

**Maternal knowledge on causes and strategies in home management of childhood diarrhoea
in University of Ilorin Teaching Hospital, Kwara State**

Onasoga, Olayinka A¹, Afolayan Joel Adeleke¹, Owoeye, Isaiah Dada², Umar Godwin Ogirima¹

¹Department of Nursing Science, Faculty of Clinical Sciences, College of Health Sciences,
University of Ilorin, Ilorin, Nigeria

²School of Psychiatric Nursing, Neuropsychiatric Hospital, Aro-Abeokuta, Ogun State, Nigeria

Corresponding Author: Dr. Onasoga, Olayinka A.

Department of Nursing Sciences, Faculty of Clinical Sciences, College of Health Sciences,
University of Ilorin, Ilorin, Nigeria

yinka_onasoga@yahoo.com

+2348064967578 or +2348055216895

Abstract

Home management of childhood diarrhoea is the cornerstone to early recovery and prevention of complications associated with diarrhoea among under-five children in developing countries especially Nigeria. Hence, this study aimed to assess knowledge of mothers of under-five children on causes of childhood diarrhoea and the choice of treatment strategies adopted at home; since the management at the domestic level has significant impact on the health of the under-five children in resource poor countries like Nigeria.

A descriptive cross sectional survey was used and purposive sampling technique was used to select a sample frame of 150 mothers using fisher's formula. Data were collected using validated structured questionnaires. Data were analyzed using the statistical product for service solution (SPSS) version 21.

The results were presented using both descriptive and inferential statistics with level of significance set at 0.05. The study revealed that most of the respondents were predominantly married with a mean age was 31 years, minimum age of 17 years and maximum age of 51 years. Majority of respondents 75.3% had adequate knowledge of the causes of childhood diarrhoea. All the respondents employed oral rehydration therapy (ORT) in management of childhood diarrhoea at home and the most frequently strategies used were homemade fluids, such as salt/water solution, Salt sugar solution (SSS), coconut juices and garri water. Despite the fact that majority 136 (90.7%) of the respondents claimed that they would recommend their intervention(s) to others, some misconceptions still exist about causes and home management of childhood diarrhoea among respondent. The study also revealed that there was no significant relationship between knowledge about causes of childhood diarrhoea and the choice of treatment strategies with $p\text{-value} = 0.370 > 0.05$ and the choice of treatment strategies with $p\text{-value} = 0.370 > 0.05$.

It was recommended that health education on home management of childhood diarrhoea should be integrated into routine health education package for both antenatal and post-natal women in order to eradicate misconceptions and mortality due to childhood diarrhoea.

Keywords: Childhood diarrhoea, Home Management, Strategies, Knowledge of diarrhoea

Introduction

Diarrhoeal diseases remain one of the leading causes of preventable death among children especially under-five in developing countries despite the availability of a simple treatment solution (Yilgwan & Okolo, 2012). It is the second leading cause of under - five deaths that requires urgent intervention at the household level (Ellis, Winch, Daou, Gilroy & Swedberg, 2007; Altinier & Martín, 2017). Globally, diarrhoea kills around 760 000 children under five every year (WHO, 2013; Gibson, Sahanggamu, Fatmaningrum, Curtis, & White, 2017).

The burden of diarrhea-related deaths varied across the continent, diarrhoea-related mortality rates declined between 2000 and 2015 in virtually all Africa regions. However, the rates increased in certain parts of the Central African Republic, Gabon, Ivory Coast, Zimbabwe and Nigeria. Nigeria contained the regions with the highest rates of cases of severe diarrhoea per 1000 children in 2015 (Reiner Jr, Graetz, Casey, Troeger, Garcia, Mosser, et al., 2018).

Childhood diarrhoea is defined as the frequent passage of abnormally loose or watery stools at least three times within a 24-hour period in children (Lamberti, 2014). On the average, children below three years of age in developing countries experience three episodes of diarrhoea each year (Karambu, Matiru, Kiptoo, & Oundo, 2013). This condition leads to rapid loss of water and electrolytes and subsequent dehydration if fluids are not replaced with ORS. Early dehydration does not exhibit signs or symptoms; moderate dehydration involves thirst, restlessness, decreased skin elasticity and sunken eyes; severe dehydration results in shock, altered consciousness, pale skin and low blood pressure, in addition to the symptoms of moderate dehydration (Lamberti, 2014). Moreover, the clinical manifestations of childhood diarrhoea include watery stool, weakness/fatigue, abdominal pain, swelling (bloating), increase thirst, sunken eye, loss of appetite, fever, bloody stools, weight loss, loss of body fluids (dehydration), dizziness, incontinence.

