

Environmental factors associated with diarrhoea among under-five children attending at Muhimbili National Hospital, Tanzania: a descriptive cross sectional study

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Abstract

Background: Generally, diarrhea is still a second major reason of death and illness in children below the age of five years. It holds breathes of around half a million under five children's every year and causes million more to be admitted. Every year diarrhea kills around 525000 children of under five years.

Although few study have been done in Tanzania to determine factors associated with diarrhea among under five children, but environment factors have not yet well addressed. Therefore, this study seeks to address environmental factors associated with diarrhoea among under-five children attending at Muhimbili National Hospital, in Tanzania.

Methods: A quantitative descriptive cross sectional study design of 100 simple randomly participants were selected. Questionnaires were used to collect data form key informants who were mothers/ carers with a child of under-five suffering from diarrhoea admitted at Muhimbili National Hospital, Tanzania. Data were analysed using SPSS. Statistical tests used were mean, median, proportions and chi square. Environmental risk factors associated with diarrhoea were determined with a p value of less than 0.05. Ethical approval and permission to collect data were obtained from relevant authorities.

Results: Unsuitable infrastructure for grey water disposal, improper hand washing before feeding the baby and hand washing without using clean water and soap had strongly association with the occurrence of diarrhoea in under-five children attending at Muhimbili National Hospital (MNH) with P-value of 0.00, 0.00, and 0.01 respectively.

Conclusion: Childhood diarrhoea is contributed by various environmental risk factors including unimproved sanitation, lack of hand washing facilities and poor knowledge among caregivers. This calls for the importance of providing health education to the caregivers on the cause, prevention and treatment of diarrhoea among under-five children.

Background

Generally, diarrhoea is still a second major cause of death and illness in children below the age of five years. It holds breathes of around half a million under five children every year and causes million more to be admitted. Every year diarrhoea kills around 525000 children under five years. Globally there are nearly 1.7 billion cases of childhood diarrhoea disease every year. It is always a symptoms of an infection in the intestinal tract caused by parasite, viruses, and bacteria (1).

The illness and deaths associated with diarrhoea diseases among under five children are extremely large and continue to exist among children living in poor countries, including in Sub Saharan countries, and create a great effects to health of the society (2). The study conducted by Bado, Susuman (2) identified that there is a link between diarrhoea disease among under five children and poor standard of living, poor general hygiene and inability to have safe water for drinking

The effects that may result from diarrhoea include electrolytes and fluid imbalance, disturbance in acid and base regulation. Children suffering from severe diarrhoea they are at risk of getting electrolyte imbalance like hypokalaemia and dehydration which is the most cause of death if it is not treated immediately (3). The common ways of preventing diarrhoea disease are by applying the ways target in interfering of faecal oral transmissions pathways, commonly refers as five "F" (fluids, fields, flies, finger and food) such using clean and safe water, sanitation, hygiene good preparation of food which all (4).

In Tanzania, by the year 2017 diarrhoea was the third principal cause of under-five morbidities which accounts over 27% (5). Although there is decreasing in mortality caused by diarrhoea in under-five children, but still there is a persistent morbidity caused by diarrhoea. Therefore, study aimed on determining the environment factors associated with diarrhoea among under-five children attending at MNH in Tanzania.

Methodology

This research was conducted to determine environmental factors associated with diarrhoea among under five children attending at Muhimbili national hospital in Tanzania. The study was conducted at Makuti A ward and at emergency department (EMD) at MNH. Makuti A is a specialized ward for admitting children under eleven years of age suffering from diarrhoea, and EMD is the place for receiving referral cases and patients coming from home. Following the study being conducted at MNH which is the national referral hospital receiving patients from different parts of Tanzania, the findings of this study is expected to be generalized all over the country.

The study population were caregivers or parents of the children of under the age of five years attending at MNH whom the chief complaint of children on admission was diarrhoea. Another inclusion criteria of participants were those carers who provided consent and were speaking English or Kiswahili (National language of Tanzania). However, the study excluded the caregivers/ parents whom their children were serious sick.

