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Level of reporting and factors associated with Reporting of Public Health Signals by Village Health Team Members in the Event-Based Surveillance System, Kabarole District, Uganda, July 2022–March 2023

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Summary

Background: Event-based surveillance (EBS) is the collection, analysis and reporting of unstructured health-related information to detect public health risks. In July 2022, the Uganda Ministry of Health (MoH) trained Village Health Team (VHT) members in Kabarole District and rolled out the EBS system with an emphasis on submitting public health signals. We assessed the level of reporting and factors affecting reporting in the EBS system by VHTs in Kabarole District, Uganda, July 2022–March 2023.
Methods: We conducted a cross-sectional study among VHTs and key informants (KI) involved in EBS activities from the district health office and health facilities in the district in March 2022, eight months after the rollout of EBS in Kabarole District. We used multistage sampling to recruit VHTs from sub-county to village levels. Purposive sampling was used to select KIs involved in EBS activities to gain insight into factors influencing EBS reporting. We collected data using an interviewer-administered structured questionnaire which comprised of socio-demographic and occupational characteristics and a KI interview guide. We assessed the proportion of VHTs who submitted any public health signal in the EBS system from July 2022–March 2023. Multiple logistic regression analysis was used to identify factors associated with reporting. Qualitative data were analyzed using thematic content analysis.
Results: Among 380 participating VHTs from 189 villages, 258 (68%) were female, 262 (69%) had attained secondary school education, and 288 (76%) had worked >5 years as a VHT. Mean age was 44±12 years; median work experience as a VHT was 7 years (interquartile range: 5-19 years). Ninety-one (24%) respondents had reported a public health signal in the EBS system in the last eight months. Reporting was associated with age >45 years (adjusted odds ratio [aOR]=2.4; 95%CI: 3.3-5.7), being female (aOR=2.8; 95%CI: 2.0-5.7), doing VHT work >5 days per week (aOR=4.4, 95%CI: 1.2-5.1), and having at least secondary school education (aOR=1.1, 95%CI: 1.2-4.8). Factors influencing reporting included remuneration, feedback, and support supervision from the district health authorities.
Conclusion: Less than a quarter of VHTs in Kabarole District reported public health signals in the EBS system during the eight-month period following implementation.

Leveraging older, more experienced VHTs with higher education levels as mentors and providing routine support supervision of VHTs may improve reporting of public health signals in the EBS system.

Introduction

Event-Based Surveillance (EBS) involves collection, monitoring, assessment and interpretation of primarily unstructured, ad-hoc information regarding health events that may present acute public health risk [1]. Such information can come from diverse sectors including formal and informal data from human, animal, environmental, and other sectors [2, 3]. The overall goal of EBS is to enhance timely early detection of outbreaks and other public health threats. In low-resource countries such as Uganda, where routine surveillance is still weak, EBS can be a supplementary tool for indicator-based surveillance (IBS), the more standard approach to national surveillance systems [4]. Event-Based Surveillance strengthens the early warning function of national surveillance systems, improves their ability to generate data for action, and facilitates rapid signal verification and response [5].

To promote the adoption of EBS, the World Health Organization (WHO) published guidelines to help member states design event-based surveillance systems and suggested actions needed to improve International Health Regulation (IHR) capacities for health security in 2019[6]. To date, EBS has been adopted by several countries as a way of expanding the detection capacity of their existing surveillance systems [1, 7, 8].

Despite the potential advantages of the EBS system and the availability of guidelines to design it, countries still struggle to sustainably and effectively implement it [9]. This may be due to a limited understanding of its key principles or how best to implement it at the national level. To promote the adoption of EBS, in July 2022 the Uganda Ministry of Health, together with partners, identified and trained community health workers (known as Village Health Team (VHT) members. Village Health Team from several districts, including Kabarole District, were trained to rollout the EBS system. However, the success of the rollout and the factors influencing VHTs reporting of public health signals in EBS are unknown. We evaluated the level of VHT reporting and the factors influencing reporting of public health signals in the EBS system eight months after its roll-out to provide recommendations to the Ministry of Health (MoH).

Methods

Study design and setting

We conducted a cross-sectional study using both qualitative and quantitative methods from March 20–26, 2022, in Kabarole District, located in south-western Uganda. The district acts as a gateway to the eastern Democratic Republic of Congo's (DRC) border districts of Kasese (in the west) and Bundibugyo (in the northwest). Kabarole's location exposes it to elevated risk of various outbreaks and public health events that may stem from its neighbors, most recently Ebola and measles[10]. The area also receives high numbers of refugees [11].

