Jurnal eduHealt
Volume 15 , Number 01, 2024, DOI 10.54209/eduhealth.v15i01
ESSN 2808-4608 (Online)
https://ejournal.seaninstitute.or.id/index.php/healt

The influence of knowledge and health service in the usage of oral rehydration salts in diarrhea management for children under 5 years; case study in Balikpapan, Indonesia

Tri Murti[1], Muhammad Hanafiah Juni[2], Hejar Abdul Rahman[3], Salmiah M.S[4]
[1]Occupational Health Safety Study Program, STIKES Mutiara Mahakam Samarinda, [2,3,4]Departement of Community Health, Faculty of Medicine and Health Science, University Putra Malaysia

Article Info
Keywords:
ORS,
Knowledge,
Health Service,
Diarrhea.

ABSTRACT
Oral Rehydration Salts (ORS) solution can contribute to a substantial reduction in infant deaths from diarrhea. However, factors affecting the use of ORS is not known at Balikpapan City, Indonesia. This study aims to establish the determinants of ORS use in children under-five years with diarrhea in Balikpapan City, Indonesia. To examine the Influence of Knowledge and Health Service in the usage oral rehydration salts in diarrheal management for children under 5 years among mothers attending health clinics in Balikpapan. A cross sectional study was done based on 3 health clinics. Four hundred three mothers with children who have diarrhea 2 weeks episode and are under the age of 5 years. Definition ORS used sachet package and salt sugar solution. Data were collected using structured questionnaires, including demographic information, knowledge about diarrhea, health service factors and cost in health facility the management of diarrhea. The prevalence of mothers used ORS for the management of diarrhea was only 68.7%. Factors associated with ORS used were knowledgeable mothers about danger signs of diarrhea (adj. OR: 170.49, 95% CI: 41.38, 702.46); obtain of ORS from public health facilities (adj. OR: 22.7, 95% CI: 6.93, 74.41). Health seeking behavior, knowledge, source and mode of obtaining ORS significantly increases ORS solution use in children under-five with diarrhea in Balikpapan District.

Corresponding Author:
Tri Murti
Occupational Health Safety Study Program, STIKES Mutiara Mahakam Samarinda
trimurti.tugiman@gmail.com

INTRODUCTION

Passing loose or watery stools at least three times in a 24-hour period is known as acute diarrhea. Dysentery, sometimes known as bloody diarrhoea, is the term for loose stools that contain blood. The most crucial factor is not the frequency of the feces but rather their consistency. Breastfed infants frequently have "pasty" stools frequently, which is not the same as diarrhea. Often, a mother can determine with accuracy if her child is experiencing diarrhea (S.K. Bhattacharya, 2000). Mach et al. (2009) and Walker et al. (2012) stated that diarrhea is a disease characterized by having watery stool more than thrice a day with

Jurnal eduHealt
Volume 15 , Number 01, 2024, DOI 10.54209/eduhealth.v15i01
ESSN 2808-4608 (Online)
https://ejournal.seaninstitute.or.id/index.php/healt

liquid feces consistency sign. The most important indicator of diarrhea in children is the consistency of stools. Diarrhea occurs due to gastrointestinal infections caused by parasitic organisms, viruses, and bacteria. These are normally caused by poor personal hygiene, such as person to person or drinking water, or contaminated food (Asif et al., 2013).

The World Health Organization (2013) has classified acute diarrheal episodes in children as mild, moderate, and severe diarrhea. Mild acute diarrhea is defined as having a few diarrhea stools in a day, whereas moderate acute diarrhea is defined as having more than a few but not more than 10 diarrhea stools in a day. Meanwhile, severe acute diarrhea is defined as having more than 10 times loose and watery stools in a single day (24 hours). Unfortunately, it had been estimated that more than 588 million moderate and severe episodes of diarrhea occurred among children in developing countries, resulting in some form of dehydration (Lamberti et al., 2011).

