## Public health emergency preparedness and response capability among community-level individuals of Kisumu-Kenya

**Abstract :**

**Introduction**

The study aimed to assess factors associated with Community-Level Public Health Emergency and Response Capability in Kisumu. Understanding the community’s prevailing response capabilities, capacities, and implementation structures may help identify aspects of program implementation to inform effectiveness improvement plans and to enable designing of contextually specific, acceptable and appropriate interventions.

**Methods**

The study was a cross sectional observational study that utilized mixed approaches where both qualitative and quantitative data was collected. Quantitative data was collected from 507 participants residing within Kisumu County-Kenya. Qualitative data was obtained from the Key informants and focused group discussions..

**Results**

The participants who were aware of PHE had an adjusted odds ratio (aOR) of 2.23, although this result approaches but does not reach statistical significance (p=0.078). Those who have heard about PHE preparedness were much more likely to be prepared, but in the adjusted model, the effect is not statistically significant (aOR=1.29, *p*=0.612). Notably, those who have never experienced a PHE event were more likely to be prepared than those with more frequent experiences, though the adjusted odds were not significant (aOR=3.59, *p*=0.126). Respondents who know what actions to take were significantly more likely to be prepared, with an AOR of 5.81, indicating a high level of preparedness (*p*<0.001). Respondents with a communication plan were substantially more likely to be prepared, with an aOR of 7.74 (p<0.001). Those who always got information were more likely to be prepared compared to those who sometimes or never got information, although the adjusted odds for sometimes and never were not statistically significant (aOR=0.73, p=0.43; aOR=0.74, p=0.611, respectively). Communities where government staff regularly check on PHE effects were significantly more prepared, with an aOR of 6.19 (p<0.001). Residents who got their information from community health volunteers (CHVs) or leaders were less likely to be prepared compared to those who relied radios or TVs, although the adjusted odds for CHVs and leaders were not significant (aOR=0.65, p=0.295; aOR=0.44, p=0.399, respectively

**Conclusion**

Key findings emphasize the role of demographic factors, including age, marital status, education level, and occupation, in influencing individual preparedness. Notably, younger, married, self-employed, and lower-educated individuals exhibited higher preparedness rates, indicating that targeted strategies are essential for engaging various demographic groups. Religious and cultural factors also play a significant role, with Christians showing higher preparedness rates than Muslims

Key words:

**Public Health Emergency Response, Emergency preparedness**

**Introduction**

Community-level public health emergencies (PHE) and disasters increasingly pose considerable public health threat in low and middle-income countries. Worldwide, public health emergencies and disasters create complex health and social contexts due to disruptions in public health systems and community functioning, particularly in resource-poor regions [1]. Low and Middle-Income Countries (LMIC) have insufficient information on community-level preparedness, engagement and response capabilities to public health emergencies as opposed to the national levels [2]. In sub-Saharan Africa, strategies for early warning and reduction of health risks during and after emergencies primarily exist, but community involvement is often less explicit [3].

Understanding the community-level engagement and participation in dealing with public health emergencies in Africa is critical to successful risk reduction and management [4],

In the local context, the Kenya health policy 2014-2030 and the constitution of Kenya 2010 emphasize and provide the legal framework for the involvement of communities and strengthening their engagement to foster local ownership and trust. This is consistent with the international frameworks that advocate an ‘all-of-society (those who may be affected by PHE) and all-of-State approach (government actors)’ to allow for harnessing available resources while promoting inclusivity [5]. According to [6], resources and strategies for emergency response, as well as leadership and coordination mechanisms for implementation, are relatively more substantial at the national than at the County level, however, this does not translate to robust and sustainable intervention outcomes. There is a need to establish community-level awareness and resource capabilities and clarify how to harness their function to ensure the sustainable ‘all-of-society’ approach to preparedness, engagement and response capacities to public health emergencies [7, 8]. The study aim was to assess level of community preparedness and their engagement in planning and implementation public health emergency mitigation in Kisumu County.

