

Community overview on the differential prevalence of Hepatitis E in two Sub Counties in Kitgum District: A qualitative study

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Research Article

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Abstract

Background

There was an epidemic of Hepatitis E infection in Kitgum District in 2007. More than 10,422 people were infected, and over 166 deaths were registered due to the Hepatitis E virus. Kitgum District Health Management Information Systems (HMIS) showed that Hepatitis E cases continued to occur more in Mucwini than Kitgum Matidi Sub County despite instituting similar epidemic control measures in the two communities. The tenacity of the virus in Mucwini Sub County had remained unclear.

Objective

To assess communities' views and perspectives on the differential prevalence of Hepatitis E in the two Sub Counties of Kitgum Matidi and Mucwini in Northern Uganda.

Methods

A cross-sectional study using qualitative methods was conducted. Four Focus Group discussions and six key informant interviews were conducted with village health teams, local council chairpersons, health workers, and community members. These persons were chosen purposively because of their expertise and experience in community and health services. Face-to-face interview guides were administered to obtain detailed information on factors associated with the differential occurrence of Hepatitis E in the two Sub Counties. This study was approved by a local IRB and Uganda National Council of Science and Technology (UNCS&T).

Results

The most significant findings from this study were the differences in prevention and control practices in the two communities. Residents of Mucwini were less compliant to infection, prevention, and control guidelines, and disagreements between local councilors and village health teams in Mucwini led to poor implementation and non-adherence to guidelines on community control of Hepatitis E.

Conclusion

A differentially higher prevalence of Hepatitis E in Mucwini than Kitgum Matidi Sub County resulted from poor personal and community hygiene and non-adherence to behavior change communication among residents Mucwini compared to their counterparts in Kitgum Midi. The authors recommend a more proactive approach in managing the epidemic by securing the willingness of the affected community to adopt appropriate infection prevention and control guidelines. In addition, disagreements among stakeholders should be resolved timely so that all community members adhere to control measures.

Background

Hepatitis E virus (HEV) is one of the five viruses that infect the liver and causes acute viral hepatitis [1]. This non-enveloped, positive-sense, single-stranded RNA (Ribonucleic acid) virus belongs to the hepevirus genus that resembles calicivirus morphologically and organizationally on its 7.5kb genome [1]. The "E" was chosen to illustrate its enteric, endemic, and epidemic qualities that capture its epidemiology [1]. "E" also made sense alphabetically because Hepatitis A, B, C, and D viruses had already been identified as causing hepatitis (liver inflammation) in humans [1]. According to the World Health Organization (WHO, 2001), the virus is spread in the stool of infected persons and is primarily spread through the consumption of fecal water or food [1,2].

Hepatitis E is an acute gastrointestinal illness in people and is highly age-specific among persons between 15 and 45 years [3]. It has higher case fatality rates in women during the third trimester of pregnancy which constitutes almost 30% of the specific group [4].

The risk factors of HEV infection are related to poor sanitation and shedding of the virus in feces [1]. Person-to-person transmissions are usually uncommon [1,2]; however, predisposing factors include international travelers to regions of the world where hepatitis E is endemic [1,5]. After the catastrophe, refugees residing in overcrowded temporary camps, persons with chronic liver diseases, and possibly persons working with non-human primates such as pigs, cows, sheep, donkeys, and goats are potential sources of the virus and significant risks [6].

The first documented cases of Hepatitis E in Northern Uganda were described in Madi Opei Sub County in Lamwo district in 2007 [7]. The Hepatitis E epidemic spread from Madi Opei in Lamwo District to involve all the 19 Sub Counties in the neighboring Kitgum District [7,8]. More than 10,422 people were infected, and over 166 deaths were registered due to the virus [8]. The case fatality rate in Kitgum District was reportedly 1.59% (Unpublished Hepatitis E Surveillance report, 2008) [9]. Authors have suggested that the Hepatitis E infection caused more morbidity and mortality in the Acholi sub-region than any other epidemic. In addition, the Hepatitis E epidemic also spread to other neighboring districts of Amuru, Gulu, Pader, Kotido, Yumbe, and Kaabong [8].