Rotavirus is the leading cause of acute diarrhoea among children worldwide, accounting for about 40% of diarrhoea-associated hospital admissions (CDC 2015). Other common enteropathogenic causes of diarrhoea include: *Shigella*, *Vibrio cholerae*, enterotoxigenic *Escherichia coli* (ETEC), cryptosporidium, campylobacter and salmonella. These organisms are mostly transmitted via the fecal-oral route through ingestion of contaminated food or water. As such, inadequate personal hygiene, poor sanitation, limited access to clean water, and unsafe disposal of human faeces are key risk factors for contracting diarrhoea (Lamberti, 2014).

UNICEF /WHO (2013) issued report on the Integrated Global Action Plan for diarrhoea management and the report outlined strategies to help countries reduce diarrhoeal mortality by 2025, advocating for the promotion of rotavirus and measles vaccination; vitamin A supplementation; early, exclusive breastfeeding; hand washing with soap; improved drinking water quantity and quality; community-wide sanitation; reduced osmolarity, ORS for the prevention and treatment of dehydration, and zinc supplementation for 10-14 days following diarrhoea onset (Lamberti, 2014).

Despite this initiation on diarrhoea management, mortality from diarrhoea and its complications ranges from 1.5 to 5.1 million deaths per year for under - five children; accounting for about 9% of all deaths among children younger than five years globally, (Kumar, Singh and Verma, 2017; Karambu, Matiru, Kiptoo, & Oundo, 2013). Diarrheal diseases are a major cause of child mortality and one of the main causes of medical consultation for children in sub-Saharan

countries. In sub-Saharan Africa, only about one in three children experiencing diarrheal episodes receive ORS, and less than 5 % receives zinc supplementation (UNICEF, 2015). Most of these deaths result from excessive fluid and electrolyte losses which are highly preventable by simple remedies such as oral rehydration solution (ORS) and other fluids available at home. This approach of management of childhood diarrhea has been the foundation of treatment for the life-threatening dehydration that can result from diarrhea until the 1980s when many countries first established national diarrhea control programs which promoted various forms of oral rehydration therapy including sachet oral rehydration solution (ORS), sugar and salt solution (SSS) and zinc supplements. The forms of home management of childhood diarrhoea include Oral Rehydration Salts (ORS) which is a special combination of dry salts that is mixed with safe water or Salt Sugar Solution (SSS) and continuous breastfeeding. This can help replace the fluids lost due to diarrhoea. In most countries, ORS packets are available from health centers, pharmacies, markets and shops. Its preparation involves putting the contents of ORS packet in a clean container, check the packet for directions and add the correct amount of clean water. During preparation, avoid small quantity of water because this could worsen the condition. Also, only water should be added to the solution and not wine, fruit juice, sugar or soup. After which, stir well and feed it to the child from a clean cup.

Appropriate treatment of diarrhoea is simple and can be provided in home settings by mothers to prevent dehydration and decrease diarrhoea related deaths. Furthermore, Sandhu and Devadason (2015) assert that ideally, management of acute diarrhea should begin at home because early intervention reduces complications with subsequent mortality. However, harmful practices based on poor knowledge, beliefs and myth such as restriction of food and fluids, wrong preparation of the solution based on a standard ratio of water, sugar and salt are prevalent, especially in developing countries where the diarrhoea mortality is high (Carter, Bryce, Perin, Newby, 2014). Diarrhea remains a significant cause of morbidity and mortality in resource poor countries like Nigeria mainly among rural communities where factors like low socio-economic status, unavailability of good drinking water together with poor hygiene practice by some mothers have resulted to an increased risk of contracting diarrhea among under-five children.