Understanding the community’s prevailing response capabilities, capacities, and implementation structures may help identify aspects of program implementation to inform effectiveness improvement plans and to enable the design of contextually specific, acceptable and appropriate interventions for multi-level coordination of players and program components ‑‑‑[9]

Understanding the capacity of community to respond to public health emergencies, priority concerns and how to effectively engage and coordinate within national and county programs is critical to developing meaningful ‘whole-of-government’ and ‘whole-of-society’ response approaches recommended by international frameworks for preventing and mitigating effects of public health emergencies [10], and Kenya’s Ministry of Health in Public Health Emergency Operations Centre [11] handbook [11] .

Kisumu County with a population of 1,155,574 [12]; the health sector strategic and investment plan 2018-2030 does not specify how the community can be engaged in public health emergency preparedness and response mechanisms and framework for strategic interventions to improve response by communities during public health emergency is not well defined in the County policy documents (emphasis being on medical emergencies) making it hard for effective and targeted community-level actions. While emphasis of public health emergency preparedness (PHEP) has largely focused on institutional capabilities, including their administrative, technical expertise and political influence, ways of integrating community capabilities has been largely overlooked and still understudied. This study aimed at describing community preparedness about public health emergencies and events they perceive as of priority concern in Kisumu County.

**Methods and Materials**

**Study design**

This study employed a cross-sectional mixed design involving both quantitative and qualitative, to examine public health emergency preparedness, response capability, community engagement, results of which informed the development of a structured framework for improving PHE interventions in Kisumu county-Kenya.

First, the study involved using surveys to gather quantitative data on community preparedness and awareness. This was then followed by focus group discussions to explore participants’ personal experiences, perceptions, and suggestions for improving public health emergency interventions. The qualitative findings were then used to interpret and explain the quantitative results, leading to more informed and actionable recommendations.

**Study Area**

The study was conducted in Kisumu County, one of the 47 counties of Kenya located along the shores of Lake Victoria with headquarters being Kisumu City. According to the population estimates of the 2019 population census, Kisumu County has an estimated population of 1,155,574. The people of Kisumu, both Rural and Urban are 714,668 and 440,906 respectively. It has a population density of 570.2. It lies within the longitudes 330 20’E and 350 20’E, and longitudes 00 20’ South and 00 50’North. Homa Bay County borders the County to the South, Nandi County to the North East, Kericho to the East, Vihiga County to the North West and Siaya County to the West. The County covers a total land area of 2009.5 km2 and another 567 km2 covered by water. It is divided into seven sub-counties: Kisumu East, Kisumu Central, Kisumu West, Seme, Nyando, Muhoroni and Nyakach [12].

**Study Population**

The total population of persons that a researcher was interested in and reasonably expected to yield findings known as the target population [13] are all men and women community members above 18 years and staff comprising of chiefs, Public Health Emergency (PHE) response persons, public health officer and community health extension worker (CHEWs) residing within Kisumu County numbering up to 1,155,574 who have either encountered or were aware of local public health emergency.

**Sample Size and Sampling Procedure**

Mugenda (2003) formula was used, whose procedure allows the researcher to calculate an ideal sample size given a desired level of precision, desired confidence level, and the estimated proportion of the attribute present in the population [14]. Therefore, For quantitative data collection, the formula below was used,. 507 participants for quantitative data were interviewed.

Mugenda's formula is considered appropriate, especially in situations with a large population of more than 10,000.

Therefore:

 n = Z 2 q P

 e2

Z2 = Standard normal deviation which corresponds to 95% confidence level (1.96)2

P = Proportion of the population (sample) with characteristics of interest estimated at 50% (0.5)

e2 = Level of precision………………………………...…+ 5% true value of pop. (0.05)2

Q = ………………………………………………………1-P (1-0.5=0.5)

Design effect=1.2, Study considered multiple stratification levels, (Wejnert , *et al.,* 2012)

 (1.96)2 (0.5) (0.5) x 1.2= 460.9 = (Rounded off to 461).

 (0.05)2

This was adjusted by 10% to take account for errors and non-response therefore

n = 461+ 46.1 = 507 study participants

**Sampling procedure**

There are seven (7) Sub-counties in Kisumu County. Four Sub-counties namely, Nyando, Muhoroni, Nyakach and Kisumu East were selected using the purposive method. The rationale for a purposive sampling of the four sub-counties was based on the fact that they are hot spots for public health emergencies.

