

Determinants of Hand Washing Practices and Diarrhea Prevention among Mothers of Under-Five Children in Ibadan, Nigeria

Kabiru K. Salami

Department of Sociology, University of Ibadan, Nigeria

Childhood diarrhea is the third-leading paediatric, diagnosed in hospitals and causes nearly one-quarter of under-five death in Nigeria. Morbidity and mortality for children through diarrhea are influenced by poor hygiene practices including poor hand washing. Thus this study examines the practice of hand washing by mothers as a preventive mechanism against diarrhea experience among children under age five. A pretested standardized questionnaire was administered to 600 mothers of children under age five and complimented with eight sessions of in-depth interview (IDI) conducted among mothers in Ibadan metropolis. Overall, about 58% of the mothers were within 30-39 years of age range, 11% had no formal education, about 31% reported diarrhea experience for their children 2 weeks before the survey, while 84.5% of them sought hospital care during diarrhea episodes. Respondents reportedly drank water from stream (8.7%) and used faecal disposals (91.5%) different from water closet. Hand washing after toilet use was reportedly common to all the respondents; 24.3% washed their hands with water only, while 35% reportedly washed their hands occasionally. Only 33.5% reportedly got information on hand washing practices from health workers. Education and income of the respondents influenced adoption of frequent hand washing practices ($p < 0.05$). The study suggests focused health education for mothers through the media on the importance of frequent hand washing practices.

Keywords: Diarrhea, hand-washing practices, under-five children, diarrhea, Nigeria

Introduction

Diarrhea is a water-borne disease mainly contributed through the ingestion of contaminated food and water. According to the World Health Organization (2008), diarrhea is the expulsion of loose or watery stool at least three times in a day. It is simply an alteration in a normal bowel movement characterized by an increase in the water content, volume, or frequency of stool especially when the frequency of stool increase to more than three times per day in children (Giannattasio, Guarino and Lo Vecchio, 2016). Various factors are responsible for diarrhea among children under age five, including insufficient breastfeeding, malnutrition and insufficient water sanitation and hygiene (Thiam, Diene, Fuhrmann, Winkler, Sy *et al.*, 2017). A prolonged diarrhea

experience can lead to excessive dehydration, and the presence of salt and nutrients in the faeces (Radlovic, Lekovic, Vuletic and Simic, 2015). It is responsible for a good number of morbidity cases, and children are more vulnerable to complications of diarrhea because a smaller amount of fluid loss leads to dehydration compare to the cases in adults (Nordqvist, 2015). Diarrhea diseases and other gastrointestinal illnesses can lead to death by drying up body fluids resulting in profound dehydration (Bowen, Agbotwalla, Luby, Tobery, Ayers *et al.*, 2012). It constitutes one of the major causes of illness and death all over the world, particularly in infants and young children (Nordqvist, 2015).

The World Health Organization (WHO) in collaboration with United Nations Children's



Fund (UNICEF) declared in 2009 that, about 2 billion diarrhea cases occurred globally and 1.9 million children under age 5 year die yearly, mostly in developing countries. This translates to 18% of mortality among children under age five. It also connotes that well over 5000 children die daily due to diarrheal diseases. About 78% of child deaths attributed to diarrhea diseases occur in the Africa and south-East Asian regions. Nearly one in five deaths among the children is attributed to diarrhea diseases, hence, it was observed that diarrhea disease kills more children than malaria and measles put together (WHO, 2009). Its global burden was about 99.2 million DALYs (WHO, 2003) and 15% of under-five mortality each year occur in developing countries (WHO, 2002), while its incidence is seasonal and child's age-dependent. Worldwide, 5.9 million deaths (43 per 1,000 live births) in children under-five years are due to preventable diseases such as malaria, pneumonia and diarrhoea, with the African region alone accounting for 47% of these deaths (Boerma, Mathers, AbouZahr, Chatterji, Hogan, Stevens *et al.*, 2015). Dairo, Ibrahim and Salawu, (2017) reported 21.1% prevalence rate of childhood diarrhea in Nigeria, while 22% was reported in Ethiopia (Alebe, Tesema, Temsigen, Gebrie, Petrucka and Kibret, 2018). Children in the first twenty-four months of life are most vulnerable but this declines as they grow older (Gracey, 1996; Black, Morris and Bruce, 2003).

In sub-Sahara Africa, Nigeria has one of the worst hit of diarrhea prevalence rate of 18.8%. Nigeria also accounts for 16% of child mortality attributed to diarrhea. About 150,000 deaths estimate mainly amongst children under age five also occur annually as a result of diarrhea but compounded by poor sanitation and poor hygiene practices such as poor hand washing. Diarrhea is closely linked to malnutrition, and it is a condition that is often common in more than half of all children under age five (Limlim, 2008). Huffman (1990) observed that the addition of supplements to infants feeding under prevailing environmental conditions in developing nations leads to their increased diarrheal attack and reduced food intake. In the same vein, persistent diarrhea can contribute to malnutrition and sometimes impaired growth and development (Ejemot *et al.*, 2009).

Diarrheal pathogens are mostly spread through the faecal-oral transmission: from stool of one person to the mouth of another; contaminated food or drinking-water or from person-to-person (UNICEF and WHO, 2009; WHO, 2013) due to poor hygiene. Three clinical diarrheal types: acute watery diarrhea; bloody diarrhea and persistent diarrhea have been identified (WHO, 2009). The main causative agents for all types are bacterial infections, viral infections, parasites, food intolerances, reaction to medicines, intestinal diseases, and functional bowel disorders. In 2000, the General Assembly of the United Nations maintained that nations are to agree on massive reductions in mortality due to diarrhea in order to achieve the Millennium Development Goal (MDG), and specifically reducing the rate of mortality, by two-thirds, among children under age five (World Bank, 2003). Significantly, most diarrhea deaths are preventable using low-cost interventions. The World Health Organisation recommends some diarrhea-preventive measures which include access to safe drinking-water; adoption of improved sanitation, exclusive breastfeeding for the first six months of life; good food and personal hygiene; health education on transmission and spread of infections; rotavirus vaccination; and hand washing with soap (WHO, 2013). The practice of hand washing with soap is the most cost-effective intervention of the preventive measures. Good hand washing is the first line of prevention against the spread of many diseases including the most common types of infectious diarrhea (UNICEF, 2007). Clean hands can prevent person-to-person spread of germs and throughout the community (Khan, 1982; Fewtrell *et al.*, 2005). Good hand washing techniques necessitate use of adequate amount of soap to rub both hands together in order to create a friction and rinse under running water (Sifat, 2013).