A quantitative approach with descriptive cross sectional study design was employed. Simple random sampling methods were used in selecting participants (caregivers/ parents) of the under-five ages children attending at MNH who met inclusion criteria. A total of 100 participants were sampled for the study. Data was collected using questionnaires and were entered, cleared and analysed by using SPSS version 20. Data analysis were done by categorizing the social demographic characteristics and clinical characteristics using mean, median, and proportions. Results were presented in the form of cross tabulation and inferential statistics were analysed by chi square.

Before collecting the data, research proposal was submitted to Aga Khan Ethical Review Committee (ERC) for approval. The permission to conduct the research was obtained from MNH. Informed consent were obtained from each participant before engaging them in the study. Consent form was developed in English language and translated to Kiswahili for the respondents who were not using English. The benefits of this study such as helping parents or care givers and health workers on modifying

environmental factors associating with diarrhoea among under five children were explained to participants. Additionally, information that were shared were helpfully to the policy makers on setting guidance on how environmental factors associating with diarrhoea among under-five children can be addressed and eliminated. The study findings were helpfully to health workers working in a ward admitting children suffering from diarrhoea and EMD to understand the environmental factors associating with diarrhoea among under-five children and to offer health education to care givers in order to prevent the recurrence. There was no any compensation offered for their participation. Participation of carers did not affect their child health services provided by the hospital facility. All their rights were observed and respected. Respondents had rights to refuse to participate in the study, and were having the right to withdraw from the study at any point without any effect on the care of their child. Confidentiality was maintained by ensuring that name of the participant and the name of a child did not appear on the filled questionnaire whereby the number was used instead of names. Information were collected and stored in the soft copy and saved in the researcher laptop with a password protection, no one was having an access to data, apart from the researcher and supervisor. The hard copy was kept in a locked cupboard. Privacy was maintained during data collection. No any harm was caused by this study.

Results

A total of 100 respondents participated in the study. The majority of the participants (50%) were aged between 26-35 years. For education status, most of the participants (46%) had primary education. Other characteristics of the participants are shown in table 1.

Table 1: Socio-demographic characteristics of the participants in MNH (n=100)

Variable		Frequency	Percentage	Cumulative frequency
Sex of the child	Male	49	49.0	49
	Female	51	51.0	100
	Total	100	100.0	
Age of care giver in years	16-25	31	31.0	31.0
	26-35	50	50.0	50.0
	36-45	9	9.0	9.0
	46-55	5	5.0	5.0
	56-65	5	5.0	5.0
	Total	100	100	100.0
Age of child in months	1-12	42	42.0	42.0
	13-24	36	36.0	78.0
	25-36	16	16.0	94.0
	37-60	6	6.0	100.0
	Total	100	100.0	
Education level	Primary	46	46.0	46.0
	Secondary	35	35.0	81.0
	University	9	9.0	90.0
	No formal education	10	10.0	100.0
	Total	100	100.0	
Marital status	Single	31	31.0	31.0
	Married	63	63.0	94.0
	Divorced	3	3.0	97.0
	Widow	3	3.0	100.0
	Total	100	100.0	
Relationship with the child	Father	1	1.0	1.0
	Mother	86	86.0	87.0
	Grandfather	1	1.0	88.0

Variable	Frequency	Percentage	Cumulative frequency
Grandmother	8.0	8.0	96.0
Others	4.0	4.0	100.0
Total	100		

The data show that most of participants were living behaviours which do not prevent risk factors for diarrhoea. Hand washing was a big challenge whereby > 90% were not washing their hands appropriately. Other findings are shown in table 2.