Most diarrhoeal episodes are first treated at home, thus prompt and appropriate initial management of diarrhoea at home depend on the level of maternal knowledge about cause of diarrhoea and timely use of ORS and other strategies to prevent dehydration and death (Kumar, Singh & Verma, 2016). The researchers in this study are interested in investigating the maternal knowledge on causes of childhood diarrhoea as well as various management strategies adopted by mothers of under-five at home.

Research questions

The research questions were:

1. What is the knowledge of mothers of under-five children on causes of childhood diarrhoea?
2. What is the choice of treatment strategies adopted by mothers of under-five children for childhood diarrhoea?

Hypothesis

There is no significance relationship between mothers' knowledge and their choices of treatment strategies of childhood diarrhoea.

METHODOLOGY

A descriptive cross sectional survey was adopted in this study. This research study was conducted in University of Ilorin Teaching Hospital (UITH) Ilorin, Kwara state. The sample size was determined using the fisher's formula. A total of 150 mothers of under-five children were selected using purposive sampling technique.

Data was collected through the use of validated structured questionnaire that was developed by the researchers. The instrument was divided into four sections: Section A elicited socio-demographic data from the respondents; Section B contains questions on knowledge of mothers on causes of childhood diarrhoea and Section C contains questions on choice of treatment strategies adopted by mothers for diarrhoeal disease. The instrument was pre tested using 20 mothers from General Hospital Ilorin. A reliability co-efficient of 0.75 was obtained and this was considered satisfactory.

Ethical approval was obtained from the ethical committee of in University of Ilorin Teaching Hospital (UITH) and consent was also obtained from the respondents individually after adequate information had been given about the study, freedom of withdrawal at any point was also stated to them. The instrument was administered over a period of one month and the completed questionnaires were coded and analyzed using Statistical Product for Service Solution (SPSS) version 21. The results was presented using descriptive statistics in form of table, and inferential statistics in form of chi-square (X^2) was used to test the hypotheses formulated at the 0.05 alpha levels.

Results

Socio demographic profile	Responses	Frequency	Percentage (%)
Age Mean = 31 Std. = 7.169	15 – 25	21	14.0
	26 – 35	100	66.7
	36 – 45	23	15.3
	46 – 55	6	4.0
Religion	Christianity	57	38.0
	Islam	93	62.0
	Others	0	0.0
Marital Status	Single	0	0.0
	Married	133	88.7
	Divorced	12	8.0
	Widowed	5	3.3
What is your education status	No formal education	2	1.3
	Primary	12	8.0
	Secondary education	36	24.0
	Tertiary education	100	66.7
Occupation	Housewife	14	9.3
	Civil servant	44	29.3
	Traders	60	40.0
	Tailoring	16	10.7
	Teaching	10	6.7
	Others	6	4.0
Ethnicity	Yoruba	126	84.0
	Igbo	6	4.0
	Hausa	10	6.7
	Others	8	5.3
Level of income	Less than ₦20,000	47	31.3
	₦20,000 - ₦40,000	68	45.3
	₦41,000- ₦60,000	17	11.3
	₦61,000-₦80,000	10	6.7
	above ₦80,000	8	5.3

Table 1 shows that majority 100 (66.7%) of the respondents were within the age of 26 – 35 years, with minimum age of 19years and maximum age was 51. The mean of the age was 32years. Majority 133 (88.7%) were married, Two-third of the respondents 100 (66.7%) had tertiary education, less than half 60 (40.0%) practised trading as occupation, Majority 126 (84.0%) of the respondents were Yoruba,

Table 2: Knowledge on the causes of childhood diarrhoea (n=150)

Variables	Responses	Frequency	Percent	Decision
Teething	Yes	79	52.7	Poor
	No	71	47.3	
Dirty home environment	Yes	138	92.0	Good
	No	12	8.0	
Sugary or sweet food	Yes	121	80.7	Good
	No	29	19.3	
Contaminated food/water	Yes	128	85.3	Good
	No	22	14.7	
Flies	Yes	119	79.3	Good
	No	31	20.7	
Malnutrition	Yes	91	60.7	Good
	No	59	39.3	
Undigested food	Yes	79	52.7	Good
	No	71	47.3	
Dirty feeding bottle	Yes	130	86.7	Good
	No	19	13.3	
Malaria fever	Yes	64	42.7	Poor
	No	86	57.3	
Worm infestation	Yes	64	42.7	Poor
	No	86	57.3	
Pile "gedi-gedi"	Yes	97	64.7	poor
	No	53	35.3	
Infection	Yes	106	70.7	Good
	No	44	29.3	
food allergy	Yes	121	80.7	Good
	No	29	19.3	