Kabarole District has a population of 348,000 [12], 15 sub-counties, 52 parishes, and 346 villages. It has an estimated 1,048 VHTs who participate in public health campaigns and perform community disease surveillance. The Ministry of Health guides that a village should have at least 4-5 VHTs depending on the population density [13]. In July 2022, the Uganda Ministry of Health together with partners identified and trained 528 VHTs in Kabarole District. They were trained for a period of one week in EBS on how to detect signals, how to record them in the VHT and EBS notebooks, and how to transmit them to the center MoH by means of SMS using 6767 platform or to the electronic Integrated Disease Surveillance and Response (eIDSR) system.

Structure and reporting of signals in the Uganda Event Based System

The EBS unit at the National Public Health Emergency Operations Center (NPHEOC) coordinates all EBS activities in the country. The NPHEOC is situated in the Division of Public Health Emergencies under the Department of Integrated Epidemiology Surveillance and Public Health Emergencies. This department is supervised by the Directorate of Public Health, which reports to the Director General of Health Services of the MoH at the National level.

Public health signals can be sent by any community member, including VHTs, and are mainly received from communities, schools, and hospitals. They are transmitted through the text messaging platform; the 6767, the eIDSR) platform or phone calls on a toll-free hotline to the EBS unit at the NPHEOC. These public health signals can also be reported to the nearest health facility. The EBS unit at the NPHEOC also does routine media scanning and social media monitoring. Once signals are reported, the EBS team at the NPHEOC triages them and sends them to the district for verification by the district team whether false or true. This stage forms the basis of decision-making about whether to keep the signal, watch, respond or ignore it. VHTs receive feedback via phone calls from the NPHEOC or district health authorities.

Together with partners, the MoH carried out trainings and developed several reporting tools, guidelines, and standard operating procedures (SOPs) for EBS to facilitate its nationwide implementation in 2022 [14]. The guidelines indicate the priority events and signals (Table 1) that are supposed to be reported in the EBS system. Community signals are broad, non-disease-specific and are simplified for easy comprehension by VHTs and community members. A VHT is expected to report them immediately using the available communication channels.

EBS has own reporting channels where information is sent through, although sometimes this information is also embedded in the Indicator Based Surveillance (IBS) system. At the end of every month, all public health signals from the different districts are submitted to the EBS unit at the NPHEOC for analysis.

Table 1: The list of public health signals developed by the Ministry of Health, Uganda

Human signals a) Unexplained bleeding from any part of the body in a person of any age. b) A child below the age of 15 years with sudden onset of weakness in any one of the limbs c) Anyone with fever and rash d) Any occurrence of unusual signs, symptoms or deaths e) Two or more persons with similar signs and symptoms in the same location (i.e. school, village, workplace, prison, country, region, etc.) f) Sudden death in an apparently healthy individual g) Anyone with three or more watery stools in 24 hours h) Respiratory symptoms with fever in any person who has recently traveled abroad in the last 14 days. i) Anyone who gets severe symptoms following vaccination. j) Unusual numbers of children absent from the same school or class due to same illness k) Unusually high number of people from the same location buying drugs for the same illness from a drug shop.
Environmental signals a) Massive growth of algal bloom (green growth) or water weeds in water bodies e.g lakes, rivers or streams b) Improper waste disposal, leakage or spillage on land, in air or water bodies c) Unusual change in physical water quality parameters of drinking water sources (e.g. color, taste, odor, suspended solids, turbidity) d) Occurrence of an environment hazard e.g., flood, landslide, earthquake, frequent and more intense earth vibrations, release of gasses, cracks on the ground e) Unexplained death of aquatic animals (e.g., fish, hippos, etc.) f) Reported outbreak of water related diseases in a health facility g) Sudden increase in average atmospheric temperature noticed for two days
Animal signals a) Sudden death of an animal b) Any animal presenting with unusual signs or behavior (e.g. aggression, bleeding, dizziness, weight loss, isolation from other animals, diarrhea, body swellings, limpness, loss of hair, coughing, excessive drooling, blindness) c) Any animal with a loss in production (e.g. milk, eggs, abortions)

Sample size determination and sampling procedure

We used the formula by Kish-Leslie for determination of sample size for single proportion [15]. We utilized a 56% estimated proportion of VHTs reporting surveillance information with a margin of error of 5%, and obtained a sample size of 380 respondents [16].