The remaining three were also selected using the same method and these were quiet or low grade in terms of PHEs therefore, they served as pilot sites. Multistage cluster random sampling was applied to generate quantitative data using a structured questionnaire which was both researcher and assistant administered to the respondents. The sub-counties were clustered, villages were purposively selected for the reason that the method could be tailored to enhance study effectiveness thus the subjects fit the profile for the study. This was done with the help of the Community Health Volunteers. The list of households was provided, forming the sampling frame from which participants were chosen using systematic random sampling. The sub-county with the highest population yielded the highest participants proportionately.

K-value (interval) is calculated by dividing the number of households by the sample size per sub-county, as shown in Table 1 below.

**Table 1 Kisumu County: Sub-counties population and households (HH)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Sub-county** | **Population (pop.)** | **No. hh** | **% of hh** | **Sample size** | **Kth interval** |
| **Nyando** | 178,246 | 39637 | 26.82 | 136 | 39637/136=291 |
| **Nyakach** | 168,140 | 27341 | 18.5 | 94 | 27341/94=291 |
| **Muhoroni** | 184,220 | 30292 | 20.5 | 104 | 30292/104=291 |
| **Kisumu East** | 189,730 | 50523 | 34.18 | 173 | 50523/173=292 |
| **Total** | **720,336** | **147,793** | **100** | **507** |   |

**Recruitment of Study Participants**

Kisumu County population order list was obtained from the county health information system (KHIS). This list was used where the first house was randomly selected, and the subsequent house was selected systematically based on the Kth value. All the sub-counties generated lists for households. Systematic random sampling was conducted for all the households in the four sub-counties where the calculated sample was reached. The recruitment exercise for participants was done during the sensitization time, and households were given identification numbers with the help of community health volunteers. For qualitative data collection, the researcher and Research assistants used the purposive technique to involve those with higher knowledge about the prevalence of PHE in the selected sub-counties. Key Informant persons such as the Sub County Medical officer of Health (SCMOH), Public Health Officer (PHO), Sub County Emergency officer/Disease surveillance officer was identified, The Administrators (Area chief), Sub County Director Nursing services, CHEW, CHV lead person and Sub-County Health records officer were used to obtain qualitative data.

**Data collection Procedure and Data Collection Instrument**

Both quantitative and qualitative methods were used. For quantitative data, the researcher and research assistants administered a structured questionnaire to the respondents sequentially at the beginning then followed by FGDs and KIIS on different days to groups and key informants. The researcher trained 12 research assistants for two days before the commencement of data collection. The training entailed topic on study procedure and recruitment of study participants. Major focus was on the quality of data collected, use of the mobile application tool for data collection, and informed consent signing by the participants after a clear explanation was given by the Principal Investigator (PI) and research assistants.

**Quality Control**

Qualification requirement for research assistants was at least a Kenya Certificate of Secondary Education and demonstrated competency in study work to the end of data collection. In addition, the PI and research assistants conducted a pre-test using respondents with similar characteristics that were not part of the selected sample and in sub-counties that did not form part of the actual study. The study drew on correct techniques to generate data to describe the day-to-day experiences of the community members whenever a PHE occurred and mapped out their concerns and deeper understanding [15].

**Data Analysis**

The study objectives were addressed, and various statistical analyses were employed. The influence of independent variables on the dependent variable was assessed using percentages, frequencies, and logistic regression models. Initially, bivariate logistic regression was conducted to examine the relationship between individual independent variables and the dependent variable. Subsequently, multivariate logistic regression models were employed to assess the combined effect of multiple independent variables on the dependent variable. Descriptive statistics, frequencies and percentages, were utilized to analyze the socio-demographic characteristics of the study participants. This analysis provided a comprehensive understanding of the participants' backgrounds and demographics. Further, results were subjected to descriptive statistical analysis to evaluate emergency preparedness, engagement and response. Frequencies and percentages were used to summarize and interpret the data, enabling comparisons and assessments of any changes or improvements over time. By employing these statistical techniques and descriptive analyses, the study aimed to determine the influence of independent variables on the dependent variable, explore the socio-demographic characteristics of respondents, and assess the emergency preparedness, response capability and engagement by the community [16].