Table 2 shows that approximately half of the respondents 79 (52.0%) claimed that tooth eruption causes childhood diarrhoea, majority 138 (92.0%) of the respondents said dirty environment, 121 (80.7%) said sugary or sweet food, 128 (85.3%) said contaminated food or water, 119 (79) said flies while 91 (8.0%) of the respondents said malnutrition. About half of the respondents 79 (52.7%) also opined that undigested food causes childhood diarrhoea, 130 (86.7%) said dirty feeding bottle, less than half 64 (42.7%) mention malaria fever and worm infestation as causes of childhood diarrhoea. More than half 97 (64.7%) claimed that pile ("gedi-gedi") can cause childhood diarrhoea, 106 (70.7%) said infection while 121 (80.7%) said food allergy result in childhood diarrhoea.

Table 3 Strategies employed by mothers for childhood diarrhoea (n=150)

S/No.	Variables	Responses	Frequency	Percentage	Decision
1	Salt and sugar solution	Yes	96	64.0	Mostly employed
		No	54	36.0	
2	Salt and water solution	Yes	83	55.3	Mostly employed
		No	67	44.7	
3	Anti-diarrhoeal drugs	Yes	110	73.3	Mostly Employed
		No	40	26.7	
4	Drugs antibiotics	Yes	99	66.0	Mostly Employed
		No	51	34.0	
5	Garri water	Yes	48	32.0	Rarely employed
		No	102	68.0	
6	Sachet ORT	Yes	134	89.3	Mostly Employed
		No	16	10.7	
7	Native medicine	Yes	62	41.3	Rarely employed
		No	88	58.7	
8	Zinc solution	Yes	55	36.7	Rarely employed
		No	95	63.3	
9	Coconut water	Yes	70	46.7	Rarely employed
		No	80	53.3	
10	Plain water	Yes	92	61.3	Mostly employed
		No	58	38.3	
11	Rice water with salt	Yes	140	93.3	Mostly employed
		No	10	6.7	
12	Breast milk	Yes	89	59.3	Mostly employed
		No	61	40.7	
13	Rush child to the hospital	Yes	128	85.3	Mostly employed
		No	22	14.7	
14	outcome of the intervention strategy used	Good	123	82.0	Good
		Fair	23	15.3	
		Poor	4	2.7	
15	Would you recommend your intervention(s) above to others	Yes	136	90.7	Yes
		No	14	9.3	

Table 3 reveals that majority 96 (64.0%) of the respondents employed salt and sugar solution to treat childhood diarrhoea at home, 83 (55.3%) employed salt and water solution to treat childhood diarrhoea at home, 110 (73.3%) gave anti-diarrhoea drugs, 99 (66.0%) gave drugs antibiotics, 134 (89.3%) gave sachet ORT, 89 (59.3%) gave breast milk while 128 (85.3%) said they rushed the child to the hospital. However, few of the respondents 35 (23.3%) gave garri water to treat childhood diarrhoea at home, 62 (41.3%) gave native medicine, 55 (36.7%) gave zinc solution 10 (6.7%) gave coconut water, 58 (38.7%) gave plain water, while only 10 (6.7%) gave rice water with salt.

Regarding the outcome of the intervention given, majority 123 (82.0%) of the respondents claimed that the outcome of intervention given was good while 23 (15.3%) said it was fair and 4 (2.7%) said it was poor. Majority 136 (90.7%) of the respondents maintained that they would recommend their intervention(s) to others while 14 (9.3%) would not.

Table 3 Chi-square showing relationship between knowledge about causes of childhood diarrhoea and choice of treatment strategies (n=150)

Knowledge about causes childhood diarrhoea	Choice of treatment strategies of childhood diarrhoea			Pearson Chi-square X^2	P – value	Df	Results
	Employed	Not Employed	Total				
Good knowledge	77	36	113	1.990	0.370	2	Not significant H_0 accepted
Poor knowledge	16	21	37				
Total	93	57	150				

Table 3 above shows that there is no significant relationship between knowledge about causes of childhood diarrhoea and the choice of treatment strategies with p-value = 0.370 > 0.05. Since the p-value is greater than the significance value of 0.05, the null hypothesis was therefore accepted.