The district epidemic response task force instituted interventions to address identified risk factors for the Hepatitis E virus. These interventions included surveying to identify contaminated and unprotected water sources, sinking more boreholes, initiating water chlorination at water collection points and household levels, distributions of jerry cans and soaps, digging more pit latrines, health education and hygiene, supportive care especially for pregnant women who were reported to have severe clinical manifestations of the disease [8].

Kitgum District Health Management Information Systems (HMIS) showed that Hepatitis E cases continued to occur more in some Sub Counties than others despite instituting the same epidemic control measures in all Sub Counties in Kitgum District since the major Hepatitis E epidemic in 2007 [8,9]. The reasons for the persistence of Hepatitis E virus in some Sub Counties had by the time of this study remained unclear.

Explanation of the conceptual framework

Many factors contributed to the differential prevalence of Hepatitis E in the two communities. These could be classified as individual factors, including communal hand washings, poor water storage practices coupled with poor household hygiene, poor excreta disposal, and improper animal rearing with littered excreta in household compounds. These factors aided the person-to-person transmission of Hepatitis E in the community. The socio-demographic characteristics, for example, age, sex, head of households, and the level of education, interplay with the socio-cultural factors that resulted in the spread of the virus at the household level.

Community factors included knowledge, attitude, awareness, and practices on Hepatitis E, level of understanding, health-seeking behaviors, and community literacy levels. Poor sanitation led to continuous shedding of the organism in the environment, leading to contamination of community water sources, which led to the propagation/spread of the disease.

The health system factors such as health education/mobilization, accessibility, availability, the commitment of the health staff, and lack of commitment by the task force contributed to more cases of Hepatitis E in Mucwini than Kitgum Matidi Sub County in Kitgum District.

This study aimed to assess Communities' views and perspectives on the differential prevalence of Hepatitis E in the two Sub Counties of Kitgum Matidi and Mucwini in Northern Uganda.

Methods

Study design: This study was cross-sectional and used qualitative methods for data collection. This was part of a more extensive study designed to determine factors associated with the differential occurrence of Hepatitis E in two Sub Counties in Kitgum District.

Study settings: This study was conducted in Mucwini and Kitgum Matidi Sub Counties in Kitgum District. The two Sub Counties were chosen because of the differential prevalence of Hepatitis E in the two communities, as reported in the monthly Kitgum District surveillance team meeting.

Kitgum District is located approximately 452 kilometers north of Kampala, the capital of Uganda. It is bordered to the north by Lamwo District and South Sudan, to the east by Kaabong and Kotido Districts, to the south by Pader and Agago Districts, to the west by Gulu and Amuru Districts. Kitgum District has an estimated total population of 254,000 people.

Kitgum District comprises one County, Chua, with 10 Sub Counties, 13 parishes, and 112 villages. Machine Sub County has a population of 23,423 inhabitants with nine parishes and 65 villages, while Kitgum Matidi has a population of 20,356 inhabitants with four parishes and 47 villages.

Kitgum District has seven health centers II, eight Health centers III, and two Health Center IV at the health sub-district level. It has one General Hospital and one private and not-for-profit faith-based Hospital (FBH), St. Joseph's Hospital. The General Hospital is a 360-bed capacity, while the private not-for-profit, St. Joseph's Hospital, is a 250-bed capacity hospital.

The study population: The study participants were Kitgum District Health Officer, In-charges of HC III, Chairpersons LC III of the two Sub Counties, Chairperson of LC1s, and the village health team members Mucwini and Kitgum Matidi Sub Counties.

The study participants: The study population comprised the District Health Officer (DHO), Health Center III in-charges, local council chairpersons, and members of the village health team (VHT). These persons were selected because they influenced the community's socio-cultural, sanitation, and health-related views because of their knowledge, attitudes, and practices on Hepatitis E. They had in-depth knowledge of the community settings and occurrence of Hepatitis E. They were also critical stakeholders in implementing health-related policies and thus were well placed to give solutions to the Hepatitis E epidemic in their areas.

Sampling and field procedures

Key informant interviews: Participants for key informant interviews were Health Center III in-charges of Mucwini and Kitgum Matidi, Local Council chairpersons III of the two Sub Counties, and the District Health Officer (DHO) of Kitgum District. These persons were chosen purposively because of their expertise in community and health matters and experience with the population. A face-to-face interview guide was administered to obtain information on factors associated with the differential occurrence of Hepatitis E in the two Sub Counties.

