International Journal of Science and Research (IJSR)
ISSN: 2319-7064
SJIF (2020): 7.803

Households' Hygienic Practices that Contribute to Recurrent Cholera Outbreaks in Homa - Bay County, Kenya

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Abstract: ***The study objective was to determine hygienic practices among household members that contribute to severe diarrhea leading to hospitalization in Ndhiwa Sub - County. This was a survey research design, which was cross - sectional analytical in nature and involved 400 participants. Data was collected and analyzed using SPSS. There was statistically significant relationship between severe diarrhea leading to hospitalization and existence of HWFs (chi - square = 14.348, p = 0.000 < 0.01), signs of latrine use (chi - square = 3.353, p = 0.043 < 0.05). It is concluded that there is a relationship between households' hygienic practices and severe diarrhea leading to hospitalization.***

Keywords: Household head, cholera outbreak, hygienic practices, improved latrine, hand washing

1. Introduction

Cholera is a disease of public health importance. The disease causes considerable loss of life and socioeconomic disruption. The disease causes panic, interrupt the social economic framework, as well as hinder development within the affected population. Cholera disease causes an approximated 3 to 5 million cases as well as 100000 to 120000 deaths in a year globally. Epidemic cholera disease has continued in most of African nations since the 7th pandemic hit the continent in 1970 (Gretchen, 2015). Kenya has registered many waves of epidemics resulting in significant morbidity as well as mortality. Cholera is endemic in Kenya.

The access to sanitation within Kenya is a major challenge, for example, in Homa Bay County, less than a quarter of the population (22%) have access to improved sanitation, and over a third (39%) do not have any latrines at all but use open spaces (WSP, 2014). In Kenya, there is 65% overall access to sanitation, with a 56% and 79% coverage in rural and urban areas respectively (KDHS, 2015). These statistics demonstrate that more than 6 million citizens in Kenya may be defecating in the open that causes diseases such as cholera (CIA, 2012). Access to sanitation in Ndhiwa Sub - County stands at 61% (MOH, 2016), which might be the reason for recurrent cholera outbreaks in the sub - county. For that reason, this study sought to establish households' hygienic practices that contribute to recurrent cholera outbreaks in Ndhiwa Sub - County.

This research helped in understanding as well as documenting the household practices that contribute to severe diarrhea leading to hospitalization in Ndhiwa Sub - County. This is significant in bringing to an end such a trend in the region and make the realization of health and development outcomes likely. The information assembled, has given background information needed for designing successful, evidenced based, and focused strategies to curb recurrent cholera disease in Ndhiwa Sub- County. Additionally, the information assembled is significant to policy makers as well as program developers executing programs on water and environmental health projects. The findings of this study inform focused strategies and programs for eliminating cholera outbreaks in the country.

2. Literature Review

Many studies have been conducted regarding cholera outbreaks. For example, a study by Taylor et al. (2015), demonstrates that epidemics of cholera may be linked to climate as well as climatic occurrences. Besides, Robert (2015), finds that in Ndhiwa Sub County, cholera outbreaks are preceded by duration of warm weather. These findings are supported by MOH (2015) that affirms that in Ndhiwa Sub County, epidemics of cholera are more often than not affected by variability of climate. Besides, heavy down pour is always a significant issue in surface water contamination with slurry or sewage; for that reason, causes outbreak of cholera. It is noted that in period of flood, cases of diarrhea are increased probably six times compared to the expected endemic (Taylor et al., 2015). These studies have highlighted reasons for cholera outbreaks, reasons cholera outbreaks have been continuing, theories of cholera outbreaks, as well as consequences of cholera disease but failed to address household practices that contribute to recurrent cholera outbreak. This study will be limited to Ndhiwa Sub - County and fills the knowledge gap of recurrence of cholera outbreak.

3. Methodology

A cross - sectional analytical study design was used among the randomly selected study participants. The study was carried out within Ndhiwa Sub - County, Homa - Bay County, Kenya. Ndhiwa Sub - County is selected because of repeated outbreaks of cholera in the sub county. The target population for the study included 400 household heads within Ndhiwa Sub - County.