Table 2: Risk factors associated with diarrhoea among under-five children attending at MNH (n=100)

VARIABLE	FREQUENCY	
	YES	NO
Hand washing facilities at home.	20 (20%)	80 (80%)
Hand washing by using clean water and soap	8 (8%)	92 (92%)
Hand washing before feeding the baby	19 (19%)	81 (81%)
Hand washing before feeding	7 (7%)	93 (93%)
Boiling and filtering drinking water	31 (31%)	69 (69%)
Suitable infrastructure for grey water disposal	1 (1%)	99 (99%)
Proper place for waste disposal	15 (15%)	85 (85%)
Covering of food after preparing	90(90%)	10 (10%)
Proper place for cooking food	22(22%)	78 (78%)
Washing utensils used for serving meals for children	88 (88%)	12 (12%)

Another risk factor for diarrhoea is unsafe and unclean water. As it is shown in figure 1, majority of participants (77%), were getting drinking water from public tap.

From the study findings, two participants' characteristics were associated with diarrhoea among their under five children. One the identified characteristic was age of participants whereby children cared by participants aged between 26-35 years were at greater risk of diarrhoea (p value=0.041). Another

participants' characteristic was education status whereby the findings show children cared by carers with primary level of education were at greater risk of diarrhoea (p-value=0.00) as it is shown in table 3. However marital status and the relationship of carers with children had no association with diarrhoea.

Table 3: Association of demographic data as risk factor for diarrhoea among under-five children at MNH (n=100)

χ^2	Df	P-value	High risk	Low risk		
Age of the care giver	16-25	27	4	9.957	4	0.041
	26-35	29	21			
	36-45	8	1			
	46-55	4	1			
	56-65	4	1			
	Total	72	28			
Education status of the care giver	Primary	44	2	3.980	4	0.00
	Secondary	18	17			
	University	1	8			
	No formal education	9	1			
	Total	72	28			
Relationship with the caregiver	Father	0	1	38.270	3	0.409
	Mother	61	25			
	Grand father	1	0			
	Grand mother	7	1			
	Others	3	1			
	Total	72	28			
Marital status of the care giver	Single	26	5	3.140	3	3.70
	Married	42	21			
	Divorced	2	1			
	Widow	2	1			
	Total	72	28			

The study also found that only 18.1% of the participants were practice boiling and filtering drinking water while 81.8% of respondents did neither boil nor filter water for drinking. There was an association between not boiling and filtering drinking water and diarrhoea (P-value=0.00). Also the study found that there was an association between improper hand washing by using clean water and soap and diarrhoea in under-five children (P-value=0.00). It was found that only 28% of participants were practising proper hand hygiene while 72% did not wash their hands appropriately. Other risk factor identified to have association on diarrhoea was improper place for waste disposal (P=0.01). A total of 85(85%) respondents indicated to have no proper place for waste disposal.

Moreover, the study showed that there was a statistical association between a place of cooking and diarrhoea (P-value=0.00), and improper washing of utensils used for serving meal with diarrhoea (P-value =0.00). A total of 67% of respondents states to have no proper place for cooking food. Also source of water for drinking and domestic use and feeding food sold by food vendors appear to have association with diarrhoea with P-value was of 0.00, and 0.00 respectively.

Majority of the respondents (72%) initiated complementary feeding to their children before six months of life with the P value of < 0.03. Only 28% of the respondents reported to have started complementary feeding after six months of life.

Discussion

This study was designed to determine risk factors associated with diarrhoea among under-five children attending at MNH. The study was a facility-based study that made use of respondents on assessing the environment factors contributing to diarrhoea among under five children attending at MNH.

The study found that age (P-value=0.01) and educational status of the caregiver (P-value=0.00) have shown association with environmental factors contributing to diarrhoea while the other demographic data of carers did not show any association with diarrhoea among under-five children. Having higher level of education to the caregivers increased knowledge on preventing diarrhoea to their children, this may be due to having knowledge on different causes of diarrhoea and how prevent it. This findings is supported by the study done in Ethiopia whereby mothers with higher level of education experienced superior chance of their children to be safe from diarrhoea (6).

Also the study found that neither boiling nor filtering drinking water is among of the risk factors contributing to diarrhoea to under five children. The results is supported by the study done in Ethiopia which revealed that lack of clean and safe water was among of the contributing factors to diarrhoea among under five children, and only 44% of the overall population in Ethiopia had access to clean and safe drinking water supplies (7). Similarly, the study done by (8), found that as accessibility of home based drinking water treatment was the preventive measures of occurrence of diarrhoea in under-five children. Additionally, children whom their families doing home treatment of drinking water such as

boiling and application of chemicals such as chlorine and or filtering of water were found to have low chances of acquiring diarrhoea (9).