Focus Group Discussions (FGDs): A total of four focus group discussions were held with members of the village health team (VHT) and LC 1 Chairpersons. These participants were chosen because of their experience and expertise in clarifying relationships between the community and health services and their ability to reflect on the general community's perspectives and views. In Mucwini Sub County, focus group discussions were held at the Sub County headquarters. In contrast, in Kitgum Matidi, focus group discussions were held in the waiting room of Health Centre III. The focus groups comprised 11-13 members of 6 females and seven males aged 25-37 years. All participants had attained at least seven primary levels of education. Discussions were held in the local language, guided by the principal investigator, who two research assistants assisted. The team obtained written informed consent, noted down the proceedings and other non-verbal expressions in notebooks. In addition, proceedings were audiotaped recorded to provide backup information from participants.

Data collection methods and tools: Qualitative data were collected using key informant (KI) interviews using KI guides (*Additional file A1*) and focus group discussions (FGDs) using FGDs guides (*Additional file A2*). The principal

investigator moderated all consultations and discussions and assisted research assistants who took notes on the meeting proceedings. Interviews and discussions lasted between 45-60 minutes.

Data quality control: To collect quality data for this study, research assistants were trained, were familiar with health care delivery systems, had prior experience in data collection, and were identified by the Kitgum District health office. In two days of training, research assistants were taught interviewing skills, correct recording of responses, and correct identifying methods. The movement emphasized strict adherence to procedures laid down in the proposal. Additionally, all data collection tools were translated to Acholi, the language spoken by most participants. The interview and focus group discussion guides were pre-tested among community members who were not part of the main study. Results of the pretest were used to determine the flow and consistency of the instruments. The principal investigator administered these interviews and focused group discussion guides (Additional file A1 and A2) and was assisted by research assistants. In addition, the principal investigator conducted interviews by traveling to the two Sub Counties, arranged, and completed data collection herself.

Data Analysis: Responses from KIIs and FGDs were summarized, and critical quotes were included in the results presented on infection, prevention, and control practices in the two Sub Counties.

Ethical Considerations: This study was approved by Makerere University School of Public Health Higher Degrees Research and Ethics Committee and the Uganda National Council of Science and Technology (UNCST). Administrative approval was obtained from the office of the District Health Officer of Kitgum District and Local Council III Chairpersons at the Sub County headquarters. Investigators explained the study’s purpose, risks, and benefits to the community members before requesting them to participate.

Each respondent gave informed consent, and the team ensured that the confidentiality of their information was preserved throughout and after the study. The research team confirmed that no respondents’ names were recorded in data collection tools but used unique identifiers.

Results

Four focus group discussions were conducted with the local council chairpersons 1 (LC 1) and village health teams (VHTs) in the two Sub Counties. Key informant interviews were conducted with the Kitgum District Health Officer, in-charges of HC IIIs, and LC III chairpersons of the two Sub Counties.

The prevalence of Hepatitis B in Mucwini and Kitgum Matidi Sub Counties

According to the study, 97(41.99%) participants from Mucwini were reported to have had cases of Hepatitis E in their household compared to 63(26.47%) in Kitgum Matidi Sub County.

Table 1
Two by two table showing proportion of households with a reported member of the family having Hepatitis E by Sub County

Sub County	Suffered from Hepatitis E		Total
	No	Yes	
Kitgum Matidi	175(73.53%)	63(26.47%)	238(100%)
Mucwini	134(58.01%)	97(41.99%)	231(100%)
Total	309(65.88%)	160(34.12%)	469(100%)

Table 1 shows a two-by-two table, and the reported prevalence of Hepatitis E is higher in Mucwini Sub County 97(41.99%) than in Kitgum Matidi 63(26.47%) at 95% Confidence Interval (95% CI): $\chi^2 = 1.61$, 95% CI:1.39-1.87; $p < 0.001$.