After collection, data was cleaned and coded. Thematic analysis from responses was done. Quantitative data from

the field was checked daily for completeness and coded for appropriate computer entry. Data was analysed by SPSS version 20. Descriptive and inferential statistics are used where descriptive included frequencies and percentages and inferential statistics comprised of cross tabulation and chi - square, which were used to test the significance of the association between the dependent and independent variables.

4. Analysis

4.1 Socio - Demographic Characteristics

A total of 400 respondents participated in the study. Eight demographic variables, as per the questionnaire, were investigated. Result in Table 4.1 presents the socio - demographic characteristics of the study respondents.

Table 4.1: Socio - Demographic Characteristics of the Study Respondents

Variable	*Frequency (%)*
Socio - demographic variables (N = 400)	
Ward (area of residence)	
Kanyadoto	92 (23.0%)
Kologi	122 (30.5%)
North Kabuoch	186 (46.5%)
Gender	
Female	299 (74.8%)
Male	101 (25.2%)
Age	
18 – 27 years	84 (21.0%)
28 – 37 years	122 (30.5%)
38 – 47 years	88 (22.0%)
48 years and above	106 (26.5%)
Marital status	
Married	373 (93.3%)
Single	15 (3.8%)
Widow	12 (3.0%)
Number of household members	
1 - 3	126 (31.5%)
4 - 6	191 (47.8%)
7 and above	83 (20.8%)
Level of Education	
No formal education	65 (16.3%)
Primary	213 (53.3%)
Secondary	90 (22.8%)
Tertiary	32 (8.0%)
Occupation	
Casual	14 (3.5%)
Peasant farmer	307 (76.8%)
Professional	27 (6.8%)
Trader	42 (10.5%)
Others	10 (2.5%)

4.2 Perceived Causes of Cholera

The study also sought to find out whether or not the participants were aware of the cause of cholera. From the findings, it was established that the participants agreed that the most common causes of cholera were poor hygiene or not washing hands, 293 (73.3%); drinking unsafe water, 292 (73.0%) and eating bad food, 266 (66.5%) as shown in figure 4.1.