Diarrhea is a common cause of death among children, accounting for 9 per cent of all deaths among children under age of 5 worldwide. In 2013, an estimate of 1,600 children died each day, or about 580,000 a year due to diarrhea. Most deaths from diarrhea occur among children less than 2 years of age living in South Asia and sub-Saharan Africa (WHO & UNICEF, 2013). Despite this heavy toll, slow progress was made in preventing death due to diarrhea among children. From 2000 to 2013, the annual total number of deaths from diarrhea among children under 5 decreased from over 1.2 million to fewer than 0.6 million. This was because many children were saved through appropriate and simple management of diarrhea in children with the use of oral rehydration salts (ORS) and zinc supplementation (UNICEF, 2012).

Furthermore, UNICEF and the WHO have recommended the treatment of diarrhea in children by replacing fluids through oral rehydration therapy. These interventions have been proven to be cost-effective, affordable, and relatively straightforward to be implemented (WHO & UNICEF, 2004). However, at worldwide, only 40 per cent of children under the age of 5 with diarrhea received oral rehydration therapy for treatment of diarrhea. Coverage of ORS usage was the lowest in sub-Saharan Africa and South Asia Regions (36 per cent and 38 per cent, respectively), where most deaths from diarrhea occurred among children (UNICEF, 2014a).

Besides, diarrhea is an endemic in Indonesia and it is also a potential disease outbreak, often accompanied by death. Based on a report prepared by the Indonesian Ministry of Health pertaining to a survey carried out in 2007, diarrhea had been the number one cause of death among children under 5 years old (25.2%), and in year 2013, it causes 6.7% of death among children under 5 years old (Indonesian Ministry of Health, 2014). Although there was a decrease in the incidence of diarrhea, it had been discovered that the use ORS for treatment of diarrhea among children was low (33.3%) (Indonesian Ministry of Health, 2013).

In fact, many factors can be associated to the causes of diarrhea in Indonesia. Hardi (2012) found that diarrhea had been related to maternal knowledge, exclusive breastfeeding, and environment sanitation. Meanwhile, Adisasmito (2007) systematically

Jurnal eduHealt
Volume 15 , Number 01, 2024, DOI 10.54209/eduhealth.v15i01
ESSN 2808-4608 (Online)
https://ejournal.seaninstitute.or.id/index.php/healt

reviewed the factors of diarrhea in infants, as well as children in Indonesia, and suggested that environmental factors, such as clean water and toilets, led to the incidence of diarrhea in children.

Therefore, it is important to make provision against diarrhea by increasing knowledge and awareness among mothers about proper management and practice of children suffering from diarrhea. One of the methods is known as Oral Rehydration Salts (ORS), which has become the most commonly recommended treatment for dehydration caused by diarrhea. Moreover, many researchers have proven the effectiveness of ORS in dealing with diarrhea among children (Munos et al., 2010; Pham et al., 2013; Walker et al., 2013; Walker & Walker, 2014). In addition, numerous researches also have portrayed that one of the main causes of death among infants had been diarrhea, which was attributed to improper health management, either at home or in the health care (Das et al., 2014; Lanata et al., 2013). On top of that, diarrheal episodes in children under 5 years old, which are not treated appropriately, can lead to severe dehydration, as well as contribute to high morbidity and mortality rates. In Balikpapan, the Infant Mortality Rate (IMR) was 5/1,000 live births compared to the national average of 32/1,000 live births with diarrhea (Indonesian Ministry of Health, 2010a).

METHODS

The study was conducted in City of Balikpapan, whereby one of the major cities is East Kalimantan in Indonesia. City of Balikpapan comprises the area of about 503.3 km², which is divided into 5 districts. Those district are Balikpapan Selatan, Balikpapan Timur, Balikpapan Utara, Balikpapan Tengah, and Balikpapan Barat (Dinkes KALTIM, 2012).