Likewise, in this study, there was a significant association between the availability of hand washing facilities with childhood diarrhoea. Families that have got access to hand washing facilities at their homes had lower risk of developing diarrhoea. This is well in line with other studies done by (10) which suggested that the availability of water could have an impact on hand washing, basically because when water is nearby, hand washing is extra common and this encourages hygiene improvement.

Also unsafe source of water appears to have association with diarrhoea. This is consistent with study on unimproved water source as the major risk factor for diarrheal diseases transmission. Families with unprotected water sources were expected to have children with diarrhoea three times more and vice versa (8).

Also this study found that eating of streets food sold by food sellers which is not prepared at clean and safe environment had association with diarrhoea among under-five children. This findings is well in line with the study done by Agustina, Sari (11) which found that the practice of getting cooked food made out of home is associated to the source of food borne transmitted diseases including diarrhoea in children.

Furthermore, initiating complementary food before the age of 6 months seems to be among of the risk factors for transmission of diarrhoea. This study found that children whom started complementary feeding below the age of six months had diarrhoea. This is similar to the study done in India that showed that 55.6% of children who kept in EBF up to six months were at low risk of developing diarrhoea compared to those who started complementary feeding before completing six months of life (12). Also another study recommended that introducing weaning food to the children made in dirty environment are usually infected with pathogens and are the major risk factor for diarrhoea in under-five children (11)

More factors revealed to have association on diarrhoea in this study were place for waste disposal especially latrines at home. As per previous study done by Godana and Mengiste (8) found that children from homes without toilet facilities were at high risk of having diarrhoea compared to children from families having latrine facility. The availability of latrine rises the chance of its use that enables the safe disposal of faeces. This was identified as one of the factors of decreasing interaction between causative agents of diarrhoea and the host. Improper disposal of children faeces was strongly connected with acute diarrhoea in children. Likewise, the study done in Ethiopia by Gbru, Tasha (13) found that that children whose their families perform improper waste disposal were at risk of developing diarrhoea compared to children whose their families were performing proper waste disposal.

Limitation

Some respondents who met inclusion criteria were not ready to participate in the study as they were busy with taking care of their children.

Conclusions

The findings identified important environmental determinants that contribute to the occurrence of diarrhoea in under-five children attending at MNH. Both facilities and behavioural aspects of environmental health act more notably as determinants of childhood diarrheal disease. The findings show that childhood diarrhoea has a number of environmental determinants, particularly environmental health risk factors such as poor knowledge on diarrhoea causation, lack of improved sanitation and hand washing facilities. This indicates the importance of environmental health as a determinant of preventing diarrhoea among under five children. Therefore, it is important to provide health education on ways of preventing diarrhoea such as improved sanitation and good hygiene practices. Moreover, the health education should focus on the availability and use of hand-washing facilities and ensuring parents and or caregivers have knowledge about the causes of diarrhoea. This implies that hygiene promotion programs should give priority to protective factors to carers and their children.

Abbreviations

EBF Exclusive breast feeding

EMD Emergency Medicine Department

ENT Ear, nose, throat

MNH Muhimbili National Hospital

ORT Oral rehydration therapy

ORS Oral rehydration solution

WHO World health organization

WASH Water, sanitation and hygiene

Declarations

Ethics approval

The ethical approval provided by Ethics review sub Committee (ERC) of the Aga Khan University (AKU), with committee reference number AKU/R.01/2019 then submitted and reviewed by a chair ERC-AKU. The permission was provided by Head of teaching and Consultancy Unit at Muhimbili National hospital with Reference number MNH/TRC/Permission /2019/037.