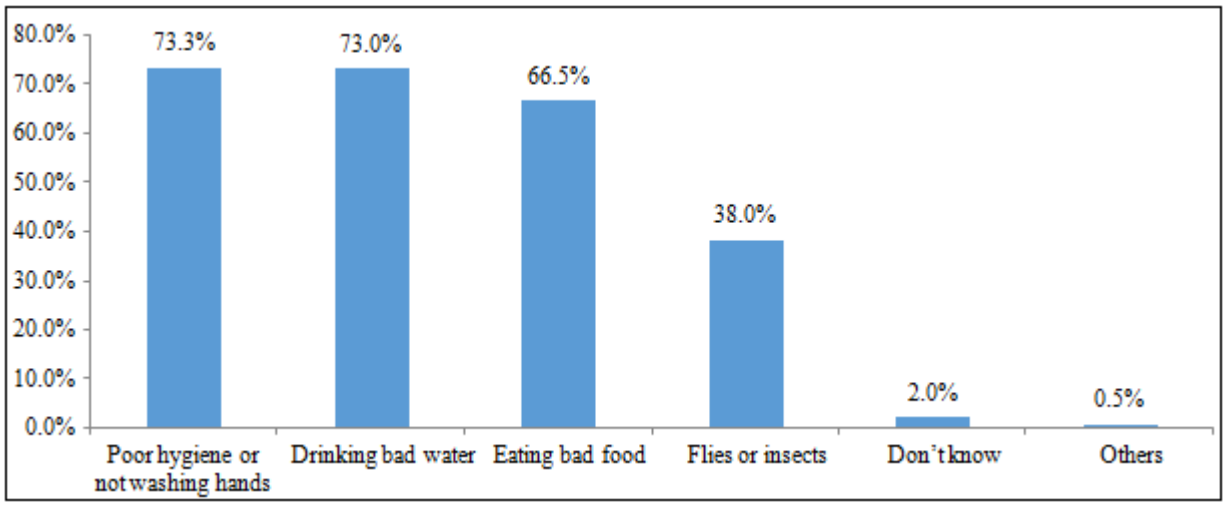

Figure 4.1: Perceived Causes of Cholera

4.3 Hypothesis Testing

A cross tabulation and a chi - square test was done to ascertain the relationship between households' hygienic practices and severe diarrhea leading to hospitalization. This was to test a null hypothesis that there is no relationship between households' hygienic practices and severe diarrhea leading to hospitalization in Ndhiwa Sub - County, Homa - Bay County.

Table 4.2: Relationship between severe diarrhea leading to hospitalization and households' hygienic practices

Variable	Category	Occurrence of severe diarrhea disease in the last one year leading to hospitalization		Degrees of freedom	Chi square - value	P - value
		Yes	No			
Place of washing hands exists	Yes	60.2% (100)	39.8% (66)	1	14.348	0.000
	No	41.0% (96)	59.0% (138)			
Pit latrine or toilet exists	Yes	52.7% (164)	47.3% (147)	1	7.795	0.004
	No	36.0% (32)	64.0% (57)			
Signs that latrine or toilet is in use	Yes	51.7% (154)	48.3% (144)	1	3.353	0.043
	No	41.2% (42)	58.8% (60)			
Evidence of open defecation	Yes	41.7% (48)	58.3% (67)	1	3.405	0.041
	No	51.9% (148)	48.1% (137)			
Evidence of waste management	Yes	54.0% (109)	46.0% (93)	1	4.018	0.028
	No	43.9% (87)	56.1% (111)			

5. Discussions

5.1 Education Level

The study respondents demonstrated low levels of illiteracy, with majority 213 (53.3%) having primary education. Education level directly affects decision making process for a respondent and their acceptance of appropriate latrine practices. It emerged that latrine usage was 100% among those with tertiary level of education; this is a good finding as education helped households to accept appropriate practice of cholera prevention through properly disposing their fecal matter. These results are consistent with the findings of Rachael (2015) which showed that education is important in decision making.

5.2 Knowledge on Cholera Disease

The results revealed that 39% of respondents were knowledgeable on cholera signs or symptoms. This is a low knowledge level because it cannot help in breaking the transmission cycle of the disease. It emerged that 48% of the respondents were knowledgeable on transmission routes of cholera disease, which denotes that 52% are not aware of cholera transmission routes; such a knowledge level on cholera transmission route is inadequate in ensuring effective control.

The results showed that 63% of the respondents were knowledgeable on cholera preventive measures. Similarly, research by Nguyen et al. (2014) revealed that some behavioral practices can lead to epidemics of cholera. Some of such behavioral practices range from food handling to hygiene issues. Not washing of hands with soap before food handling or eating, after defecation, and unhygienic preparation or conservation of food is linked with cholera outbreak. Additionally, studies by Marx et al. (2010) and Guerrant, Walker, and Weller, (2011) show that individuals washing their hands prior to eating as well as after visiting the toilet are at lower risk of infection with cholera.

The findings of the current study show that there is a knowledge gap as 61% of respondents being ignorant of cholera signs, 52% of respondents are not aware of cholera transmission routes, and 37% of respondents are not aware of cholera prevention measures. The results also indicate that those respondents with knowledge on cholera have a high latrine use compared to their counterparts without knowledge on cholera disease who had lower latrine coverage. Practicing open defecation is a risk factor for cholera disease because fecal matter is the main source of pathogens causing diarrhea or cholera. Minority of the respondents demonstrated low knowledge of cholera signs/symptoms and transmission routes, which is contrary to findings of Water Sanitation Program (WSP) (2014), which showed that limited awareness/knowledge on hygiene are significant barriers to promoting latrine use. Another study by Nyambedha et al. (2013) concluded that living within a dirty setting, consuming contaminated water, as well as limited provision and use of latrines causes cholera; findings which are similar to the results of this study.