The clinic was randomly selected from 6 government clinics in Balikpapan Selatan, as shown in Table 5. The three health clinics that were randomly selected for the study were: Kelandasan ilir health clinic, Sepinggan baru health clinic, and Damai health clinic. The research design for this study was a cross-sectional study. The sample required for this research is 403 mothers completed the questionnaires.

RESULTS AND DISCUSSION

A total of 450 mothers had been invited to participate in face-to-face interview. However, only 403 mothers completed the questionnaires with a total response rate of 90%. The majority of them refused to participate due to several reasons, including busy with household chores (6.1%), as well as not interested to participate (2.9%).

Socio-economic characteristics of Mothers

summarizes the socio demographic profile of mothers that comprised of 403 participants in this study. It showed that the highest frequency for age information was at the range of 26 to 30 years old, which was indicated by 158 respondents in that range (39.2%), and the majority of them were (94.3%) married. The highest ethnic group among the mothers had been Javanese at 31%, Islam had been the main religion at 88.6%, 62.8%

Jurnal eduHealt
Volume 15 , Number 01, 2024, DOI 10.54209/eduhealth.v15i01
ESSN 2808-4608 (Online)
https://ejournal.seaninstitute.or.id/index.php/healt

had attended senior high school, 56.3% were housewives, and the highest frequency for family income ranged between 3,100,000 and 4,900,000 IDR or 61.8%.

Table 1. Distribution of Socio Demographic Characteristics of Mothers

Variable	Frequency	%	Median
Age (Years)			
21 - 25	155	38.5	27.0
26 - 30	158	39.2	
31 - 36	90	22.3	
Marital status			
Married	380	94.3	
Divorced/separated	18	4.5	
Widow/widower	5	1.2	
Level of education			
University	25	6.2	
Diploma	40	9.9	
Senior high school	253	62.8	
Junior high school	66	16.4	
Elementary school	19	4.7	
Occupation			
Housewife	227	56.3	
Business	103	25.6	
Employer (salaried)	73	18.1	
Family Income (IDR)			
≤ 3.000.000	115	28.5	
3.100.000 – 4.900.000	247	61.3	
≥ 5.000.000	41	10.2	
Area			
Kelandasan Ilir	162	40.2	
Damai	100	24.8	
Sepinggan Baru	141	35.0	
Exchange rata 1 $ Dollar = 12,000 IDR			

Socio-demographic characteristics of children

Summarizes the informed children for the results of 403 participants in this study. The results showed that the average age of the respondents was 33 months SD 17.87, and the majority was female (54.3%). Meanwhile, as for the birth order for children with diarrhea, i.e.; the first birth order contributed to the highest frequency (see Table 1). Moreover, as shown in the table, 262 respondents (65%) were from the first birth order, and those with fewer children in a household had been 314 respondents (77.9%).

Jurnal eduHealt
Volume 15 , Number 01, 2024, DOI 10.54209/eduhealth.v15i01
ESSN 2808-4608 (Online)
https://ejournal.seaninstitute.or.id/index.php/healt

Table 2. Distribution of Socio Demographic Characteristics of Children

Variable	Frequency	%	Mean
Age (Months)			
6-20	121	30.0	33.08
21-35	86	21.3	
36-50	177	19.1	
50-59	119	29.6	
Sex			
Male	184	45.7	
Female	219	54.3	
Birth order			
1st	262	65.0	
2nd	100	24.8	
3rd	41	10.2	
Number of children in a household			
≤ 5	314	77.9	
> 5	89	22.1	

Usage of ORS for Children Under 5 years old

The distribution of usage of ORS for children less than 5 years old. The results showed that more than half of the mothers used ORS (69%) for treatment of diarrhea in their children.