The guiding vision of the Global Hand Washing Day is both local and global culture of promoting hand washing practice with soap. Although people globally wash their hands with water, very few wash it with soap only at critical moments such as after using the toilet; while cleaning a child; and before handling food. Ejemot, Ehiri, Meremikwu and Critchley (2009)

reported a 39% reduction in the incidence of diarrhea in children through proper hand washing practices. Despite the acceptance of habit of washing hands with soap, as having lifesaving potential, it is seldom imbibed (WHO, 2017). Diarrhea remains preventable if individuals could avoid contacting with causative agents, however, children under age five years are unable to protect themselves from these agents but remain under the care of their mothers; hence, the maternal preventive behaviours for children are very important. A recent study (Desalgne and Getachew, 2015) observed that the incidence of diarrhea is related to maternal behaviour including hygiene practices, child feeding practices, and safe water and defecation practices. This current study therefore explores maternal diarrheal-preventive behaviour through hand washing towards their children under age five.

As part of Nigeria Government/UNICEF Wash, Sanitation and Hygiene (WASH) programme in 2004, several activities were organized in schools with active community involvement (Agberemi, Ofem and Saidu, 2009) in most Nigeria states and the Federal Capital Territory, to raise the level of awareness of hygiene and sanitation especially on hand washing. On account of the success recorded so far in Nigeria from creating awareness on hygiene practices, hand washing campaign to reach over 30 million people was adopted as one of the three targets for 2008 International year of sanitation in Nigeria (Agberemi, Ofem and Saidu, 2009). Curtis *et al.* (2000) observed that improving domestic hygiene practices could potentially be one of the most effective ways of reducing the burden of diarrhea in children. Among other factors, successful diarrhea control depends on family knowledge of prevention and treatment of diarrhea. However, Sifat (2013) noted that there is a gap between people's knowledge and hand washing practices, while Setyautami (2012) observed that people do not practise hand washing correctly. This current study identify the factors that determines the practice of hand washing and its influence in diarrhea in a South-western community in Nigeria.

Methods and Materials

This study was conducted in Ibadan, Oyo State South-western Nigeria. Ibadan is the capital city of Oyo state with 2,559,853 population (NPC, 2006). The city comprises eleven Local Government Areas (LGAs) with five LGAs within the metropolis, while the remaining six LGAs are outside the metropolis. Two LGAs were purposively selected for this study, which were Ibadan North East and Egbeda. Ibadan North East was selected from the five LGAs within Ibadan metropolis while Egbeda LGA was selected from the six LGA outside Ibadan metropolis. The headquarter of Ibadan North East LGA is located at Iwo Road with total population of 331,444 (NPC, 2010) while Egbeda LGA has its headquarter in Egbeda town with 283,643 people (NPC, 2010). The population distribution of women within reproductive age (15-49) showed that 88,498 women resided in Ibadan North East LGA, while 77,224 women were found in Egbeda LGA (NPC, 2010). However, 0.004 was used to get the sample size of the respondents in each of the selected LGAs. In Ibadan North East, 353 women were selected and 308 women were selected in Egbeda LGA. In all, 661 copies of questionnaire were administered but only 600 were eligible for analysis making a 90.8% return rate. One of the inclusion criteria used for qualified women who participated was that such women must have a child/children whose age were below five years. In addition, four in-depth interviews (IDIs) were conducted among mothers in each of the LGAs making eight IDIs in all.

The questionnaire administered on mothers was pretested in a nearby LGA among the mothers of children under age five. The instruments of data collection addressed the demographic characteristics of the respondents, mothers' practice of prevention, and the perception of mothers geared toward hand washing behaviour. The main focus of the study was explained to mothers interviewed. Mothers were made to ask for clarification before and during the interviews. The consent of the participants was sought orally and through signature or thumb printing appended on the consent form before the beginning of the interview. Initial participation was voluntary while participants were also allowed to drop out of the interview whenever they decided to.



Interview lasted approximately 45 minutes. Quantitative data with open ended were edited, coded and entered with Statistical Package for Social Scientists (SPSS) version 15 software, and all data were analysed using univariate and bivariate technique. The anonymous questionnaire was stored in a safe in the researcher's office where no one can access.

Qualitative data sessions were conducted by a moderator and a note taker. With the consent of the participants, interview sessions were tape-recorded. Interview sessions lasted approximately 55 minutes on average. These were later translated, typed out in a standard word processing format. All the transcribed narratives were analysed with Atlas.ti software. Atlas.ti software allows for thematic analysis (Brain and Clarke, 2006) through a framework approach (Spencer, Ritchie and O'connor, 2003). In this case, data were managed through familiarisation with the data, development of a coding framework, and coding data and data explanation. This approach was followed with analytical rigour and guide benefitted from other experts (Cornish, Gillespie and Zittoun, 2014). At the end, the nodes were exported from Atlas.ti to a word document to arrive at the pattern of meaning from the key themes.

Results

Table 1 provides the socio-demographic information of the 600 mothers with children under age five surveyed in this study. The age of the respondents were between 15 and 49 years. The majority (85%) of the respondents were married, 12.7% were single while others were either divorced or separated as shown in Table 1. The majority (73%) of the respondents were Christians while others were Moslems. In all, 43.2% had secondary education, 27.5% attended primary school, while 11% did not have any formal education. Expectedly, Yoruba mothers constituted the majority (84.7%) of the respondents since the study was conducted in a location predominantly inhabited by the Yoruba. Igbo and Hausa women respondents were 7.7% and 1.5% respectively, while about 6.1% were from different minority groups in Nigeria. Table 1 further detailed the occupational distribution of the respondents indicating that more than half (69%) of the respondents were self-employed,

while 22.6% were government or private employees. Respondents who were students constituted 5.7%. Data on respondents' parity revealed that about half (50.7%) had a range of one to two children, 39.5% respondents had three to four children, while others (9.8%) had five children and above.