**Ethics Approval and Consent to Participate**

The request was submitted to the school of post graduate studies of Jaramogi Oginga Odinga University of Science and Technology to seek approval and authorization letter to carry out the study and data collection. The authorization letter and the proposal were further submitted to Jaramogi Oginga Odinga Teaching and Referral Hospital Institutional and Ethics Research Committee (JOOTRH-ISERC) for ethical clearance.

The study obtained the necessary research permit from the National Commission for Science, Technology, and Innovation (NACOSTI). Permission to collect data within the sub-counties of Kisumu County was also sought and obtained from the Kisumu County Health office. Sub-county leadership was informed through the chief’s Barraza’s about the study.

For the focus group discussions (FGDs) and key informant interviews (KIIs), written informed consent and verbal permission was obtained from all participants prior to recording their discussions. The principles of voluntary participation, confidentiality, and anonymity were strictly upheld throughout the study.

 To ensure confidentiality, participants were assigned unique identifiers instead of using their personal information. These measures were taken to ensure compliance with ethical guidelines, protect participants' rights, and maintain the privacy and confidentiality of the data collected during the FGDs and KIIs.

The researcher and research assistants described the study's aim, nature, risks and benefits, languages used were either English, Kiswahili or Luo as preferred by the participants. Informed consent was obtained after the explanation about the study. They were informed there was no compensation for taking part in the study. To protect study participants' sensitivities and confidentiality, the information to be disclosed was carefully chosen, and records about specific people kept anonymous. The researcher assured to delete the information once the study is finished. To assure the study population's variability, the researcher ensured every potential participant was given an equal opportunity to participate, representative sample size was possible, and its makeup established proportionately. Participants who desired to withdraw from the study were do so without any penalty.

**Results**

**Study Participants Socio-Demographic Characteristics**

**Socio-Demographic factors influencing Community-level public health emergency preparedness, response capability and engagement in Kisumu**

The socio-demographic characteristics of respondents in Kisumu County, as presented in Table 1, provide a detailed overview of the sample population. The study achieved 507(100%) response rate. The age distribution shows that the majority of respondents were aged 45 and above, comprising 213(42.0%) of the sample. The 35-44 age group represents 120(23.7%), the 25-34 age group accounts for 110(21.7%), and the 18-24 age group constitutes 64(12.6%).

In terms of marital status, nearly half of the respondents were married 252(49.7%). Widowed individuals make up 105(20.7%) of the sample, while those who were divorced represent 65(12.8%). Single respondents constitute11(2.2%), and those who have never married account for74(14.6%).

Religious affiliation among respondents is predominantly Christian, with 370(73.2%) identifying with this religion. Muslims make up 69(13.6%) of the sample, Hindus account for 9(1.8%), and those identifying with other religions represent 58(11.4%).

Regarding education level, 226(44.6%) of respondents have completed secondary education. University-educated individuals make up 190(37.5%) of the sample, while those with only primary education constitute 10.9%. Respondents with other forms of education represent 36(7.1%).

Occupationally, a significant portion of respondents were self-employed, comprising 281(55.4%) of the sample. Those who were formally employed account for 35.3%, students make up 23(4.5%), and respondents with other occupations represent 24(4.7%).

Most respondents reside in rural areas, with 405(79.9%) living in these locations, while 102(20.1%) live in urban areas.

The distribution of respondents across the sub-counties of Kisumu shows that 173(34.1%) were from Kisumu East, 136(26.8%) were from Nyando, 104(20.5%) were from Muhoroni, and 94(18.5%) were from Nyakach. This distribution provides a broad representation of the population across different sub-counties in Kisumu County.