The difference in the prevalence of Hepatitis E in the two Sub counties was discussed by respondents in the vital informant Interviews (KIIs). Ranking the most typical health problems that affected the Sub County in 2011, the LC III chairperson of Mucwini Sub County said, *".....Hepatitis E was very serious, followed by malaria, chest infection, and HIV. Many pregnant women had stillbirths and miscarriages due to this yellow disease. Many people in my community resorted to local herbs and traditional healers for the solution."*

The counterpart in Kitgum Matidi said, *"Respiratory infection, malaria, and abdominal complaints were major health-related problems affecting the sub-county. Hepatitis E did not affect many of us because the village health team and LC 1 Chairpersons."*

Hepatitis E prevention practices in homesteads in Kitgum Matidi and Mucwini Sub Counties

The report from the study showed that the percentage of homesteads that used pit latrine correctly, ate hot food, and washed hands after latrine use during the Hepatitis E epidemic were higher in Kitgum Matidi compared to Mucwini Sub County. It was not surprising that a more significant proportion of participants from Mucwini had not participated in proper Hepatitis E prevention practices compared to their counterparts in Kitgum Matidi.

Hepatitis E prevention practices in homesteads in Kitgum Matidi and Mucwini Sub Counties in Kitum district.

Reports from the study show that communities from the two Sub Counties responded differently to their communities' infection, prevention, and control practices on Hepatitis E. The differential occurrence of the virus may be related to the community practices to the epidemic.

Figure 2 shows the percentages of homesteads that used pit latrines correctly, ate hot food, drank clean water, and washed hands after using the restroom, higher in Kitgum Matidi Sub County than Mucwini.

A member of the village health team (VHT) in a focus group discussion from Mucwini said, *".....people in our community do not listen to what is always communicated. Other people up to now do not use pit latrines but go to the bushes for defecation, claiming that they have been recommended not to do hard work, for example, digging pit latrines in their homes."*

Another member in the same group from Mucwini lamented, *".....the community is used to getting free items like they were previously in the Internally Displaced Peoples (IDP) camps where things were given free even items for digging, jerrycans and soap."*

The laxity in the use of pit latrines was mentioned as a challenge during the critical informant interview with the Mucwini Sub County local council III chairperson who said, *"..... latrine coverage in this Sub County is still low at 45%. Most residents share latrines or use bushes for defecation. Leaders (LC) of communities are relaxed to enforce some byelaws because VHTs are better paid."*

During one of the Focus Group Discussions (FGD), a member of the VHTs from Mucwini said, *"we have been advising our community against communal washing of hands during funerals and weddings, but the community here are resistant to these messages and continue to do so even during this epidemic."*

On the other hand, a member of the VHT from Kitgum Matidi said, *"We have advised the community against the practice of communal hand washings during ceremonies, and we see communities are following our advice during this epidemic. We are informed that communal hand washings only occur in homes among children before and after eating food"*.

In one of the focus group discussions in Mucwini Sub County, one LC 1 Chairperson said, *"we have advised community members to dig pit latrines, build standby water stand near the latrine, and encouraged members to use them correctly. We were dismayed to learn that some members have refused to dig pit latrines in many communities and continued to use bushes. In addition, they do not wash their hands after latrine use"*.

While in a focus group discussion in Kitgum Matidi Sub County, a councilor said, *“Ever since the Hepatitis E epidemic broke out here, many families have heeded to the health advice and have dug many pit latrines in their homes and used them correctly. In addition, they have constructed a water point for washing hands after latrine use. The community’s response has been very encouraging, and this collaboration is helping us reduce the number of new cases of the virus”*.

During one of the focus group discussions in the Mucwini sub-county, a member of the VHT said, *“We in Mucwini have had problems during the implementation of this epidemic control measures. We should agree to be frank today, especially on issues that affect leaders and health workers. We have been informed that councilors were not supporting our efforts in community health education due to differences in allowances paid to VHTs. This has made us have conflicting messages to the population during this tough time, and community response is feeble.”*

On the other hand, a VHT in Kitgum Matidi, in a focus group discussion, said, *“We have been having good meetings with the community, the local leaders, and VHTs. These meetings have helped us control the Hepatitis E virus in our community. The infection prevention and control messages have been taken up well by the community”*.

Discussions

This study showed a significant difference in Hepatitis E control practices among Kitgum Matidi and Mucwini Sub Counties residents. Residents of Kitgum Matidi were more likely to report better Hepatitis E infection, prevention, control, and practices compared to counterparts in Mucwini. This meant a difference in risks of suffering from Hepatitis E among households in the two Sub Counties even though they were in the same district. The difference in the community prevalence and practices on Hepatitis E in the two communities correlated with and was supported by reports from the Kitgum District Health Management System (unpublished HMIS report, Kitgum District, 2010) [8,9].