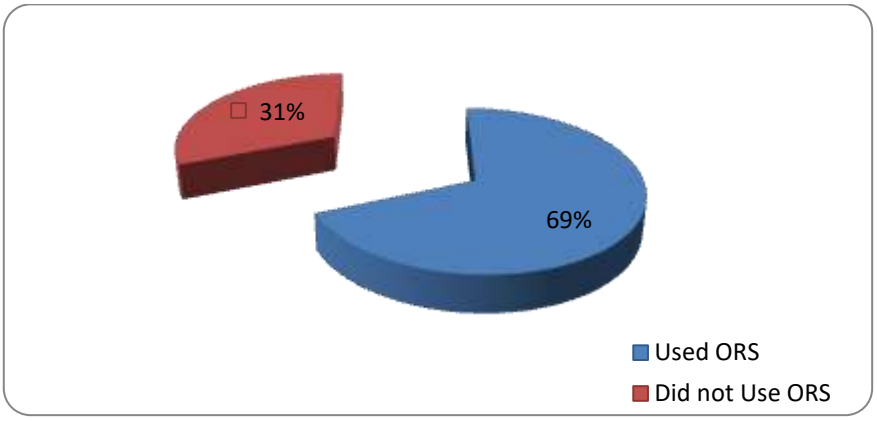

Figure 1. Distribution of Usage of ORS for Children Under 5 Years old

Knowledge of Mothers on Children Under 5 Years Old with diarrhea

The distribution of knowledge of mothers about children under 5 years old with diarrhea among 403 respondents. 5 questions were posed to retrieve the answers. Knowledge on danger signs of diarrhea all but high fever. Knowledge of the causes of diarrhea all but high dirty hands.

Jurnal eduHealt
Volume 15 , Number 01, 2024, DOI 10.54209/eduhealth.v15i01
ESSN 2808-4608 (Online)
https://ejournal.seaninstitute.or.id/index.php/healt

Table 3. Distribution of Knowledge of Mothers about Children Under 5 Years Old with diarrhea

Items	Yes (%)	No (%)	Don't Know (%)
Knowledge in danger signs of diarrhea			
Starts to pass many watery stools	263 (65.3)	131 (32.5)	9 (2.2)
Has repeated vomiting	244 (60.6)	144 (35.7)	15 (3.7)
Becomes very thirsty	216 (53.6)	174 (43.2)	13 (3.2)
Is eating or drinking poorly	248 (61.6)	144 (35.7)	11 (2.7)
Develops fever	190 (47.2)	200 (49.6)	13 (3.2)
Has blood in the stools	210 (52.1)	184 (45.7)	9 (2.2)
Does not get better in three days	186 (46.2)	210 (52.1)	7 (1.7)
Knowledge on the causes of diarrhea			
Contaminated food	281 (69.7)	113 (28.1)	9 (2.2)
Germs	269 (66.7)	128 (31.8)	6 (1.5)
Dirty hands	95 (23.5)	288 (71.5)	20 (5.0)
Cultural Practices	328 (81.4)	69 (17.1)	6 (1.5)
Knowledge of mothers in combatting diarrhea among children			
Get an early treatment as soon possible	265 (65.8)	81 (20.1)	57 (14.1)
Wait and see if it gets worse	66 (16.4)	215 (53.3)	122 (30.3)
Need not do anything at all	72 (17.9)	250 (62.1)	81 (20.0)

The distribution of knowledge of mothers on the usage of ORS for children under 5 years old among 403 respondents. 5 questions were included to obtain the answers.

Table 4. Distribution of Knowledge among Mothers on the Usage of

Items	Correct (%)	Incorrect (%)	Don't Know (%)
Knowledge of mothers on treatment of diarrhea with ORS	311 (77.2)	80 (19.8)	12 (3.0)
Knowledge on mixing ORS	272 (67.5)	80 (19.9)	51 (12.7)
Knowledge on frequency of ORS administration	230 (57.1)	105 (26.1)	68 (16.9)
Knowledge on quantity of ORS administration	272 (67.5)	125 (31.0)	6 (1.5)
Knowledge on ORS storage	280 (69.5)	117 (29.0)	6 (1.5)

Health Service Factors of Usage ORS

Shows mothers and health services factors, as well as usage of ORS. Distance to source of ORS, less than 5 km was 46.9%, which had slightly higher percentage. The percentage on the usage of ORS was the highest for less than thirty minutes was required to receive the treatment of diarrhea with ORS, which had 45.7%.