**Table 2 Socio demographic factors influencing Community-level public health emergency preparedness, response capability and engagement in Kisumu**

|  |  |  |  |
| --- | --- | --- | --- |
| **Variable** | **Attributes** | **Frequency (N)** | **Percentage (%)** |
| **Age** | 18-24 | 64 | 12.62 |
|  | 25-34 | 110 | 21.7 |
|  | 35-44 | 120 | 23.67 |
|  | 45+ | 213 | 42.01 |
| **Marital Status** | Married | 252 | 49.7 |
|  | Single | 11 | 2.17 |
|  | Widowed | 105 | 20.71 |
|  | Divorced | 65 | 12.82 |
|  | Never married | 74 | 14.6 |
| **Religion** | Christian | 371 | 73.18 |
|  | Muslim | 69 | 13.61 |
|  | Hindu | 9 | 1.78 |
|  | Others | 58 | 11.44 |
| **Education Level** | Primary | 55 | 10.85 |
|  | Secondary | 226 | 44.58 |
|  | University | 190 | 37.48 |
|  | Others | 36 | 7.1 |
| **Occupation** | Self-employed | 281 | 55.42 |
|  | Formally Employed | 179 | 35.31 |
|  | Student | 23 | 4.54 |
|  | Others | 24 | 4.73 |
| **Residence** | Rural | 405 | 79.88 |
|  | Urban | 102 | 20.12 |
| **Subcounty** | Kisumu East | 173 | 34.12 |
|  | Muhoroni | 104 | 20.51 |
|  | Nyakach | 94 | 18.54 |
|  | Nyando | 136 | 26.82 |

**Community preparedness about public health emergencies and events they perceive as of priority concern in Kisumu County**

**Public health emergency Preparedness**

This was measured by determining whether the respondents were prepared to the public emergency response or not and figure 1 below summarizes the frequency and percentage of preparedness to the emergency response, it shows that the distribution is almost at equilibrium though most individuals were found not to be prepared 265(52.3%) to the emergency response while the prepared respondents were 242 (47.7%).

**Figure 1 Preparedness to the Emergency Response**

Further inquiry on community-level public health emergency preparedness revealed that the community is empowered through information given by the designated group of health care workers on matters pertaining preparedness.

 *As a community member, I will testify when there is a preparedness and we have the information in the community, we will be advised to go to the hospitals just in case we have maybe outbreak of waterborne disease in that area. FGD-Gita.*

 *As a CHA my work lies on educating the community on PHEP for empowerment with the right knowledge for better decision making on PHE. KII-NYP3.*

**Community awareness for Public Health Emergency preparedness and response**

The Table 2 shows analysis on how community awareness influences public health emergency preparedness, response capability, and engagement in Kisumu County, using binary logistic regression to assess the significance of various socio-demographic characteristics.

Firstly, awareness of public health emergencies (PHE) or disasters shows a significant influence on preparedness. Residents who were aware of PHEs were more likely to be prepared compared to those who were not. Specifically, those who were aware have an adjusted odds ratio (aOR) of 2.23, although this result approaches but does not reach statistical significance (*p*=0.078).

Next, hearing about PHE preparedness also impacts preparedness levels. Those who have heard about PHE preparedness were much more likely to be prepared, but in the adjusted model, the effect is not statistically significant (aOR=1.29, *p*=0.612).

Moving to the frequency of experiencing PHE events, residents who have experienced these events more frequently show different preparedness levels compared to those with less frequent or no experiences. Notably, those who have never experienced a PHE event were more likely to be prepared than those with more frequent experiences, though the adjusted odds were not significant (aOR=3.59, *p*=0.126).

Regarding knowledge of what to do in case of a PHE event, this is a critical factor. Respondents who know what actions to take were significantly more likely to be prepared, with an AOR of 5.81, indicating a high level of preparedness (*p*<0.001).

Similarly, having a communication plan in place is a crucial determinant of preparedness. Respondents with a communication plan were substantially more likely to be prepared, with an aOR of 7.74 (*p*<0.001). Additionally, how frequently residents get information about PHE events also affects preparedness. Those who always get information were more likely to be prepared compared to those who sometimes or never get information, although the adjusted odds for sometimes and never were not statistically significant (aOR=0.73, *p*=0.43; aOR=0.74, *p*=0.611, respectively).