We used multi-stage sampling to select VHTs. A list of sub-counties for which VHTs were trained in EBS was obtained from the Kabarole District Health Office. Twelve sub-counties had their VHTs trained in EBS system. From this list, 6 sub-counties were randomly selected. All parishes and villages from the selected sub-counties were considered for the study, for a total of 190 villages. At the village level, two VHTs were randomly selected and interviewed after obtaining their consent.

For qualitative data, 12 key informants were purposively selected because of their involvement in EBS activities. These included health facility disease surveillance focal persons, the regional epidemiologist, the assistant district health officer, district surveillance focal person, the district veterinary officer, the district biostatistician, and the district health inspector.

Data collection instruments and study variables

Our independent variables comprised socio-demographic and occupational characteristics including age, sex, level of education, years of residence in the village, primary source of income, work experience as VHT, days worked per week as a VHT, having received training in the EBS system, having received EBS job aids, having sent public health signals in the EBS system, the method used to report public health signals, reason for not reporting public health signals, having held monthly VHT meetings, having received monthly supervision on EBS reporting and whether the VHT received feedback after sending public health signals.

The outcome variable of interest was the reporting of public health signals by VHTs in the EBS system. Reporting of public health signals was dichotomized into a binary outcome (yes/no) where ‘yes’ were VHTs who self-reported submission of any public health signal in the EBS system in 8 months after roll out from July 2022–March and ‘no’ were VHTs who did not.

We collected quantitative data using an interviewer administered structured questionnaire which was designed based on other studies done on EBS [7]. The questionnaire was translated into the local language (Rutooro) and verified by a second translator, and inconsistencies were corrected. Respondents completed the interview in their preferred language of either Rutooro or English, with Rutooro responses being translated into English.

Qualitative data were collected using a key informant interview guide. The interview guide covered the following domains: (1) barriers and facilitators to reporting of public health signals by VHTs in the EBS system, (2) knowledge and experience of the EBS system and its utilization amongst VHTs, (3) scaling up the utilization of the EBS system by VHTs in reporting public health signals. We specifically inquired about availability and utilization of EBS reporting tools and drafting of summary reports, timeliness of reporting by VHTs, signal verification and giving feedback to VHTs, explored factors that are deemed crucial to operationalize of EBS activities, including funding, renumeration, support supervision, holding regular meetings, mentorships and training.

Data management and statistical analysis

We entered data into Microsoft Excel and exported to Stata version 16 software (Stata Corporation, College Station, Texas, USA) for analysis. Data that were continuous and normally distributed like age were represented as mean and standard deviation (SD), while continuous non-normally distributed data like work experience as a VHT, number of days between occurrence of public health signal and reporting in the EBS system and number of days between submission of signal and receiving of feedback were represented as medians with interquartile ranges. We summarized categorical data like sex, level of education, source of income, knowledge of EBS, having received EBS job aids, method used to send signals, having received feedback after sending public health signals, having monthly meeting and having received monthly supervision on EBS reporting by as frequencies and percentages.

The reporting rate of public health signals was calculated as the percentage of respondents who had submitted any public signal in the EBS system during July 2022–March 2023.

Multiple logistic regression analysis was conducted to identify factors associated with reporting of public health signals in the EBS system. In this analysis, reporting of public health signals was dichotomized into binary outcomes (yes/no). The association between independent variables and the outcome variable was presented as odds ratios (ORs) and 95% confidence intervals (CIs).

For qualitative data, the audio recordings obtained from the KII sessions were transcribed verbatim and compared, coding and analysis of the transcripts were done using thematic content analysis [17]. Quotes from the participants that best described the various themes and sub-themes were stated.

Ethical considerations

We conducted this activity in response to assessment of capacity in early detection of disease outbreaks. The Ugandan MoH authorized this activity. This activity was reviewed by US CDC and was conducted consistent with applicable federal law and CDC policy. [§ §]See e.g., 45 C.F.R. part 46, 21 C.F.R. part 56; 42 U.S.C. §241(d); 5 U.S.C. §552a; 44 U.S.C. §3501 et seq. The office of the Center for Global Health, US Center for Disease Control and Prevention determined that this activity was not human subject research and with its primary intent being for public health practice or disease control.

We obtained permission to conduct the activity from the district health authorities of Kabarole District. Permission was also obtained from the chairpersons of the different local council one (LC 1) authorities in the different villages where the VHTs operated from. LC 1 is the smallest administrative unit at the village level.