Discussion

An assessment of knowledge of the respondents on causes on childhood diarrhoea revealed that Majority of the respondents affirmed that dirty environment, poor hygiene, contaminated food, infection, worm infestation, flies can predispose to childhood diarrhoea. This supports the study of Teklemichael, Mohammed and Wondwosen (2014) who stated that poor environmental sanitation, unsafe water supply and inadequate personal hygiene are responsible for 90% of diarrhoea occurrence. Furthermore, Most of the respondents 80.7% claimed that sugary or sweet food and intolerance to some food (food allergy) can result in childhood diarrhoea. This corroborates Kvissberg, Dalvi, Kerac, Voskuil, Berkley, Priebe, and Bandsma, (2015) statement that significant decrease in carbohydrate absorption can lead to severe osmotic diarrhoea.

Most of respondent still hold on to the belief that teething is also a cause of diarrhoea in children. This is similar to a study carried out by Ogbeyi, Onyemocho, and Ogbonna, (2016) in a rural community in Benue State, Nigeria where 68.1% identified tooth eruption as the cause of diarrhoea. However, the percentage in this study is slightly low (52.7%). Notwithstanding, studies have shown that teething is not associated with childhood diarrhea, hence the need to discourage this misconception through. (Owais et al 2010; Feldens et al.2010).

Piles also known as Haemorrhoids is culturally known as Jedijedi among the people of south-western Nigeria. Haemorrhoids are common anorectal disease in which there are varicose veins in the anus or rectum. (Azeez & Isiugo-Abanihe, 2017; Lohsiriwat, 2015). Most of the respondents also had misconception that pile “gedi-gedi” can cause childhood diarrhoea. This Misconceptions is stemmed from the belief that sugar or sweet food is one of the risk factors of haemorrhoids since it can cause diarrhoea (Azeez & Isiugo-Abanihe, 2017). Therefore, it is

germane to provide adequate health education to mothers on diarrhoeal causes in order to clear these misconceptions.

All the respondents employed oral rehydration therapy (ORT) in management of childhood diarrhoea at home. This is in line with the study conducted in Ibadan by Agbolade, Dipeolu, and Ajuwon (2015) where majority of the respondents used oral rehydration solution (ORS) for home management of diarrhoea. This could be due to the fact that ORS is easily available accessible, and affordable. However, both the WHO and UNICEF policy recommended that ORS should be used successfully at home (Bella, Ai-Freihi, El-Mousan, Danso, Sohaibani, & Khazindar, 1994). It is worthy to note that the use of zinc solution in the home management of childhood diarrhoea was very low (36.7%) among respondent. This corroborates similar study conducted in Bangladesh by Akhtaruzzaman, Hossain, Choudhury, Islam, & Dhar, (2015) where awareness and use of zinc for diarrhoea management were very low among mothers.

Majority of the respondents also self-medicated with antibiotics or anti-diarrhoea drugs while less than half also uses native medicine/mixtures. The use of drugs such as antibiotics and antidiarrhoeal agents in the management has been reported by other studies (Akhtaruzzaman, et.al, 2015; Agbolade, et.al., 2015); however, such treatment can be harmful to the child and can lead to wide spread antibiotic resistance (Ugwu, Edeani, Ejikeugwu, Okezie, & Ejiofor, 2017), thus the use of self-medication should therefore be discourage among mothers. According to Akhtaruzzaman, et.al; (2015) approximately, 90% cases of diarrhea can be successfully managed with oral rehydration therapy and continued feeding without use of drugs.