Consent to publish

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Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing interests

None of the authors have any conflicts of interests in this study

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Authors' contributions

- VM collected, analysed and interpreted data
- AM collected, analysed and interpreted data
- TM interpreted data

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Figures

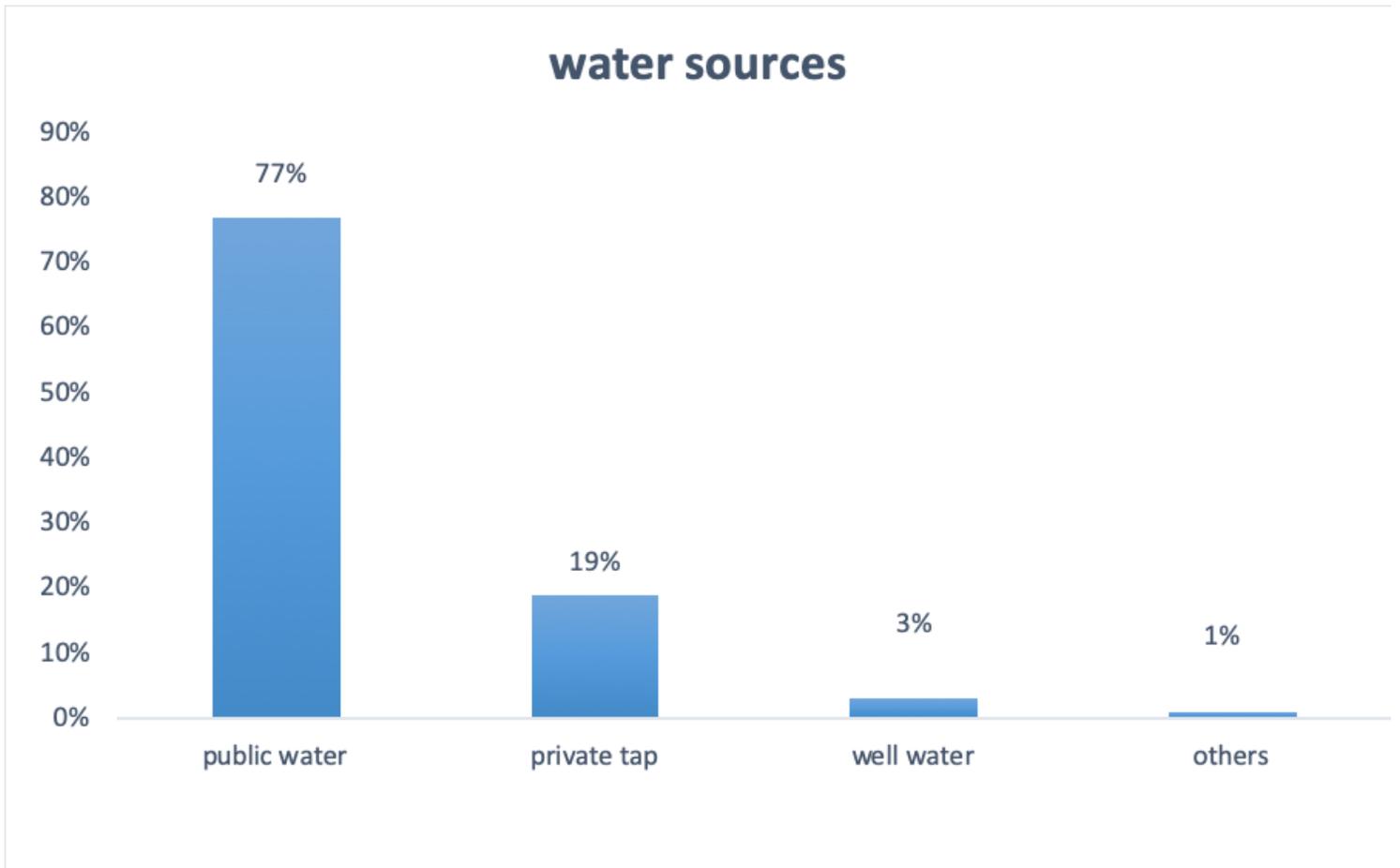


Figure 1

Distribution of water sources in the society