5.3 Latrine Provision and Use

The results of this study showed that 78% of the respondents in Ndhiwa Sub County had latrines. This is not good enough because for cholera prevention, everyone must use latrine appropriately. Among those who had latrines, it emerged that 83% had regular pit latrines, 17% had ventilated improved pit latrines, and none had flush toilet. Regular pit latrines can act as open defecation site if they lack hand washing facilities, aperture cover, or vent pipes to control flies as there exist possibility of coming into contact with fecal matter. This added to the proportion that practices open defecation can be said as the cause of recurrent cholera outbreaks in Ndhiwa Sub County. The study also revealed that respondents who did not have latrine either used bush (45%), used cat method (41%), shared with neighbors (22%), or open defecated (3%). It has been shown that VIP latrines or flush toilets are the best in completely creating barrier between fecal matter and human waste (Ambe, 2016). These findings are similar to results of another study by Budhathoki et al. (2017) that showed that 76.9% had pit latrines and the remaining proportion practiced open defecation. Similarly, according to WHO (2010), latrine provision and usage has a linkage to severe diarrhea leading to hospitalization. Open field defecation remains a major way of contaminating unprotected sources of water and environment causing outbreaks of cholera. The findings of this study also matches those of Nelson and Williams (2014), which also links fecal matter contamination to cholera disease.

5.4 Hand Washing Facilities Provision and Use

One of the best ways of preventing cholera outbreaks include hand washing with soap at critical times. The study showed that 42% of participants had hand washing facilities.

This is a low percentage for effective cholera prevention. The study determined times of hand washing among respondents and it emerged that 88.3% washed their hands before eating, 63% washed hands after eating, and 83.6% washed hands after visiting a toilet. It is important that those washing hands after visiting latrines were above 80% which is a good practice for cholera prevention. However, the intervention of hand washing can only be effective if the water used is safe. A study by Rachael (2015) also revealed that hand washing was effective in preventing diarrheal cases leading to hospitalization. Hand washing at critical moments, for example, after visiting latrines is best practice in preventing cholera outbreak.

5.5 Water and Sanitation Practices

The study revealed that main water sources included wells/springs (54.5%) and rivers (23.75%). These water sources are certainly not safe for drinking. The challenges of cholera transmission through unsafe water in Ndhiwa Sub County can arise from contamination with fecal matter because 22% of the respondents do not have latrines, and majority of them confessed they buried or threw it away or open defecated. The results show that only 65% of the respondents can access sufficient water supply throughout the year. Therefore, inadequate supply of water coupled with unsafety challenges is a matter requiring redress to tackle recurrent cholera outbreak. The study shows that 87% of respondents treat drinking water, which means 13% do not treat drinking water. Under such circumstances, consuming untreated water inevitably exposes residents of Ndhiwa Sub County to risks of diarrhea or cholera diseases, which can easily be transmitted because majority (52%) of the respondents have also shown low knowledge on cholera transmission. The main method of water treatment is chlorination at 69%. Ideally, with limited water treatment practice among the households and water scarcity, consuming untreated water is inevitable, which exposes the population to risks of suffering cholera. Treatment of drinking water must be emphasized as it is the most effective control measure for controlling cholera outbreak associated with consuming unsafe water. These findings are in tandem with germ theory. Snow reasoned that the germ was transmitted or passed from an individual to another via drinking water (Friis& Sellers, 2014).