Jurnal eduHealt
Volume 15 , Number 01, 2024, DOI 10.54209/eduhealth.v15i01
ESSN 2808-4608 (Online)
https://ejournal.seaninstitute.or.id/index.php/healt

Meanwhile, as for waiting time in the facility, 63.5% disliked waiting for a long time, whereas for reception at health facility, the respondents answered 'yes' (59.8), which portrayed the highest percentage compared to 'no' (40.2%). In addition, for the item related to health education provided on diarrhea, the answer 'yes' (57.8%) contributed to the highest percentage. On top of that for availability of health provider at time of visit, the respondents answered 'yes' (66.3%), and 56.6% of the respondents were happy with the way the health workers received them at the facility.

Table 5. Distribution of Health Service Factors on the Usage of ORS

Items	Yes (%)	No (%)
Distance to source of ORS		
Less than 5 km	189 (46.9)	214 (53.1)
5-10 km	95 (23.6)	308 (76.4)
More than 10 km	119 (29.5)	284 (70.5)
The time required to receive the treatment for diarrhea with ORS		
Less than 30 minutes	184 (45.7)	219 (54.3)
30-60 minutes	150 (37.2)	253 (62.8)
More than 1 hour	69 (17.1)	334 (82.9)
Waiting time in the health facilities	147 (36.5)	256 (63.5)
Reception at health facility	241 (59.8)	162 (40.2)
Health education provided on diarrhea	233 (57.8)	170 (42.2)
Availability of health provider at time of visit	267 (66.3)	136 (33.7)
Health workers received visit to the facility	228 (56.6)	175 (43.4)

The Association between mothers' knowledge and usage of ORS

The relationship between mothers' knowledge and usage of ORS. Many respondents had good knowledge (72.7%) compared to those with poor knowledge (65.3%). The results indicated that there was a significant relationship between usage of ORS and knowledge among mothers (=7.08,df=1,p=0.008)

Table 6. Association between mothers' knowledge and usage of ORS

Variable	Used ORS n (%) 277 (68.7)	Didi not use ORS n (%) 126 (31.3)	χ^2	df	P value
Knowledge of All					
Good Knowledge	136 (72.7)	51 (27.3)	7.08	1	.008
Poor Knowledge	141 (65.3)	75 (34.5)			

Significant level at $p < 0.05$

Jurnal eduHealt
Volume 15 , Number 01, 2024, DOI 10.54209/eduhealth.v15i01
ESSN 2808-4608 (Online)
https://ejournal.seaninstitute.or.id/index.php/healt

The Association between mothers' health services factors and usage of ORS

The association between mothers' health service factors and usage of ORS. The availability of health services (79.7%) had slightly higher percentage compared to the unavailability of health services by (57.1%). The results indicated that there was a significant relationship between usage of ORS and health services factors (=23.86,df=1,p<0.001)

Table 7. Association between mothers' health services factors and usage of ORS

Variable	Used ORS n (%) 277 (68.7)	Didi not use ORS n (%) 126 (31.3)	χ^2	df	P value
Health service factors					
Available	165 (79.7)	42 (20.3)	23.86	1	<0.001
Not available	112 (57.1)	84 (42.9)			

Significant level at p < 0.05

Discussion

Diarrhea is one of the most dangerous diseases among children under 5 years old. It can also increase the effect of other diarrhea among children, such as dehydration, high fever, and convulsions. Valid information regarding the number of children suffering from diarrhea with usage of ORS solution gives an idea about how effective the management efforts are against diarrhea, as well as the aid from public health professionals to plan more aggressive and effective programs to combat diarrhea among children under 5 years old.

Besides, independent cross-sectional studies in a population over time provide important information about the secular trend of ORS among children under 5 years old. However, attention should be paid to the comparability of the surveys with respect to sampling, ORS solution, and definition of diarrhea disease among children under 5 years old. The purpose of this study was to identify the rate of usage of ORS solution and to explore the factors associated with diarrheal management for children under 5 years old among mothers attending health clinics.