Studies elsewhere demonstrated a difference in risk of acquiring Hepatitis E within socio-demographic characteristics, such as age and gender, and not in communities [10,11]. A study conducted in a displaced population of Darfur found that more women were hospitalized compared to men [10]. This current study found no difference in the demographic characteristics of individuals within the two communities. Instead, it demonstrated a significant difference in the community prevalence and practices on Hepatitis E. Factors identified with the differential prevalence was related to poor personal and community hygiene, low community awareness, and inadequate infection prevention, control, and practices on Hepatitis E. We found that hand washings after visiting latrine as well as the frequency of communal hand washings were associated with the differential prevalence of Hepatitis E in the two Sub Counties. Kitgum Matidi were more likely to report hand washings after visiting latrines than their counterparts in Mucwini. This finding highlighted the critical aspect of household hygiene in spreading Hepatitis E infection. This was corroborated by another study in northern Uganda where households with two or more cases of Hepatitis E were associated with a family member having attended a funeral, washed hands in standard basins with others during functions, and were likely not to have washed hands after visiting latrine [12].

Similarly, a study conducted in the Lamwo district found that person-to-person transmission was highlighted as one factor that propagated the Hepatitis E epidemic secondary to contaminated water sources [12].

The source of drinking water and storage facilities were not associated with the differential prevalence of Hepatitis E in this current study. However, previous studies demonstrated that outbreaks were linked to contaminated water sources [13]. In addition, there was no association between domestic animal keeping and the differential prevalence of Hepatitis E in the study population, although this contrasted with a study conducted in Chad [11].

The most significant findings from this study were the differences in prevention and control practices in the two communities involving improvement of the hygiene condition and provision of drinking water as observed in another study [14]. Residents in Kitgum Matidi had better and more effective control prevention practices compared to Mucwini. Correct use of latrine, eating hot food, drinking clean water, and washing hands after latrine use were the prevention interventions residents in Kitgum Matidi practiced. On the other hand, less than 10% of residents of Mucwini washed hands after latrine use and drank clean water.

These differences in the Hepatitis E prevention practices in the two communities may have in part explained the observed differences in the community prevalence of Hepatitis E in the two Sub Counties.

Disagreements among implementors of the prevention strategies in Mucwini Sub County

Exciting reports from Mucwini showed that disagreements between stakeholders involved in managing the Hepatitis E epidemic contributed to the poor response of the community and, therefore, a differentially higher prevalence of Hepatitis E in Mucwini compared to Kitgum Matidi. This drew the authors' attention to suggest that indifferent messaging and disagreements between LCs and VHTs on the issue of personal benefits such as allowances significantly led to the higher prevalence of Hepatitis E in Mucwini Sub County. Authors argued that had this problem been identified early by supervisors of epidemic response in the district, an amicable solution would have been achieved, and the unnecessary morbidity and mortality suffered by residents of Mucwini would have been averted or at least minimally experienced in the Sub County. These authors view that, had the epidemic managers been on the ground, encouraged and practiced the principles of hand washings and getting disputes resolved as quickly as possible in the management of Hepatitis E epidemic, these higher numbers of cases would have been averted in Mucwini Sub County.

Resistance to behavior change communication messages in Mucwini Sub County

The authors noted that residents of Mucwini were less receptive to behavior change communication messages during the management of the Hepatitis E epidemic in their community. This was observed when residents preferred to participate in some selected activities but ignored the overall infection prevention and control guidelines from health workers. For example, residents continued to use bushes for defecation and refused to dig pit latrines in their homesteads. The authors reviewed this information and proposed that managers of the district level should have adopted a modified approach to this process in such situations. This would have involved the use and engagement of change agents, opinion leaders, local leaders, religious and others who could influence behaviors of communities in Mucwini where there was evident resistance to the health messages.

Adherence to traditional practices incompatible with the prevention and control of Hepatitis E.

The research team found that conventional practices such as communal hand washings during functions continued in Mucwini during the Hepatitis E epidemic. In addition, correct use of latrines and hand washings after latrine use was not practiced. Instead, residents of Mucwini preferred to defecate in the bushes and not wash their hands after latrine use. Authors argue that the insistence on the use of traditional practices among residents of Mucwini during the Hepatitis E epidemic may have in part contributed to a higher prevalence of Hepatitis E in Mucwini compared to Kitgum Matidi. These were confirmed from reports derived from the focus group discussions and key informant interviews.