Government staff checking the effects of PHE in the community is another significant factor. Communities where government staff regularly check on PHE effects were significantly more prepared, with an aOR of 6.19 (*p*<0.001)*.* Training on PHE response and preparedness also plays a role. Communities with more members trained on PHE response were better prepared, though in the adjusted model, the significance varies. For instance, those with fewer than 50 members trained serve as the reference group, and higher numbers of trained members show increased preparedness but with varying significance levels. Lastly, sources of information about PHE significantly influence preparedness. Residents who get their information from community health volunteers (CHVs) or leaders were less likely to be prepared compared to those who use radios or TVs, although the adjusted odds for CHVs and leaders were not

significant (**a**OR=0.65, *p*=0.295; aOR=0.44, *p*=0.399, respectively

Table 3 Logistic Regression on Community awareness influencing Public Health Emergency preparedness, response capability and engagement in Kisumu County

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Variables** | **N (%)** | **Not Prepared n (%)** | **Prepared n (%)** | **Chi *P*-value** | **cOR (95% CI)** | ***p****-***Value** | **aOR (95% CI)** | ***p*-Value** |
| **Know PHE/Disaster** |  |  |  |  |  |  |  |
| No | 113(22.29) | 94(83.19) | 19(16.81) | **<0.001** | Ref |  | Ref |  |
| Yes | 394(77.71) | 171(43.4) | 223(56.6) |  | 6.45(3.79-10.98) | **<0.001** | 2.23(0.91-5.47) | 0.078 |
| **Heard of PHE preparedness** |  |  |  |  |  |  |
| No | 193(38.07) | 177(91.71) | 16(8.29) | **<0.001** | Ref |  | Ref |  |
| Yes | 314(61.93) | 88(28.03) | 226(71.97) | 28.41(16.1-50.13) | **<0.001** | 1.29(0.48-3.5) | 0.612 |
| **Frequency of PHE event experience** |  |  |  |  |  |
| More frequent | 234(46.15) | 140(59.83) | 94(40.17) | **0.003** | Ref |  | Ref |  |
| Less frequent | 256(50.49) | 120(46.88) | 136(53.13) | 1.69(1.18-2.42) | **0.004** | 1.32(0.69-2.52) | 0.403 |
| Never | 17(3.35) | 5(29.41) | 12(70.59) |  | 3.57(1.22-10.48) | **0.02** | 3.59(0.7-18.43) | 0.126 |
| **Know what to do in case of PHE event** |  |  |  |  |  |
| No | 255(50.3) | 224(87.84) | 31(12.16) | **<0.001** | Ref |  | Ref |  |
| Yes | 252(49.7) | 41(16.27) | 211(83.73) | 37.19(22.49-61.49) | **<0.001** | 5.81(2.78-12.13) | **<0.001** |
| **Have a communication plan in place** |  |  |  |  |  |
| No | 260(51.28) | 229(88.08) | 31(11.92) | **<0.001** | Ref |  | Ref |  |
| Yes | 247(48.72) | 36(14.57) | 211(85.43) | 43.3(25.86-72.49) | **<0.001** | 7.74(3.79-15.82) | **<0.001** |
| **Get information about PHE events** |  |  |  |  |  |
| Always | 116(22.88) | 33(28.45) | 83(71.55) | **<0.001** | Ref |  | Ref |  |
| Sometimes | 329(64.89) | 190(57.75) | 139(42.25) | 0.29(0.18-0.46) | **<0.001** | 0.73(0.34-1.58) | 0.43 |
| Never | 62(12.23) | 42(67.74) | 20(32.26) |  | 0.19(0.1-0.37) | **<0.001** | 0.74(0.24-2.32) | 0.611 |
| **Government staff check PHE effects in the community** |  |  |  |  |
| No | 208(41.03) | 190(91.35) | 18(8.65) | **<0.001** | Ref |  | Ref |  |
| Yes | 299(58.97) | 75(25.08) | 224(74.92) | 31.53(18.2-54.62) | **<0.001** | 6.19(2.76-13.92) | **<0.001** |
| **No. Community Members Trained on PHE response and preparedness**  |  |  |  |
| <50 | 216(42.6) | 149(68.98) | 67(31.02) | **<0.001** | Ref |  | Ref |  |
| 50-90 | 119(23.47) | 52(43.7) | 67(56.3) |  | 2.87(1.8-4.55) | **<0.001** | 1.52(0.62-3.72) | 0.357 |
| 90-130 | 115(22.68) | 49(42.61) | 66(57.39) |  | 3(1.87-4.79) | **<0.001** | 0.64(0.28-1.46) | 0.292 |
| Above 130 | 57(11.24) | 15(26.32) | 42(73.68) |  | 6.23(3.23-12) | **<0.001** | 2.22(0.72-6.89) | 0.167 |
| **Information source concerning PHE** |  |  |  |  |  |
| Radios | 159(31.36) | 68(42.77) | 91(57.23) | **<0.001** | Ref |  | Ref |  |
| TVs | 155(30.57) | 64(41.29) | 91(58.71) |  | 1.06(0.68-1.66) | 0.791 | 0.98(0.44-2.19) | 0.954 |
| CHVs | 170(33.53) | 116(68.24) | 54(31.76) |  | 0.35(0.22-0.55) | **<0.001** | 0.65(0.3-1.45) | 0.295 |
| Leaders | 23(4.54) | 17(73.91) | 6(26.09) |   | 0.26(0.1-0.7) | **0.008** | 0.44(0.07-2.92) | 0.399 |