This study found that more than half of the children under 5 years old with diarrhea had consumed ORS solution. The finding in this study had exhibited better results than earlier studies in Indonesia, which showed that the consumption of ORS among diarrhea patients had been only 38% (MacDonald et al., 2007). Furthermore, studies elsewhere, for instance China, had shown the overall treatment rate with usage ORS in all care of diarrhea among children under 36 months old had been 34.62% (Gao et al., 2013). Meanwhile, a study in developing countries showed a drastic increment in the usage of ORS in the 1980s, from an estimated 5% in 1982 to 61% in 1988 for children less than 5 years of age (Claeson, 1990). Within the same time period, the percentage of children with diarrhea in the last two weeks receiving ORS or recommended home fluids during the diarrhea episode

Jurnal eduHealt
Volume 15 , Number 01, 2024, DOI 10.54209/eduhealth.v15i01
ESSN 2808-4608 (Online)
https://ejournal.seaninstitute.or.id/index.php/healt

increased from approximately 0% in 1982 to 32% in 1988 (Claeson, 1990). However, global ORS use rates have not changed substantially since the late-1980s, remaining at about 30% (Ram et al., 2008; Sabot et al., 2012). Another study from Pakistan showed that 40.5% of children had taken ORS (Morikly et al., 2002). The results of another study from Ethiopia, carried out among 590 households with 30.5% prevalence of diarrhea, showed that the usage of ORS for 24-35 months old infants was 33% (Mohammed & Tamiru, 2014). Moreover, based on the National Health Survey of Indonesia, children under 5 years old with males 7.1% and females 6.3%, who suffered from diarrhea, had the intake of ORS at 33.3% (Indonesian Ministry of Health, 2013).

The rate for the usage of ORS in the present study was (67.7%), which was higher than some figures retrieved in some previous studies in developing countries, for example, in Nigeria (26%) and in Ethiopia (33%). This could be due to better health care coverage in this region. The access to the health clinics was easy and they were suggested for regular follow up with the same health care providers in the continuity of their diarrhea care.

There was a significant difference in the usage of ORS with age of children in the present study. For instance, in Bolivia, a significant difference for age of children under 5 years old (Caruso et al., 2010) and Gurpreet et al. (2011) also reported that there was a significant difference between age of children for 0-4 years and usage of ORS. However, this difference existed in other studies as well; Gao et al., (2013), and Sastry and Burgard (2011) in their studies that reported the usage of ORS among children under 5 years old. Such difference was also existent in another study even after adjustment had been made for the usage of ORS. Plus, a study by Lenters et al., (2013) showed that the percentage of children diarrhea had been higher in children < 6 years old.

This study showed a statistically significant difference between mothers' knowledge and usage of ORS for children under 5 years old by logistic regression analysis. A study by Jamison et al. (2006) also reported that there was slight but significant relationship between knowledge and usage of ORS solution.

In addition, MacDonald et al. (2007) showed the association between current maternal knowledge on correct signs of dehydration and usage of ORS. Besides, there was a significant difference in mothers' good knowledge towards diarrhea and the management of diarrhea disease for children under 5 years old with the usage of ORS (Amare et al., 2014). Therefore, knowledge of mothers on comprehensive modification, including good knowledge and maternal knowledge, should be practiced with usage of ORS especially for children under 5 years old suffering from diarrhea.

The findings in this study revealed the association between usage of ORS and health service factors for children under 5 years old suffering from diarrhea. This study also found that the majority of the health service factors with usage of ORS for diarrhea disease did not have regular availability of source as treatment of children with diarrhea showed important predictors associated with available health service for the usage of ORS with diarrhea disease in children (Adhikari et al., 2006; Sreeramareddy et al., 2006). Similarly,

Larson et al. (2006) reported that increased likelihood of seeking service from health clinics by mothers displayed significant difference with usage of ORS for children with diarrhea.