Authors suggest that in the future, opinion leaders, traditional leaders, church leaders, and influential leaders would be engaged in such undertakings when the need for modification of traditional practices was required. In addition, law enforcement would be necessary to bar residents from doing actions that lead to persistent negative behaviors. This was expected to cause the changes required to allow the community to overcome the Hepatitis E epidemic, adversely affecting them.

In summary, these authors have argued that for an epidemic to be successfully managed, the community's willingness to accept and promote severe restrictions, forego their ways, and follow infection prevention and control guidelines were critical for successfully managing an epidemic [16]. These became evidenced as residents of Mucwini did not follow infection, prevention, and control (IPC) guidelines with resultant persistent and higher prevalence of Hepatitis E in their communities.

Strengths and limitations of this study

This study based its report on qualitative information from DHO, local leaders, and health workers. The qualitative data were triangulated to ensure that the recorded data in the KIIs and FGDS of the study were consistent and followed each other. Because they are qualitative information, it has limitations on its ability for generalizability in the broader context in the community where the study was conducted.

Conclusion

The differentially higher prevalence of Hepatitis E in Mucwini compared to Kitgum Matidi Sub County resulted from poor personal and community hygiene and non-adherence to behavior change communication messages among residents of Mucwini compared to counterparts in Kitgum Matidi. The authors recommend a more proactive approach in managing the epidemic by securing the willingness of the affected community to adopt appropriate infection prevention and control guidelines. In addition, disagreements among stakeholders involved in epidemic management should be resolved timely so that all members of the community's control measures are adhered to.

Abbreviations

HEV	Hepatitis E virus
MOH	Ministry of Health
LCs	Local Councilors
WHO	World Health Organization
HC	Health Center
ANOVA	Analysis of Variance
IDP	Internally Displaced Persons
FGDs	Focus Group Discussions
KIIs	Key Informant Interviews
UNCST	Uganda National Council of Science and Technology
VHTs	Village Health teams

Declarations

Ethical approval and consent to participate: This study was approved by Makerere University School of Public Health Higher Degrees Research and Ethics Committee and the Uganda National Council of Science and Technology (UNCST). Administrative approval was obtained from the office of the District Health Officer of Kitgum District, Local Council III Chairpersons at the two Sub County headquarters. Informed consent was obtained from each participant for this study.

Consent for publication: All participants consented to the publication of this information.

Availability of data and materials: The minimal data that supports this manuscript are available in the manuscript, and others can be accessed upon reasonable request to the corresponding author.

Competing Interests: All authors declare no conflicts of interest.

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Authors' contributions: JA, CGO, JK, participated in designing the study, JA and DLK were responsible for fieldwork supervision, JA, CGO, and DLK were responsible for data analysis, interpretation, writing, and revision of the manuscript.

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Figures

Figure 1: The conceptual framework on factors associated with the occurrence of Hepatitis E