Table 1: Socio-demographic Characteristics of the Respondents

Characteristics	Frequency (N=600)	Percentage
Age		
Below 19 years	10	1.6
20 -29 years	172	28.7
30 - 39 years	346	57.7
40 – 49 years	72	12.0
Marital Status		
Married	510	85.0
Single	76	12.7
Divorced	10	1.6
Cohabiting	4	0.7
Religious Affiliation		
Christianity	438	73.0
Islam	162	27.0
Educational Level		
No formal Education	66	11.0
Primary Level	165	27.5
Secondary Level	259	43.2
Others*: NCE, OND, HND, BSC	110	18.3
Ethnic group		
Yoruba	508	84.7
Igbo	46	7.7
Hausa	9	1.5
Others	37	6.1
Occupation		
Self Employed	414	69
Government/Private Employees	136	22.6
Students	34	5.7
Others	16	2.7
Number of Children Born		
1 – 2 children	304	50.7
3 – 4 children	273	39.5
5 children and above	59	9.8

*Others: NCE=National Certificate in Education, OND=Ordinary National Diploma, HND=Higher National Diploma, BSc=Bachelor of Science

Diarrhea Experiences and Preventive Practices

Diarrhea was reported for 187 (30.5%) children 2 weeks prior to the survey, which reportedly lasted for between 1 day (30.8%), 3 days (58.8%), 1 week (6.3%) and 2 weeks (4.0%). Respondents sought treatment through herbs (2.0%), self-medication (13.5%) and hospital (84.5%). Other household members were reported to have experienced diarrhea by 249 (41.5%) mothers. These victims of diarrhea were reportedly treated through drugs from the chemist (4.3%), drugs already had at home (15.8%), hospital (79.2%), while 0.7% did not treat diarrhea. Overall, diarrhea experience was reported by all the respondents in a range of once (77.3%), twice (14.7%) and thrice (4.2%).

Four episodes were reported by 2.0% mothers, while seven episodes were reported by 1.8% mothers.

The regularity and frequency of hand washing practice was examined. In all, 237 (39.5%) of the respondents reportedly washed their hands “as many times as possible” in a day, followed by 210 (35%) who washed hands occasionally. Not less than 22.5% of the respondents washed hands always, while 3% did not wash hands frequently. Overall, a large majority (62%) of the respondents washed their hands frequently. Considering the materials used in washing hands, significantly, about three-quarters of the respondents indicated the use of any disinfectant or any good hand wash soap.



For instance, detergent was used by a third (33.2%) of the respondents while 28.8% reportedly used antiseptic soap. Also 13.7% respondents used 'bar soap', while 24.3% of the respondents did not use any soap, other than ordinary water, to rinse hands. When this study probed for which activities necessitated mothers to practice hand washing, only 12.7% of the respondents indicated washing hands before eating, 7.8% did wash hands before cooking meals and the majority (79.5%) reportedly washed their hands after using the toilet. In the same vein, mothers, during in-depth interviews, maintained that hand washing is tied to hygiene practice ranging from pre domestic chores to post toilet use:

Hand washing is a method or means of cleanliness. It can take place in various situations: after household works, or doing things that contaminate our hands; probably when we use the toilet or handle dirty things. (IDI/female/33years/married)

Toilet facilities used by the children of the respondents were mentioned to include potty (53.5%), pit latrine (32.2%) and water closet (8.5%). Others indicated use of dust bin (3.7%) and stream (2%) as toilet facilities. Most participants maintained that it is highly essential to wash hands after use of the toilet, although they clearly stated that washing hands after all activities is hygienic. A participant described how essential is hand washing in the prevention of diarrhea diseases:

It is good to wash hands both before and after eating; it is also a good hygienic practice to wash our both hands after using the toilet to avoid diarrhea. (IDI/female/married/39 years)

Illness experience by children of the respondents was reported. When respondents were asked about their child's illness experience in the last two weeks before the survey, respondents reported diarrhea (13.3%), malaria (35.2%) and Acute Respiratory Infection (ARI) (4.5%). Other (47%) respondents were reportedly free from

any illness conditions in the last two weeks prior to the study. Data on the sources of drinking water showed that 50% were drinking from well, 26.5% drank water from borehole, 10.8% reportedly drank tap water, 3.5% of the respondents relied on rain water while 8.7% respondents were drinking stream water.

Patterns of Hand Washing

Patterns of hand washing adopted by mothers were reported in Table 2. Eight activities influencing handwashing practices in the household were identified and linked to hand washing: cooking/preparing food, taking/eating food, feeding babies, toileting, and changing diapers. Others are eating fruits, eating snacks and handshaking. Respondents were asked to state when they washed hands either before or after any of these activities.

Table 2 indicates that mothers practice handwashing before and after 'taking food' (81.7%) than practiced for before and after 'cooking/preparing the food' (76%). These, however, attracted more handwashing practice than the care for the babies. For instance, only 64.8% mothers washed hands before and after feeding their babies, while 61% and 52.8% did practice handwashing for toileting and changing of diapers respectively for their children. Hand shaking attracted the lowest rate of handwashing practice by mothers both before and after. There is a clear indication from Table 2 that some activities seemingly require hand cleaning before while others necessitate hand cleaning after performing the activities, hence variation in the handwashing performance by the mothers of children under age five.