CONCLUSION

The usage of ORS solution was found to be satisfactory for children under 5 years old in Balikpapan, Indonesia. Among the factors associated with the usage of ORS were adequate knowledge among mothers, good belief among mothers, good perceptions among mothers, and the availability of ORS in health services. Therefore, clinicians and policy makers should place greater emphasis on achieving the goal of the usage of ORS in all children suffering from diarrhea, especially among those who are knowledgeable, besides having belief and perception, as well as seek treatment in health clinics.

REFERENCE

Amare, D., Dereje, B., Kassle, B., Tessema, M., Mulu, G., Alene, B. and Ayele, A. 2014. Maternal knowledge and practice towards diarrhoea management in under 5 children in Fenote Selam Town, West Gojjam Zone, Amhara Regional State, Northwest Ethiopia. Journal Infectious Disease and Therapy 2:6.

Adhikari, K.P., Kunwar, L.S., MacDonald, V. Paudel, M. 2006. Qualitative research for a Zinc treatment program in Nepal: Findings and recommendations. http:// www.psp-one.com/content/resource/detail/3280/.

Asif, M., Tripathi, N.K., Ahmed, S. 2013. Toward near real time publish health surveillance (A decision support system for public health surveillance). International Journal of Computer Applications 61(21): 0975-8887.

Caruso, B., Stephenson, R., and Leon, J.S. 2010. Maternal behavior and experience, care access, and agency as determinants of child diarrhea in Bolivia. Rev Panam Salud Publica 28(6): 429-439.

Claeson, M.H.M.M. 1990. Global progress in the conrol of diarrheal diseases. Paediatric Infectious Disease Journal 9: 345-55.

Das, J.L., Salam, R.A. and Bhutta, Z.A. 2014. Global burden of childhood diarrhea and interventions. Current Opinion in Infectious Disease 27(5):451-458.

Dinas Kesehatan Kalimatan Timur. 2012. Profil Kesehatan.

Gao, W., Yan, H., Wang, D. and Dang,S. 2013. Oral rehydration salt use and its correlates in low-level care of diarrhea among children under 36 months old in rural Western China. BMC Public Health 13:238.

Gurpreet, K., Tee, G.H., Amal, N.M., Paramesarvathy, R. and Karuthan, C., 2011. Incidence and determinants of acute dirrhoea in Malaysia: A population-based study. Journal Health Population and Nutrition 29(2): 103-112.

Hardi, R.A. 2012. The factors which are the incident of diarrhea at toddler in local Clinic Barangnglompo Ujung Tanah Subdistrict. Bachelor Thesis, Universitas Hasanudin.

Indonesia Ministry of Health. 2010a. Indonesia Health Profile. Jakarta.

Jamison, D.T., Breman, J.G., Measham, A.R., Alleyne, G., Claeson, M., Evans, D.B., Jha, P., Mills, A. Musgrove, P. 2006. Priorities in developing countries (2nd edition). In: Diarrheal Disease, ed. Keusch, G.T., Fontaine, O., Bhargava,A., Pinto-Boschi, C., Bhutta, Z.A., Gotuzzo,E., Rivera, J.A., Chow, J., Salles-Shahid, S.A. and Laxminarayan, R, pp. 371-388. Oxford University Press and World Bank: Washington DC.

Lamberti, L.M., Walker, C.L.F., Noiman, A., Victora, C. and Black, R.E. 2011. Breastfeeding and the risk for diarrhea morbidity and mortality. BMC Public Health 11 (3): 515.

Lanata, C.F., Walker-Fischer, C.L., Olascoaga, A.C., Torres, C.X., Aryee, M.J., Black, R.E. and For the Child Health Epidemiology Reference Group on the World Health Organization. 2013. Global causes of diarrheal disease mortality in children.

Lenters, L.M., Das, J.K. and Bhutta, Z.A. 2013. Systematic review of strategies to increase use of oral rehydration solution at household level. BMC Public Health 13(3): 528.