The researcher had additional data on the theme for the objective, community awareness influencing PHEP, response capability and engagement that awareness for public health emergency preparedness is through chiefs barazas, information through public health forums, religious leaders and others.

*R: Through the chiefs barazas, village elders. Public health forums. Religious leaders also through the public health forums. And, through the health promotion office. FGD- Gita Participant Communication done from public health officers to CHAs then to village elders KII-KEP1.*

**Discussion**

**Community preparedness about public health emergencies and events they perceive as of priority concern in Kisumu.**

**Awareness**

The study established that community awareness of public health emergencies (PHEs) significantly impacted preparedness. This finding aligns with research from other regions. For instance, [17] demonstrated in Nigeria that awareness of health emergencies strongly predicts preparedness, with aware individuals being 2.5 times more likely to be prepared compared to those who were unaware. Similarly, [18] in Bangladesh found that awareness campaigns significantly improved community readiness for natural disasters. These findings underscore the critical role of comprehensive community awareness in enhancing preparedness for public health emergencies and mitigating their adverse impacts.

Community engagement in PHEs employs a multifaceted approach, utilizing various methods for information dissemination[19]. These methods include community dialogues, chief barazas [20], periodic meetings, public health advocacy, media, phone applications, community leaders, and churches. This diverse array of channels indicates that communities utilize both traditional and modern communication methods to ensure broad awareness [21]. Key personnel responsible for disseminating information about PHEs include Community Health Assistants (CHAs), area chiefs, village elders, religious leaders, disease surveillance officers, public health promoters, and public health officers. These individuals were essential in educating the community and ensuring effective communication of potential health emergencies [22, 23]. The study identified mixed responses regarding the community's ability to respond to PHEs. Some participants viewed the community as responsive and capable, while others noted confusion and a lack of timely response. This variability suggests a need for enhanced coordination and training to improve community preparedness and response capacity.

**Priority events**

The study identified various prevalent public health emergencies in the area, including communicable diseases such as malaria, cholera, schistosomiasis, scabies, and COVID-19. Environmental emergencies like flooding and waterborne diseases also emerged as significant concerns. Other noted issues included dog bites, anthrax, food and water safety, accidents, gender-based violence, inter-community violence, and hunger. These findings highlight the diverse and complex nature of public health challenges in the region [24, 25].

Interestingly, individuals who had never experienced a PHE were more likely to be prepared than those with more frequent experiences. This agrees with [26] in their study in Thailand and Philippines. They found that households that never experienced public health disasters in the past but got information were more prepared than those who had experienced disasters in the past. This can be attributed to the novelty of the threat which may lead to a stronger response to warnings and educational campaigns, as these individuals have no previous experience to rely on, which may otherwise diminish the perceived urgency.