Table 2: Selected activities influencing handwashing practices by the mothers

S/N	Activities	Handwashing practices		
		before activity	after activity	before and after activity
1	Cooking/preparing food	18.3%	5.7%	76%
2	Taking/eating food	16%	2.3%	81.7%
3	Feeding baby	22%	13.2%	64.8%
4	Changing diapers for baby	16%	31.2%	52.8%
5	Toileting	13.2%	25.8%	61%
6	Eating fruits	21.2%	22.3%	56.5%
7	Eating snacks	32%	15.8%	52.2%
8	Hand shaking	1.5%	82.2%	16.3%

Hand washing is generally considered a good health-promoting practice by the mothers. Narratives from the in-depth interviews enunciated that mothers’ perception on hand washing revolves around a belief that the practice has no disadvantage rather it can prevent contracting infections and illness. Prevention of diarrhea infection was specifically identified as one of the reasons for practising hand washing:

When you want to eat, you need to wash hands; so hand washing has to do with cleaning your hands from dirt because the causes of diarrhea are of different kinds. Sometimes, the type of food the child eats can cause him or her to have diarrhea. When a child stool too much it is diarrhea because stooling is one of the symptoms of diarrhea. (IDI/female/married/30years)

As the mothers considered the practice important, the frequency of hand washing practices for different activities daily was teased out. Majority (70.7%) washed their hands 1-5 times, about a quarter (25.3%) reportedly washed their hands 6-10 times while only 4% washed hands more than 10 times in a day.

Narratives from the participants indicate a tendency for accepting to practice handwashing frequently especially if motivated. Availability of certain products to practice handwashing motivates mothers toward practicing handwashing. Water and soaps are key materials identified by participants: *Water is part of the factors then soap or anything I can use but when I don't have water or soap it could hinder me in one way or the other (IDI/female/39/married)*. A participant would

not be geared to practice handwashing in the absence of water and soap or if she would need to cover a distance to get any of them:

Hmm.....the major thing is water and when soap is available. But if am to go far to get water it could limit my hand washing practice. (IDI/female/married/33yrs)

Another participant expressed ability to practice handwashing but only when considered necessary. Economic activities may serve as impediment for mothers to practice handwashing hence delay till an appropriate time for the mother. A participant clearly expressed her economic behavior and engagement in unhygienic activity as determinants:

When I do dirty things I have to wash my hands. One thing that will not make me to wash my hands is that; if I am making a customer hair I can't touch her hair with wet hands, so I can't wash my hand that time. (IDI/female/28yrs/married)

A few participants attributed value to handwashing practices in terms of its capacity to prevent disease transmission. For instance, a participant explained that: *Hand washing generally has a lot of advantages because it prevents us from illness or disease or even infection, I don't think it has any disadvantages (IDI/37yrs/married/female)*. Another participant expressed an assurance that: *If I wash my hands when it is dirty I won't get infected or have disease, so to be free from infection I have to wash my hands when it is dirty (IDI/39yrs/married/female)*.

Hand washing practices: Sources of Information and Perceived Preventable Diseases

High awareness of hand washing was observed in this present study; sources of information geared toward awareness was therefore examined. Only 33.5% of the respondents were reportedly being informed by health workers, 33.3% reportedly received the information on television, while 15.7% and 13.7% heard or read information about hand washing from radio and billboards respectively. Few of the respondents got to know about hand washing practice from

other sources of information such as NGO (1%), internet (1.6%) and newspaper (1.2%).

Figure 1 presents perceived preventable diseases by practising hand washing. All the respondents perceived practice of hand washing would prevent one disease or the other. Specifically, 39.2% of the respondents asserted that hand washing would prevent diarrhea, followed by 33.2% and 21.8% respondents who stated that the practice would prevent cholera and typhoid respectively, while 5.8% perceived hand washing as capable of preventing Acute Respiratory Infection.

Perceived Preventable Diseases by Hand Washing Practice

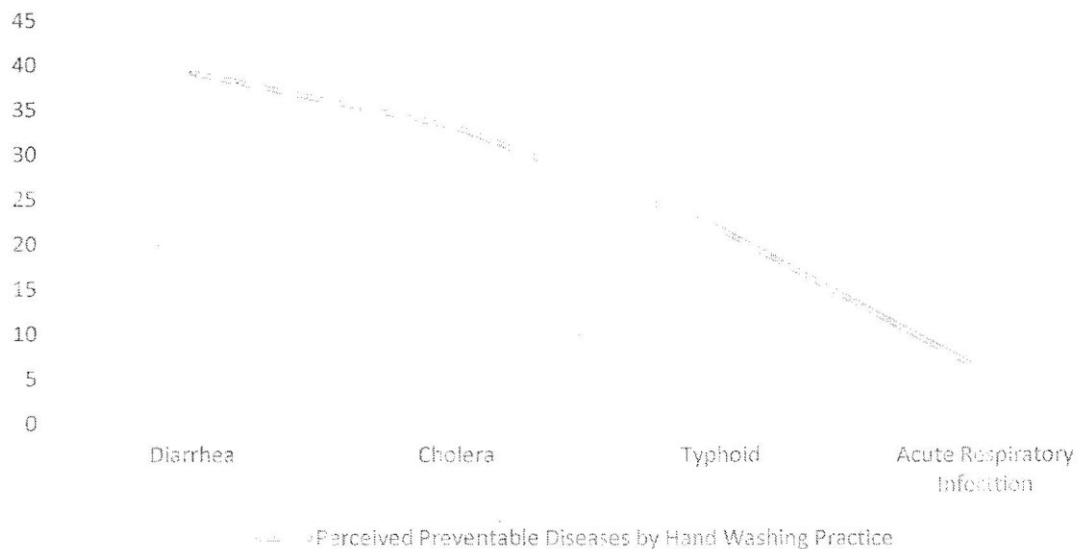


Fig. 1: Perceived Preventable Diseases by Hand Washing Practice (%)

Perception on factors influencing Hand washing practices

Respondents were asked their perception on the factors influencing the practice of handwashing. Statement questions were posed to the respondents on their perception. Responses in this section were rated as SD=Strongly Disagreed, D=Disagreed, U=Undecided, A=Agreed, SA=Strongly Agreed. These responses were scored as SD=1, D=2, U=3, A=4 and SA=5 giving rise to 1+2+3+4+5=15 with a mean score of 3 points. A mean score above 3 points is an indication that respondents actually agreed with the statement question posed to them, while a mean score below 3 points

indicates a disagreement with the statement question. The Remarks revealed the consensus of the respondents as either agreed or disagreed with the statements. Overall, the mean score of a statement that shows 3 and above is remarked as 'agreed' with the statement question, while conversely, the mean score below 3 is remarked as 'disagreed' with the statement question.

