and 84% of mothers in Palestine [14] and Saudi Arabia [18] respectively.

With regard to management of children with cough, 80% of participants of this study reported the use of over-the-counter oral cough preparations without prescriptions. This is also was found by a large survey of care seeking practices of mothers in Philippines. The authors reported 47.6% of participants relied on giving self-medications to their children instead of seeking medical advice [13]. Bhalla *et al*, in their study in India, reported 43.6% of participants have practiced self-medication for their children during ARI [21]. On the other hand, a national health survey in Germany revealed self-medication to be practiced by nearly 40% of people, of which, 32.1% was related to respiratory system [22]. Using over the counter anti-cough combination should be discouraged and a medical advice should be encouraged.

In this study, 29.6% of mothers confirmed the use of sesame oil ingestion as a home remedy for their children. Similarly, a cross-sectional study in south Nigeria revealed majority, 81.1% of the mothers has used Shea butter oil for their children as home remedy for cough as well as other oils such as palm oil to the nose for the same purpose. (23). Another country with high use of oils for respiratory problem is Saudi Arabia, the highest was Olive oil [24]. This common home remedy may expose children to the risk of aspiration ARI. Herbs' tea is another common home remedy used to alleviate symptoms of ARI especially cough. In this study, 13.1% of Mothers used drinking warm herbs especially Thyme, and 8.3% used honey with or without Lemon as cough treatment for their children. In a multicenter survey in Saudi Arabia, the authors reported the use of different herbs as a treatment of cough in ARI in 59.3 % of participants including Anise, Arab Gum, Cumin, etc. [24]. Moreover, 66.3% of mothers in another study in India have used different home remedies to treat their children with ARI [21]. Teas and different home remedies were reported in Austria in 45.1% of mothers [25], and honey was used as a treatment of ARI in 37% of mothers in Lahore with 29% used different teas [26].

In this study, 45.1% of mothers has actually given non-prescribed antibiotics for their children during ARI. Similarly, Bhalla *et al* reported 57.4% of mothers believed that antibiotics could be self-administered to children with ARI [21]. Similarly, Zyoud *et al* from Palestine reported that 59.4% of mothers agreed that antibiotics can be given to any febrile child and that mothers used non-prescribed antibiotics because of economic difficulties or lack of time to consult a pediatrician [27]. Furthermore, 55% of mothers in

Ethiopia were sure that antibiotics will shorten the duration common cold. [28]. In contrast, a recent multicenter study in Muscat, Oman, revealed that the majority of mothers has never practiced self-administration of antibiotics to their children although half of participants agreed that antibiotics could decease severity of cold [29]. Additionally, a study in Greece revealed only 10% of mothers gave non-prescribed antibiotics to their children in respiratory infections [30].

With regard to home management of acute diarrhea, 58.7% of mothers in this study did not give ORS to their children, and among those who gave it, the majority has prepared it correctly regarding dose and dilution. Nearly the same was reported by a survey in Saudi Arabia, where only 23.5% of mothers has used ORS to treat their children during diarrheal illness [11]. Moreover, a survey in India reported 46% mothers do not know ORS, and only 29.8% of those who know it has prepared it correctly [31]. In Nigeria, only 5.9% of mothers has used ORS for their children during acute diarrhea [32]. A better situation was reported in Aden, Yemen, where 42% of mothers agreed that ORS is the first step in the treatment of acute diarrhea although majority did not know how to prepare it correctly [33]. In Ethiopia, Kebede *et al*. reported 99% of mothers were oriented about ORS and 84.8% knew how to prepare it correctly [12].

Fortunately, the majority of mothers in this study did not stop breastfeeding during acute diarrhea, which indicates awareness to the importance of breastfeeding in supporting child health during diarrhea. Other foods given by mothers during diarrhea included Yoghurt, rice, rice water and apple juice. Only 14.6% has stopped all solid foods during diarrheal episodes. This low percentage is a good indicator of awareness of mothers. Comparable results were found in Ethiopia where 81.2% of mothers continued breastfeeding and gave their children Yoghurt, rice water and only 5.7% has stopped all solid foods [12]. Likewise, in India, 70% of mothers continued breastfeeding during diarrhea and 37% of them stopped all solid foods [31]. Equivalent findings were reported from Aden, Yemen where 69.1% of mothers agreed that breastfeeding is good for their children during acute diarrhea [33].

In this study, generally, no clear association was detected between educational level or socioeconomic level of mothers and home management practices except for an association between the educational level of mothers and their use of pharmacological saline nasal drops for their children in case of nasal obstruction. Likewise, several studies also could not detect clear associations [13, 16, 18]. However, a study in Iraq reported more reliance on home herbal treatment among illiterate mothers [34].

Limitations of the study

Since this is a hospital-based study, it could be a constrain to assess home-based management. In addition, this study did not include factors that could motivate the mothers to practice home treatment such as accessibility and quality of health care as well as treatment cost.

Conclusion

Inappropriate self-medication practices regarding the management of acute diarrhea and ARI as well of under use of ORS for acute diarrhea were common among mothers in this study. There is a great need to increase awareness of mothers through health education programs.

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