In the light of the above, the results indicated that generally, most of respondents in this study 75.3% had adequate knowledge of the causes of childhood diarrhoea. This finding is at variance with the study conducted in Western Ethiopia by Merga, and Alemayehu (2015) where the level of knowledge of Mothers regarding causes of diarrhoea among under-five was found to be low (20.15%). Furthermore the study also revealed that various strategies used by respondents treatment of childhood diarrhoea, at home, including homemade fluids, such as coconut juices, breast milk, salt/water solution, and garri water etc. Some of the interventions are in consistence with WHO (2013) strategies for reducing childhood diarrhoea which includes Oral rehydration solution, sugar and salt solution, zinc solution, optimal infant feeding, medication and referral.

Conclusion

Diarrhoeal disease is one of the leading causes of preventable death, especially among children aged under-five years in developing countries. However appropriate intervention for the prevention and management of diarrhoea depend on the level of knowledge about causes and use of ORS and other strategies at home. Despite the adequate knowledge of the mothers of under-five children about the causes of childhood diarrhoea and the use of strategies which are consistence with the WHO strategies for reducing childhood diarrhoea at home. There are still some misconceptions about causes of childhood diarrhoea and the strategies used in its management at home. These misconceptions are evident in the findings of this study, thus it was recommended that health education on home management of childhood diarrhoea should be integrated into routine health education package for both antenatal and post-natal women.

References

- Agbolade, M. O., Dipeolu, I. O., & Ajuwon, A. J. (2015). Knowledge and Use of Oral Rehydration Therapy among Mothers of under-five children in a Military Barrack in Ibadan, Nigeria. *African Journal of Biomedical Research*, 18(1), 7-15.
- Akhtaruzzaman, M., Hossain, M.A., Choudhury, A.M., Islam, M.N., & Dhar, S.K. (2015) Home Management of Childhood Diarrhoea by Mothers Presenting at a Tertiary Hospital in Bangladesh. *J Nepal Paediatr Soc*;35(3):237-246.
- Altinier V, & Martín G (2017) Diarrhea Caused by Shiga-Toxigenic Escherichia Coli, other Pathogens and HUS. Effects of Bismuth Hydroxide Gel. *Gastroenterol Hepatol Open Access* 6(1): 00178. DOI: [10.15406/ghoa.2017.06.0017](https://doi.org/10.15406/ghoa.2017.06.0017)
- Azeez, A. & Isiugo-Abanihe U.C. (2017). Sociocultural Context and Determinants of Treatments for Hemorrhoids Among the Nigeria Police Force, Oyo State Command. *Journal of Social, Behavioral, and Health Sciences*. 11, (1):31–46
- Bella, H., Ai-Freih, H., El-Mousan, M., Danso, K. T., Sohaibani, M., & Khazindar, M. S. (1994). Knowledge, Attitudes and Practices related to Diarrhoea in Eastern Province, Saudi Arabia. *Journal of family & community medicine*, 1(1), 40-4.
- Carter E, Bryce J, Perin J, Newby H. (2014). Harmful practices in the management of childhood diarrhea in low- and middle-income countries: a systematic review. *BMC Public Health* 15(1):788 doi:10.1186/s12889-015-2127-1
- Cunliffe, N.A., Kilgore, P.E., Bresee, J.S., et al. (2011). Epidemiology of rotavirus diarrhoea in Africa: a review to assess. *Retrieved 18th January 2017*.
- Ellis, A. A., Winch, P., Daou, Z., Gilroy, K. E., & Swedberg, E. (2007). Home management of childhood diarrhoea in southern Mali—implications for the introduction of zinc treatment. *Social science & medicine*, 64(3), 701-712
- Feldens CA, Faraco IM, Ottoni AB, Feldens EG, Vitolo MR. (2010) Teething symptoms in the first year of life and associated factors: a cohort study. *J Clin Pediatr Dent* 34(3):201-6
- Gibson, S., Sahangamu, D., Fatmaningrum, D., Curtis, V., & White, S. (2017). ‘Unfit for human consumption’: a study of the contamination of formula milk fed to young children in East Java, Indonesia. *Tropical medicine & international health*, 22(10), 1275-1282.
- Karambu, S., Matiru, V., Kiptoo, M., & Oundo, J. (2013). Characterization and factors associated with diarrhoeal diseases caused by enteric bacterial pathogens among children aged five years and below attending Igembe District Hospital, Kenya. *The Pan African medical journal*, 16, 37. doi:10.11604/pamj.2013.16.37.2947
- Kumar, V, Singh, P & Verma, S, (2016). *Management of childhood diarrhoea at homes in India: An opportunity to reduce child morbidity and mortality*. *Infection, Disease and Health* 21, (4): 176–183
- Kvissberg, M. A., Dalvi, P. S., Kerac, M., Voskuil, W., Berkley, J. A., Priebe, M. G., & Bandsma, R. H. (2015). Carbohydrate malabsorption in acutely malnourished children and infants: a systematic review. *Nutrition reviews*, 74(1), 48-58.
- Lamberti, L M. (2014). Evaluating a childhood diarrhoea management program in Uttar Pradesh, Gujarat and Bihar, India: determinants of diarrhoea prevalence, recall, care-seeking and treatment A [PhD dissertation, Johns Hopkins University] <https://jscholarship.library.jhu.edu/bitstream/handle/1774.2/37048/LAMBERTI-DISSERTATION-2014.pdf>