Table 3 presents respondents' perception towards hand washing in preventing childhood diseases. Analysis of responses to statement questions asked indicated that respondents accepted (with an aggregate score of 4.3) that mothers' hygiene determines child's health; the mean score of 4.5 depicts that hand washing was

necessary for mothers. However, respondents opposed a view that distanced source of water would preclude them from regular hand washing. As shown in Table 3, respondents

generally considered (2.8) child sickness as not normal, while respondents were opposed (2.2) to a belief that diarrhea is normal for children under age five.

Table 3: Respondents' Perception of hand washing practices on prevention of diarrhea

Variables	SD	D	U	A	SA	Mean Score	Remarks
Child's health depends on mother hygiene	34 (5.7%)	20 (3.3%)	28 (4.6%)	118 (19.6%)	400 (66.7%)	4.3	Agreed
Hand washing is necessary for mothers	24 (4%)	10 (1.6%)	29 (4.8%)	105 (17.5%)	432 (72%)	4.5	Agreed
Don't need to wash hand at all times	256 (42.6%)	247 (41.2%)	31 (5.2%)	40 (6.7%)	26 (4.3%)	1.9	Disagreed
Can't wash hands all the time because the source of water is far from house	344 (57.3%)	196 (32.2%)	22 (3.6%)	18 (3%)	22 (3.6%)	1.6	Disagreed
Child sickness is normal	141 (23.5%)	175 (29.2%)	47 (7.8%)	165 (27.5%)	72 (12%)	2.8	Disagreed
Diarrhea is normal for children under-five	148 (24.7%)	164 (27.3%)	145 (24.2%)	120 (20%)	23 (3.8%)	2.5	Disagreed
Diarrhea is not a serious health issue	230 (38.3%)	190 (31.7%)	63 (10.5%)	49 (8.2%)	68 (11.3%)	2.2	Disagreed
Dirty food contributes to diarrhea	24 (4%)	26 (4.3%)	43 (7.2%)	105 (17.5%)	402 (67%)	4.4	Agreed

Note: SD= Strongly Disagree; D= Disagree; U= Undecided; A= Agree; SA= Strongly Agree

Test of Associations of perceived factors influencing Hand washing Practice

This study tested factors of association that influence hand washing practices among the mothers of under-five children. Social and economic factors were identified and selected for testing among other factors. Specifically, the study tested for how the income and level of education of mothers could influence hand washing practice. Table 4 reveals the relationship of mothers' income on hand

washing practices. The associational test depicts that there is a significant relationship between income and hand washing practices. The Chi-square result is 8.179, df = 3 with P-value < 0.05 at 95% confident level, thus, significant relationship exists between respondent income and hand washing practices. Clearly, the results indicate that the level of income of mothers is perceived to determine the practice of, and regularity of practice of hand washing.

Table 4: The perceived influence of Income on Hand Washing Practices

Frequency of hand washing	How income affect hands washing		
	No	Yes	Total
Always	126	6	132
As many times as possible	243	12	255
Very often	185	22	207
Not often	6	0	6
Pearson Chi-Square (df)	8.179 (3)		
Significant level =	0.42		

Table 5 presents the associational relationship that exists between the level of education of the respondents and its influence on frequency of hand washing. The Chi-square $X^2 = 24.726$, df

=9, $p < 0.05$ and at 95% confident level reveals that there is a significant relationship between respondents' level of education and hand washing practices. This finding indicates that the

practice of hand washing in this study was actually motivated by the level of education of

the respondents.

Table 5: The Influence of Level of Education on Hand Washing Practices

Educational level	Hand washing frequency				Total
	Always	As many times as possible	Very often	Not often	
No formal education	2	36	28	0	66
Primary school	43	61	58	3	165
Secondary school	66	101	90	2	259
Higher education	21	57	31	1	110
Pearson Chi-Square (df)	24.726 (9)				
Significant level	0.03				

Discussion

The main objective of this study was to examine hand washing behavioural practices in preventing diarrhea among mothers with children under age five. It is widely recognised that diarrhea is a major cause of morbidity and mortality among children in developing countries, like Nigeria. Therefore the working assumption was that mothers have a major role in curtailing the incidence, prevalence and the burden of diarrhea, since children under age five do not have control over the level of hygiene required for their survival. Findings for this current study indicates that respondents sought various ways of enhancing their health status and preventing diarrhea in their children.

This study found that majority (57.7%) of the respondents were aged 30-39 years. Although 13.3% of the respondents reported that their children had diarrhea in the last two week preceding the survey, a check question clearly indicated that 30.5% had diarrhea. This result conforms to previous studies that recorded higher diarrheal prevalence among children in Imo State, Nigeria (Ajero, Obilio and Chigbo, 2015) and in Brazil (Ana *et al.*, 2015). The awareness of mothers that hand washing practices could prevent diarrhea among children under age five could also be considered as a result of improved knowledge on the causes of diarrhea. Hence, this results in this current study is similar to the position of Ajero, Obilio and Chigbo (2015) in their study, the result of which indicates that the knowledge of the causes of diarrhea among the mothers or guardians of children in their study was appreciably high. Macgregor-Skinner *et al.* (2003) rated diarrhea

as a serious disease, which should be treated through orthodox medicine (Jegede, 2010). Large majority (84.5%) of the respondents in this current study affirmed the seriousness of diarrhea which propelled them to seek orthodox treatment.

The use of modern treatment for diarrhea disease is appreciably high in this study. This is still considered as ‘after the event’ action, whereas the initial action to prevent its occurrence in the first instance is more important. Hand washing is the least cost-efficient, cost-effective in the prevention of diarrhea. The 62% frequent hand washing by the mothers involved may be seen as appreciably of good performance in this study due to the fact that the frequency of practice also needs to align with the key activities at critical moments in order to enhance hygiene practices with soap (Sifat, 2013). Whereas only 16.3% respondents considered cleaning their hands both before and after handshaking as proper; handshaking accounts for a major activity that easily transmit disease from person-to-person (Ghareeb and McClellan, 2013). It was a major social and cultural activity that was discouraged in the era of Ebola disease transmission (Oleribe, Salako, Ka, Akpalu, McConnochie *et al.*, 2015). Easy transmission of disease to others who practiced frequent handwashing could be possible. A more regular campaign on handwashing is important.