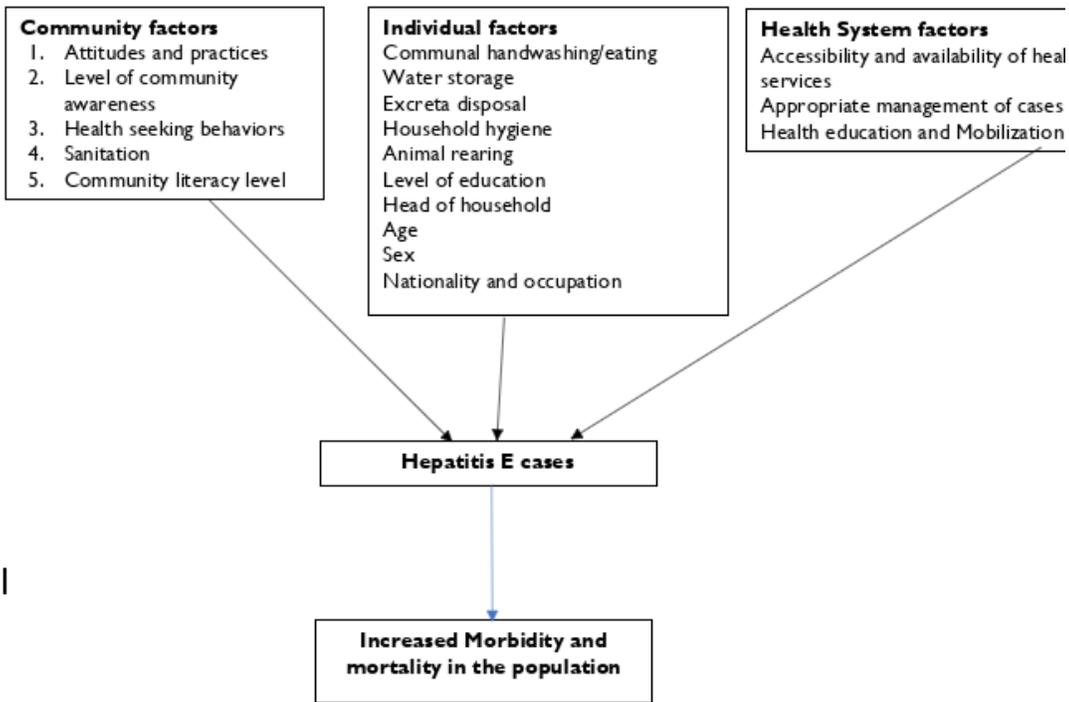


Figure 1

The conceptual framework on factors associated with the occurrence of Hepatitis E

Figure 2: Hepatitis E prevention practices in the two sub-counties of Kitgum Matidi and Mucwini

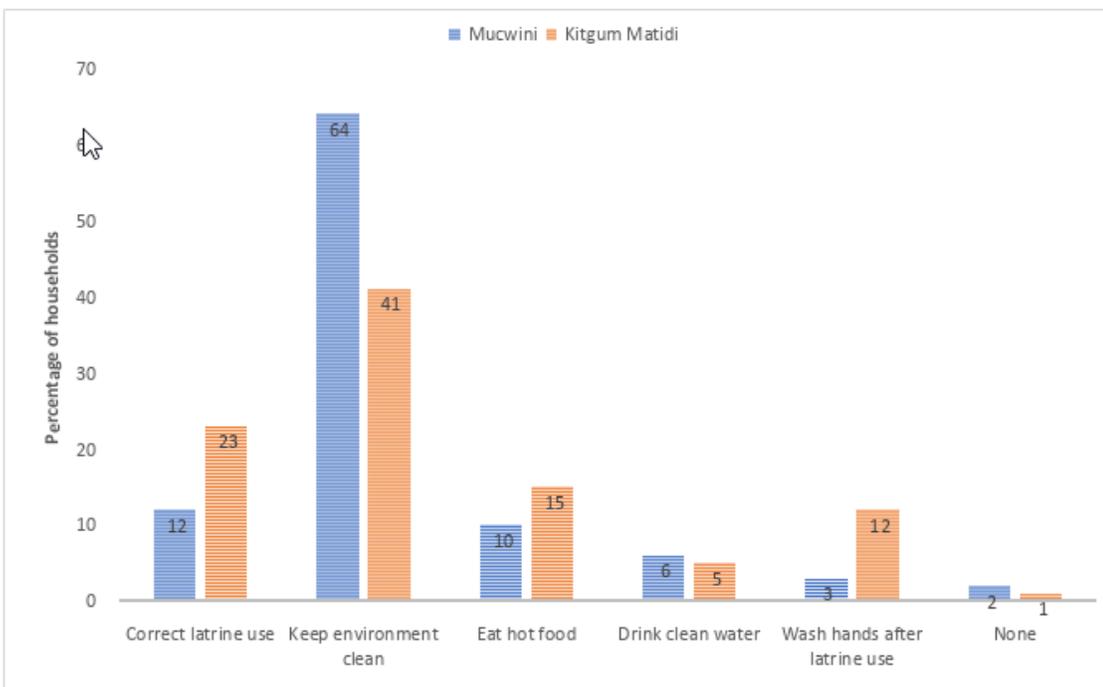


Figure 2 shows the percentages of homesteads that used pit latrines correctly, ate hot food, drank clean water, and washed hands after using the restroom, higher in Kitgum Matidi Sub County than Mucwini.

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