- Lohsiriwat, V. (2015). Treatment of hemorrhoids: A coloproctologist's view. *World journal of gastroenterology*, 21(31), 9245-52.
- Merga, N., & Alemayehu, T. (2015). Knowledge, perception, and management skills of mothers with under-five children about diarrhoeal disease in indigenous and resettlement communities in Assosa District, Western Ethiopia. *Journal of health, population, and nutrition*, 33(1), 20-30.
- Ogbeyi, G. O., Onyemocho, A., & Ogbonna, C. (2016). Assessment of caregivers knowledge of diarrhoea and practice of home management of diarrhoea disease among under two children in Opialu a rural community in Benue State Nigeria. *Global Journal of Medicine and Public Health*, 5(2), 11.
- Owais AI, Zawaideh F, Bataineh O. (2010) Challenging parents' myths regarding their children's teething. *Int J Dent Hyg* ; 8:28-34
- Perin J, Carvajal-Velez L, Carter E, Bryce J, Newby H. (2015) Fluid curtailment during childhood diarrhea: A Countdown analysis. *BMC Public Health*.15:588. <http://www.biomedcentral.com/content/pdf/s12889-015-1878-z.pdf>
- Reiner Jr, R. C., Graetz, N., Casey, D. C., Troeger, C., Garcia, G. M., Mosser, J. F., ... & Rao, P. C. (2018). Variation in Childhood Diarrheal Morbidity and Mortality in Africa, 2000–2015. *New England Journal of Medicine*, 379(12), 1128-1138.
- Sandhu, B. & Devadason, D. (2015): Management of diarrhoea. In: Wyllie R, Hyams JS, editors. *Pediatric gastrointestinal & liver disease*. 5th ed. USA: Saunders Elsevier.
- Teklemichael, Mohammed & Wondwosen (2014). Risk factors of diarrhoeal disease in under-five children among health extension model and non-model families in Sheko district rural community, Southwest Ethiopia: comparative cross-sectional study. *BMC Public Health*, 14: 395 <http://www.biomedcentral.com/1471-2458/14/395>
- Ugwu, M.C., Edeani, G.I., Ejikeugwu, C.P., Okezie, U., Ejiofor, S.O. (2017) Antibiotic Susceptibility Profile of *Escherichia coli* and *Salmonella* Causing Childhood Diarrhoea in Awka Municipality, South-eastern Nigeria. *Clin Microbiol* 6: 277. doi:10.4172/2327-5073.1000277
- UNICEF. (2015) 'Global databases based on Multiple Indicators Cluster Surveys, Demographic and Health Surveys and other nationally representative sources.'
- University of Ilorin emergency Paediatric ward record, (2017). *Retrieved 10th January, 2017*.
- WHO/UNICEF (2013). Ending Preventable Child Deaths from Pneumonia and Diarrhoea by 2025: The Integrated Global Action Plan for Pneumonia and Diarrhoea (GAPPD).
- World Health Organisation. 2013 Diarrhoeal Disease: Fact Sheet. Available from: <http://www.who.int/mediacentre/factsheets/fs330/en/> [Accessed: 14th June 2016]
- Yilgwan C.S and Okolo S.N (2012). Prevalence of diarrhoeal disease and risk factors in Jos University Teaching Hospital. *Ann Afr Med* 2012; 11:217-21