The high rate of hand washing practice as reported in this current study supports findings from other local and foreign studies (Bartram and Cairncross, 2010; Halder *et al.*, 2010; Datta *et al.*, 2011; Asekun-Olarinmoye *et al.*, 2014). The high rate of hand washing practice in this

study could be attributed to the influence of level of education of respondents. Specifically Mbakaya, Lee and Lee (2017), argue that hand washing at critical times (which includes before eating or preparing food and after using the toilet) can reduce diarrhea incidence rate by 40%. The study found that all the respondents washed their hands after using the toilets. Similarly, from a study in Korea, Jeong i, (2007) found that majority (94%) of subjects claimed to wash their hands always after using public rest rooms yet when directly observed only 63.4% of observed subjects truly washed their hands after using the toilet. This indicates that hand washing after using the toilet is an expected role which is both social and hygienic. Also, this study found that 76% and 81.7% of the respondents washed their hands before and after 'cooking' and 'taking food' respectively, while 64.8% washed their hands before and after feeding their babies. Findings in this study also indicated that majority (52.8%) wash their hands before and after 'cleansing a baby's bottom'.

Although majority of the respondents washed their hands at critical moment, yet only 24.3% of the respondents used water with any soap to wash their hands. This apparently constitute inadequate hand washing practices which may not prevent diarrhea. This was also indicated in previous studies (Bloomfield, Aiello, Cookson, O'Boyle and Larson, 2007; Seimetz, Slekiene, Friedrich and Mosler, 2017) that proper hand washing which entails the use of soap and clean water is more effective in killing germs. It was found in this study that not less than 42.5% of the respondents washed their hands at least with one soap or the other. This shows that more than half of the respondents still practised less effective hand washing. Considering the frequency of respondents with hand washing practices, the study established that 35% of the respondents washed their hands occasionally, 39.5% washed their hands as many times as possible, while 3% of the respondents rarely washed their hands. This is likely to have serious negative health implication on their children since hand washing is crucial to diarrhea prevention (Luby *et al.*, 2006; Caircross, Hunt, Boisson, Bostoen, Curtis *et al.*, 2010; Ejemot-Nwadiaro, Ehiri, Arikpo, Meremikwu and Critchley, 2015).

With respect to other practices that can prevent diarrhea among the respondents, it was found that about 38% of the respondents which accounts for more than a third of the sample population did not use proper toilet facility for their children. This predisposed their children to diarrhea. Previous studies have supported this view. For instance, Traore (1994) reported that unsafe disposal of stool left lying on the ground, thrown on a heap or outside the compound was associated with 50% increase in the risk of hospitalization with diarrhea. Baltazar and Solon (1989) also reported 64% increase in pathogens positive diarrhea in families where children stool were inadequately disposed.

Majority (33.5%) of the respondents got to know about hand washing through health workers, 33.3% and 15.7% knew about hand washing via television and radio respectively, while less than 2% read about hand washing in the newspapers. This indicates three main sources of health information to mothers. Successful health promotion and positive behaviour on adoption of the public health practices have been attributed to health workers' performance in both rural and urban communities (Bovbjerg, Eyster, Ormond, Anderson and Richardson, 2013). This calls attention to empowering the health workers with adequate knowledge about public health knowledge and diseases prevention skills. Training in new hygiene practices and returning for health workers who have being on service is proposed.

Previous studies (Catalan-Matamoros, 2011; Quattrin, Filiputti and Brusaferrro, 2015) have also emphasized the relevance of the media in promotion of positive behaviour. Programmes should take the services of the media to their own advantage. Appropriate time and duration of promotion on the media should be considered. Only 33.5% of the respondents have attended programmes on hand washing. A good number (50.5%) of the respondents made use of well water, followed by 26.5% had access to borehole while 8.7% and 3.5% still drank from stream and rain respectively. In effect, the lack of improved drinking water sources also tends to curtail personal hygiene practices, including handwashing (UNICEF/WHO, 2009). The



situation is worse when people have to spend extra money to get water or covering distance.

Socioeconomic characteristics found to influence the adoption of hand washing in this current study included the mother's educational status and employment status which is in support of the findings of studies conducted in Kenya, Ethiopia and Nigeria. Similarly these studies maintained that mothers with higher socioeconomic status and higher educational status reportedly had better hand washing practices (Datta *et al.*, 2011; Desalegne and Getachew, 2015; Asekun-Olarinmoye *et al.*, 2014). The adoption of hand washing by the respondents could be as a result of their access to information relating to the practice: income to purchase soap and adequate kitchen (Asekun-Olarinmoye *et al.*, 2014).

Conclusion

Many diarrhea-predisposing practices such as drinking from low quality water sources, poor sewage disposal and inadequate hand washing at critical times were noticed among the respondents which resulted in high diarrhea morbidity in children under age five. High income and educational level of the respondents were significant among mothers that practised proper and regular hand washing. Mothers are to be encouraged through mass media to maintain high level of personal hygiene and practise proper hand washing especially before and after critical times and beyond.