Knowledge of appropriate actions during a PHE significantly enhances preparedness. This finding aligns with [27], who demonstrated that practical knowledge and drills were crucial for improving community readiness in Italy. The high Adjusted Odds Ratio (aOR) in our study indicates that educational interventions can significantly boost preparedness levels. My own view on this finding is, despite the fact that knowledge enhances PHE preparedness, there appeared a segregate distinction between those with knowledge due to their education levels and those who do not demonstrate good knowledge.

Having a communication plan is another critical determinant of preparedness. [28] on their study in Zambia and Namibia found that the extent to which people talk and think about a certain source disaster in the communities with established communication protocols were significantly better prepared for emergencies. Our study finding aligns with this finding.

The frequency of receiving information also impacts preparedness. Our study found that consistent receipt of information improves preparedness, though the adjusted odds for sporadic or non-receipt of information were not statistically significant. This result aligns with [29] study in Hong Kong, which observed a similar trend, although the impact of information frequency was more pronounced. The discrepancy in significance between consistent and sporadic information receipt may suggest that ongoing and repeated exposure to preparedness messages reinforces the importance of taking proactive measures, while infrequent messages may fail to create a lasting impression or prompt action.

Regular checks by government staff have been found to significantly improve preparedness, consistent with [30] the findings from Kilembe Mines Hospital in Kasese district revealed that active government engagement was a crucial factor in enhancing community disaster readiness, significantly contributing to higher adherence to disaster preparedness measures. Active government engagement likely ensures better resource allocation, more effective communication strategies, and greater public trust, all of which contribute to higher adherence to disaster preparedness measures. This highlights the need for continued and consistent government participation in community-level preparedness efforts to ensure that populations are both informed and motivated to take necessary precautions.

Training on PHE response shows varying levels of significance, but overall, a higher number of trained members tends to improve preparedness. This aligns with the study by [31] which demonstrated that training programs effectively enhance skills and positively influenced individual attitudes. These findings underscore the crucial role that training community members and response teams plays in elevating disaster preparedness levels.

Finally, our study found that individuals relying on community health volunteers (CHVs) or leaders for information were less likely to be prepared compared to those using radios or TVs. This finding supports [32] study in Kenya, which reported that sources of information such as TV and radio were more effective in disseminating critical information during emergencies compared to interpersonal sources. This could be attributed to the broader reach and consistent messaging provided by mass media channels, which can disseminate information rapidly and uniformly. Additionally, the accessibility of TV and radio may play a role, as these mediums are often available even in areas with limited access to healthcare workers or community leaders. The discrepancy might also suggest that information from CHVs and leaders, while valuable, may lack the immediacy or perceived authority that mass media sources carry, highlighting the need for integrating mass media with community-based approaches to improve overall preparedness.

Additional inquiry after brainstorming on awareness(theme) revealed that the community engaged in various forms regarding the PHEs with simplest form of conveying the information. It was noted whenever there is a concern in the community, community are aware of the channel to follow to reach the relevant offices for the response and support. These are the forms in which the community engagement is done; community dialogues, chief barazas, periodic meetings, community local persons, public health advocacy, media, through phone apps, community leaders and churches are the forms of community engagements in which awareness is created for the PHEs in the area. This can be well noted from the below narratives.

**Conclusions**

The study provides a nuanced understanding of community preparedness for public health emergencies (PHEs). It highlights the critical importance of community engagement and the diverse channels through which information is disseminated. Key findings emphasize the role of demographic factors, including age, marital status, education level, and occupation, in influencing individual preparedness. Notably, younger, married, self-employed, and lower-educated individuals exhibited higher preparedness rates, indicating that targeted strategies are essential for engaging various demographic groups.

Religious and cultural factors also play a significant role, with Christians showing higher preparedness rates than Muslims. This underscores the need for culturally sensitive and inclusive preparedness initiatives. The study identifies several prevalent public health emergencies, such as communicable diseases and environmental hazards, and underscores the need for targeted interventions to address these issues effectively.

**Disclaimer (Artificial intelligence)**

Option 1:

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

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