MacDonald, S.E., Moralejo, D.G. and Matthews, M.K. 2007. Maternal understanding of diarrhoea-related dehydration and its ifluence on ORS use in Indonesia. Asia Pacific Journal of Public Health 19 (1): 34-39.

Mach, O., Lu, L., Creek, T., Bowen, A., Arvelo, W., Smit, M., Masunge, J., Brennan, M. and Handzel, T. 2009. Population-based study of a widespread outbreak of diarrhea associated with increased mortality and malnutrition in Botswan January-March 2006. The American Journal of Tropical Medicine and Hygiene 80 (5): 812-818.

Morisky, D.E., Kar, S.B., Chaudry, A.S., Chen, K.R., Shaheen, M. and Chickering. 2002. Update on ORS usage in Pakistan: Results of National Study. Pakistan Journal of Nutrition 1(3): 143-150.

Mohammed, S. and Tamiru, D. 2014. The burden of diarrheal disease among children under 5 years of age in Arba Minch District, Southern Ethiopia, and associated risk factors: A cross sectional study. International Scholarly Research Notice 6.

Munos, M.K., Walker, C.L.F. and Black, R.E. 2010. The effect of oral rehydration solution and recommended home fluid on diarrhoea mortality. International Journal Epidemiology 39: 175-187.

Pham, D.M., Byrkit, M., Pham, H.V., Pham, T. and Nguyen, C.T. 2013. Improving pharmacy staff knowledge and practice on childhood diarrhea management in Vietnam: Are educational interventious effective. PLos One 8:10.

Ram, P.K. Choi, M., Blum, L.S., Wamae, A.W., Mintz, E.D. and Bartlett, A.V., 2008. Declines in case management of diarrhoea among children less than 5 years old. Bulletin World Health Organization 86(3): A-F.

Sastry, N. and Burgard,S. 2011. Changes in diarrheal disease and treatment among Brazilian children from 1986 to 1996. P Population research and policy review 30(1): 81-100.

Sabot, O., Schroder, K., Yamey, G., Montagu, D. 2012. Scaling up oral rehydration salts and zinc for the treatment of diarrhoea. BMJ 344: e940.

S.K. Bhatttacharya. (2000). Therapeutic methods for diarrhea in children. World Journal of Gastroenterology, 6(4):497-500.

Jurnal eduHealt
Volume 15 , Number 01, 2024, DOI 10.54209/eduhealth.v15i01
ESSN 2808-4608 (Online)
https://ejournal.seaninstitute.or.id/index.php/healt

Sreeramareddy, T.C., Shankar, P.R., Sreekumara, V.B., Subba, H.S., Joshi, S,H. and Ramachandran, U. 2006. Care seeking behaviour for childhood illness, a questionnaire survey in western Nepal. BMC International Health Human Rights 6:7.

United Nations Children's Fund (UNICEF). 2012. Pneumonia and diarrhoea: Tackling the deadliest disease for the world's poorest children. New York: UNICEF.

United Nations Children's Fund (UNICEF). 2014a. The state of the world's children 2014 in numbers every child count, pp 3-7. New York: UNICEF.

Walker-Fisher, C.L., Aryee, M.J., Pinto,C.B and Black. R.E. 2012. Estimating diarrhea mortality among young children in low- and middle-income countries. PLoS ONE 7(1): 29151.

World Health Organization (WHO). 2013. Pocket book of hospital care for children: Guidelines for the management of common childhood illneses (2nd edition), pp. 126-143. Geneva: World Health Organization.

World Health Organization (WHO) and UNICEF. 2009. Diarrhoea: Why children are still dying and what can be done. In The global burden of childhood diarrhoea, pp. 4-8. New York: UNICEF.

World Health Organization (WHO) and UNICEF. 2004. Joint Statement: Clinical management of acute diarrhoea. www.wikipedia.orh/wiki/diarrhea