References

- Agberemi, Z.O., Ofem. L. and Saidu A. (2009) 'Water Sanitation and Hygiene: Sustainable Development and Multisectoral Approach. Mobilizing People for Improved Hygiene Practices through Hand Washing Campaigns in Nigeria'. *WASH Section UNICEF Nigeria*.
- Ajero, C.M.U., Obilo, A.N. and Chigbo, U.N. (2015) 'Etiology of Acute Diarrhea among Children in Owerri, Imo State, Nigeria'. *Applied Science Reports*, 10(3): 128-132.
- Animut Alebel, Cheru Tesema, Belisty Temesgen, Alemu Gebrie, Pammla Petrucka and Getiye Dejenu Kibret (2018) Prevalence and determinants of diarrhea among under-five children in Ethiopia: A systematic review and meta-analysis. *PLoS* <https://doi.org/10.1371/journal.pone.0199684>.
- Ana, L.E., Carlos, E.A.C., Welch, R.J., Bernardo, L.H., Ricardo, V.S. and Cardoso, A.M. (2015) 'Diarrhea and Health inequity among Indigenous Children in Brazil: Results from First National Survey of Indigenous People's Health and Nutrition' *BMC Public Health* 15: 191 available online: www.biomedcentral.com/14712458/15/191.
- Asekun-Olarinmoye, E.O., Omobuwa, O., Adebimpe, W.O., Asekun, O. and Ifeoluwapo, O. (2014) 'Hand Washing: Knowledge, Attitude and Practice amongst Mothers of Under-Five Children in Osogbo, Osun State, Nigeria'. *Journal of Biology, Agriculture and Healthcare*, 4: 16.
- Balthazar, J.C. and Solon, F.S. (1989) 'Disposal of Faeces of Children under Two Years Old and Diarrhea Incidence a Case Study'. *Int'l J Epi* 18(12): 16-9.
- Bartram, J. and Cairncross, S. (2010) 'Hygiene, Sanitation and Water: Forgotten foundations of Health'. *PLoS Med*, 7(11): 1000367.
- Black, R.E., Morris, S. and Bryce, J. (2003) Where and Why are 10 million Children Dying Every Year? *The Lancet*, 28 June, 361(9376): 2226-2234.
- Bloomfield, S.F., Aiello, A.E., Cookson, B., O'Boyle, C. and Larson, E.L. (2007) The Effectiveness of Hand Hygiene Procedures in reducing the Risks of Infections in Home and Community Settings including Handwashing and Alcohol-based Hand Sanitizers. *Annual Journal for Infection Control*, 35: S27-35.
- Boerma, T., Mathers, C., AbouZahr, C., Chatterji, S., Hogan, D. and Stevens, G. *et al.* (2015) Health in from MDGs Millennium Development Goals to SDGs Sustainable Development Goals. [cited 2017 Feb 21]; <http://www.popline.org/node/64-1266>.
- Bovbjerg, R.D., Eyster, L., Ormond, B.A., Anderson, T. and Richardson, E. (2013) Integrating Community Health Workers into a Reformed Health Care System. Available online www.urban.org/careworks.
- Bowen, A., Agboatwalla, M., Luby, S., Tobery, T., Ayers, T. and Hoekstra, R.M. (2012) Association between intensive Hand washing and child development in Karachi, Pakistan: A cluster controlled trial. *Archeology of Pediatric Adolescence Medicine*.
- Braun, V. and Clarke, V. (2006) Using thematic analysis in psychology. *Qualitative Research Psychology*, 3: 77-101.
- Caincross, S., Hunt, C., Boisson, S., Bostoen, K., Curtis, V., Fung, I.C. and Schmidt, W. (2010) Water, Sanitation and Hygiene for the Prevention

- of Diarrhea. *International Journal of Epidemiology*, 39: i193-i205.
- Catalan-Matamoros, D. (2010) The Role of Mass Media Communication in Public Health. Available online via www.intechopen.com.
- Cornish, F., Gillespie, A. and Zittoun, T. (2014) Collaborative analysis of qualitative data. in Flick, U. (ed.). *The SAGE handbook of qualitative data analysis*. London: Sage Publications, 79–93.
- Curtis, S., Valerie, V. and Raymond, Y. (2000) 'Domestic Hygiene and Diarrhea 'Purporting the Problem''. *Tropical Medicine and International Health*, 5(1): 22-32.
- Datta, S.S., Singh, Z., Boratne, A.V., Senthilve, V., Bazroy, J. and Dimri, D. (2011) 'Knowledge and Practice of Hand Washing among Mothers of Under-Five Children in Rural Coastal South India'. *International Journal of Medicine and Public Health*, 1(1): 33-38.
- Desalgne, A. and Getachew. M. (2015) 'Attitude towards Childhood Diarrhea Management and Prevention in under-five Children in Fenote Selam Town, West Gojjam, Amhara, Northwest Ethiopia'. *Science Journal of Public Health*, 3: 398-403.
- Ejernot, R.I., Ehiri, J.E., Meremikwu, M.M. and Critchley, J.A. (2009) 'Hand Washing for Preventing Diarrhea Cochrane Database of Systematic Reviews 2008'. Issue/Art no. : CD004265.
- Fewtrell, L., Kaufmann, R.B., Kay, D., Enanoria, W., Haller, L. and Colford, J. (2005) 'Water Sanitation, and Hygiene Intervention to Reduce diarrhea in Less Developed Countries Systematic Review and Meta Analysis'. *The Lancet Infectious Disease*, 5(1): 42-45.
- Ghareeb, P.A. and McClellan, W.T. (2013) Reducing Pathogen Transmission in Hospital Setting: Handshaking versus Fist Bump: A Pilot Study. *Journal of Hospital Infection*, 85(4): 321-323.
- Giannattasio, A., Guarino, A. and LoVecchio, A. (2016) Management of children with prolonged diarrhea. PMID: PMC4765715 version 1. F1000Res.
- Gracey, M. (1996) 'Diarrhea and Malnutrition: a Challenge for Paediatricians'. *Journal of Gastroenterology & Nutrition*, 22(1): 6-16.
- Guerant, R.L., Bern, C. and Kosek (2003) 'The Global Burden of Diarrheal Disease as Estimated from Published between 1992 and 2000'. *Bulletin of World Health Organization*, 81(3): 107-204.
- Halder, A.K., Tronchet, C., Akhter, S., Bhuiya, A. and Johnston, R. and Luby, S.P. (2010) 'Observed Hand Cleanliness and other Measures of Hand Washing Behaviour in Rural Bangladesh'. *BMC Public Health*, 10: 545.
- Huffman, S.L. and Combest, C. (1990) Role of Breast-feeding in the Prevention and Treatment of Diarrhea. *J.Dirrhoal Dis Res*.
- Jegede, A.S. (2010) *African Culture and Health*. Ibadan: Book Wright Publishers.
- Jeong, J.S., Choi, J.K., Jeong, I.S., Paek, K.R. and Park, K.D. (2007) 'A Nationwide Survey on the Hand Washing Behaviour and Awareness'. *Journal of Preventive Medicine and Public Health*, 40(3): 197-204.
- Khan, M.U. (1982) 'Interruption of Shige Ilois by Hand Washing Transaction of the Royal Society of Tropical Evidence and Hygiene. 76(2): 164-68.
- Limlim, R. (2008) *Goodwill Message During the National Launch of Hand Washing Campaign held At Sheraton Hotel and Towers Abuja on May 22, 2008*. Available at http://www.unicef.org/nigeria/media_2364.html.
- Luby, S.P., Agboatwalla, M., Painter, J., Altaf, A., Billhimer, W., Keswick, B. and Hoekstra, R.M. (2006) 'Combining Drinking Water Treatment And Hand Washing For Diarrhea Prevention, A Cluster Randomized Controlled Trial'. *Tropical Medicine & International Health*, 11(4): 479–89.
- Macgregor-Skinner, G., Mendoza, C., Chiller, T.M., Acevedo, B., Keswick, B. and Luby, S. (2003) Safe water and diarrhoea: what determines sustained use of a home water treatment product.
- Magbagbeola David Dairo, Tosin Faisal Ibrahim, Adetokunbo Taophic Salawu (2017) Prevalence and determinants of diarrhoea among infants in selected primary health centres in Kaduna north local government area, Nigeria. *The Pan African Medical Journal*, 28: 109. doi:10.11604/pamj-2017.28.109.8152.
- Mbakaya, B.C., Lee, P.H. and Lee, R.L.T. (2017) Hand hygiene intervention strategies to reduce diarrhoea and respiratory infections among school children in developing countries: A systematic review. *International Journal of Environmental Research and Public Health*, 14(4): 371. DOI: 10.3390/ijerph14040371.
- Nordqvist, C. (2015) Diarrhea: Symptoms, treatment and prevention. Web MD. www.webmd.boots.com/digestive-disorder/diarrhea. Retrieved 3/6/2015.
- NPC (2005) Population and housing census of federal republic of Nigeria.
- Oleribe, O.O., Salako, B.L., Ka, M.M., Akpalu, A., McConochie, M., Foster, M. and Taylor-Robinson, S.D. (2015) Ebola Virus Disease Epidemic in West Africa: Lessons Learned and Issues Arising from West African Countries. *Clinical Medicine*, 15(1): 1-4.