5.6 Waste Management

The study revealed that the main source of solid wastes among residents of Ndhiwa was food remains at 86.5%. Other sources of wastes included vegetation leaves, clothing, used bags, and plastic bottles among other sources. The findings on disposal of solid and liquid wastes revealed that a majority of the households practices crude dumping at 58% for solid wastes and 92% crude dumping for liquid wastes. The practice of managing wastes through crude dumping is dangerous since decomposing wastes offer encouraging environment for breeding of vectors, a basic agent for transmitting cholera. Nelson and Williams (2014), in their study, confirmed that decomposing domestic and excreta offer a favorable condition for vector breeding that is important for transmission of cholera. Their research shows that cholera is a feacal oral sickness; housefly can transmit cholera especially in areas with indiscriminate waste disposal. A research by Loukas (2016), isolated as well as identified v. cholera, which is from housefly from a region of low socio - economic status where the disease (cholera) was a problem. Additionally, a study by Dipika et al. (2007) confirms that garbage accumulation caused cholera outbreak among people living within congested regions.

5.7 Hypothesis Testing

It emerged that 60.2% of the households that had a facility for hand washing and soap reported severe diarrhea leading to hospitalization. This was a negative relationship because the expectation is that households with hand washing facilities should report fewer cases of severe diarrhea. This can also be attributed to some households using unsafe water for hand washing. Additionally, the negative relationship could be because of the households owning hand washing facilities were not actually practicing hand washing.

In - terms of existence of the pit latrine or toilets, it was observed that 52.7% in the household that were observed as having pit latrine or toilet, reported that a member of the family had suffered a severe diarrhea disease leading to admission in the last one year. This is a negative relationship that could be explained by not using the latrines properly. It was worrying to note that 51.7% of the households that had signs of the pit latrine or toilet being used reported having severe diarrhea disease leading to hospitalization, which could either be attributed to lack of hand washing facility or using unsafe water for hand washing, or the response on severe diarrhea could have been largely subjective.

From the tabulation, severe diarrhea leading to hospitalization was noted on 41.7% of the households where there was observation of open defecation. Additionally, from the tabulation, severe diarrhea leading to hospitalization was noted on 54.0% for the households with evidence of waste management. In these two cases, there was a negative relationship between the independent variables and the dependent variable. Open defecation contaminates water sources, land, and flies transmits disease causing pathogens. On waste management, it could be that waste management was not procedurally done especially disposal.

Based on these findings, it can be deduced that there was statistically significant relationship between severe diarrhea leading to hospitalization and: existence of facility for hand washing (chi - square = 14.348, $p = 0.000 < 0.01$), existence of latrine or toilet (chi - square = 7.795, and $p = 0.004 < 0.01$), signs that latrine or toilet are in use (chi - square = 3.353 and $p = 0.043 < 0.05$), evidence of open defecation (chi - square = 3.405 and $p = 0.041 < 0.05$) and evidence of waste management (chi - square = 4.018 and $p = 0.028 < 0.05$).

6. Conclusion

The researcher therefore rejects the null hypothesis and concludes that there is a relationship between households' hygienic practices and severe diarrhea leading to hospitalization in Ndhiwa Sub - County, Homa - Bay County.

The study concludes that residents of Ndhiwa Sub County had low knowledge of cholera disease. This is because it emerged that 37% of respondents were ignorant of cholera causes, 52% of respondents were not aware of cholera transmission, and 61% respondents did not know about signs or symptoms of cholera disease.

The study concludes that access to latrine is inadequate in Ndhiwa Sub County. It emerged that 22% of respondents do not access latrine.

The study concludes that practice of hand washing at critical moments is insufficient in Ndhiwa Sub County. It emerged that 58% of respondents lacks hand washing facilities, soap, and running water availed for washing hands after visiting latrines.

The study concludes that access to safe water is inadequate in Ndhiwa Sub County. The main water sources are wells and rivers. Water safety is affected by contamination and scarcity caused by drought or distance; all of which poses a challenge to the community members.

The study concludes that the environment provides conducive breeding sites for disease causing organisms in Ndhiwa Sub County. It emerged that compounds of the respondents are dirty due to indiscriminate disposal of wastes; 58% practices crude dumping of solid wastes and 94% practices crude dumping of liquid wastes.

7. Future Scope

The research proposes a study on value of San - Mark (sanitation marketing) techniques as a way of increasing sustainable use of latrines.

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