- Quattrin, R., Filiputti, E. and Brusaferrero, S. (2015) Health Promotion Campaigns and Mass Media: Looking for Evidence. *Primary Health Care*, 5: 190. *Doi: 10.4172/2167-1079.1000190*.
- Radlovic, N.P., Lekovic, Z., Vuletic, B. and Simic, D. (2015) Acute Diarrhea in Children. *Srpski archive za celokupno*, 143: 755-762.
- Seimetz, E., Slekiene, J., Friedrich, M.N.D. and Mosler, H.J. (2017) Identifying behavioural determinants for interventions to increase handwashing practices among primary school children in rural Burundi and urban Zimbabwe. *BMC Research Notes*, 10: 280. <http://doi.org/10.1186/s13104-017-2599-4>.
- Seryautami, T., Sermsri, S. and Chompikul (2012) 'Proper Hand Washing Practices Among Elementary School Students in Selat Sub District Indonesia'. *Journal of Public Health and Development*, Vol 10.
- Sifat, E. and Nepal, C. (2013) Exploring the gap between hand washing knowledge and practices in Bangladesh: a cross sectional comparative study. *BMC Public health*. <https://doi.org/10.1186/1471-2458-13-89>.
- Spencer, L., Ritchie, J. and O'Connor (2003) 'Analysis: Practices, Principles, and Processes, in Ritchie, J. and Lewis, J. (eds.), *Qualitative Research Practice. A guide for Social Science Students and Researchers*, London: Sage Publications, 199-218.
- The United Nations Children's Fund (UNICEF)/World Health Organization (WHO) (2009) *Diarrhea: Why children are still dying and what can be done* WHO Press, World Health Organization, 20 Avenue Appia, 1211 Geneva 27, Switzerland.
- Thiam, S., Diene, A., Fuhrmann, S., Wiinkler, M., Sy, I., Ndione, J. and Schindler, C. (2017) Prevalence of diarrhoea and risk factors among children under five years old in Mbour, Senegal: A cross-sectional study. *Journal of Infectious Disease and Poverty*, Biomed central. <http://creativecommons.org/publicdomain/zero/1.0/>.
- Traore, E., Cousen, S., Curtis, V., Mertens, T., Tall, F., Kank, B., Diallo, I., Rochereau, A. and Chiron, J.P. (1994) 'Child Defecation Behaviour Stool Disposal Practices and Childhood Diarrhea in Burkina Faso: Result from a Case Control Study'. *Epidemiology Community Health*, 18(3): 270-275.
- Unicef/Nigeria (2007) *WASH Programme available online* www.unicef.org/nigeria/wash_2165.html.
- WHO (2013) 'Diarrhea Disease Facts Sheet' No. 330.
- Wikipedia (2015) *Oyo State* available online: en.m.wikipedia.org/wiki/Oyo_State. Accessed on 26/11/2015.
- World Bank (2003) *Water - A priority for responsible growth and poverty reduction: An agenda for investment and policy change*. World Bank: Washington, DC.
- World Health Organisation (2002) 'The World Health Report 2002: Reducing Risk Promoting Health Life'. (WHO/WHR/02.1) Geneva.
- World Health Organisation (2003) *Treatment of Diarrhea: a Manual for physician and other senior health workers*. (WHO/FCH/CAH 3.7) Geneva.
- World Health Organization (2008) *Protecting Health from Climatic Conditions- World Health Day 2008*. World Health Organization, Geneva.
- World Health Organization (2017) *Evidence for Hand Hygiene Guidelines*. Available online www.who.int.
- WHO (2009) *Why children are still dying and what can be done*. www.who.int/maternal/child-adolescent/documents/9789241598415/en.