We obtained written informed consent from all the respondents who took part in the activity. They indicated their consent by checking an appropriate box for consent before

proceeding with the interviews. Participants were assured that their participation was voluntary and that there would be no negative consequences for declining or withdrawing from the activity. Data collected did not contain any individual personal identifiers and information was stored in password-protected computers, which were inaccessible by anyone outside the investigation.

Results

Characteristics of village health team members reporting in the event-based surveillance system, Kabarole district, Uganda, July 2022–March 2023 (N=380)

All 380 participants that were selected were interviewed (100% response rate). Among these, 258 (68%) were female, 262 (69%) had at least secondary level education, 288 (76%) had a work experience of >5 years as a VHT, and 319 (84%) worked ≤5 days a week as VHTs. The mean age of respondents was 44±12 years (range: 21-58 years). The median work experience as VHT was 7 years (interquartile range [IQR]:1-19), median number of days between occurrence of a public health signal and reporting in the EBS system was 3 days (IQR:1-9), and the median number of days between submission of a public health signal and feedback was 8 days (IQR:3-26). Most respondents (304; 80%) said they had received EBS training (Table 2).

Table 2: Characteristics of village health team members reporting in the event-based surveillance system in Kabarole district, Uganda July 2022–March 2023 (N=380)

Characteristic	Number	(%)
Sex		
Male	122	(32)
Female	258	(68)
Age in years		
≤ 45	206	(54)
>45	174	(46)
Education level		
Primary	103	(27)
Secondary	262	(69)
Tertiary	15	(4)
Years of residence in the village		
≤10	46	(12)
>10	334	(88)
Primary source of income		
Crop cultivation	281	(74)
Business	61	(16)
Livestock farmer	8	(2)
Others	30	(8)
Work experience as VHT in years		
≤5	91	(24)
>5	289	(76)

Days worked per week as VHT		
≤5 days	319	(84)
>5 days	61	(16)
Received training on EBS		
Yes	304	(80)
No	76	(20)
Received EBS job aids		
Yes	262	(69)
No	118	(31)
Sent public health signals in EBS system in last 8 months		
Yes	91	(24)
No	289	(76)
Method used to report signals		
Text message	365	(96)
Telephone call	11	(3)
Other	4	(1)
Reason for not reporting		
Absence of events worth reporting	297	(78)
Poor telecommunication network	66	(17)
Lack of motivation	17	(5)
Received feedback after sending public health signals		
Yes	27	(7)
No	353	(93)
Held monthly VHT meetings		
Yes	213	(56)
No	167	(44)
Received monthly supervision on EBS reporting		
Yes	38	(10)
No	342	(90)

Among the 380 VHTs, 91 (24%) reported a public health signal in the EBS system in the eight months after rollout. The median number of days between occurrence of a public health signal and reporting in the EBS system was 3 days (IQR:1-9) and the median number of days between submission of a public health signal and feedback was 8 days (IQR:3-26). Three hundred sixty-five respondents (96%) used text messages through the IDSR 6767 platform. The reasons for non-reporting were; absence of events worth reporting 297 (78%), poor telecommunication network 66 (17%), lack of motivation due to failure to receive feedback about the sent signals from the district 17 (5%) (Table 2)

Reporting of public health signal amongst village health team members in the event-based surveillance system, Kabarole district, Uganda, July 2022–March 2023

Most (54%) respondents reported an environmental hazard signal of heavy rains and hailstorms, while 23% reported acute respiratory symptoms with fever. Two-thirds (65%) had heard the signals they reported on the community local radio as their primary source before submitting the signal to the EBS system (Table 3).

Table 3: List of signals reported by village health team members and their sources in the event-based surveillance system in Kabarole District, Uganda July 2022–March 2023 (N=91)

Type of signals reported	n	(%)
Heavy rains and hailstorms	49	(54)
Respiratory symptoms with fever in a person of any age	21	(23)
A person with fever and rash	10	(11)
Two or more persons with similar signs and symptoms in the same location	5	(6)
Unexplained bleeding from any part of the body	4	(4)
Sudden animal deaths	2	(2)
Sources of signals		
Community local radio	59	(65)
Community members	17	(19)
Health workers	10	(11)
Faith based congregations (churches and mosques)	3	(3)
Livestock farmer	2	(2)

Factors associated with reporting of public health signals amongst village health team members in the event-based surveillance system, Kabarole district, Uganda, July 2022–March 2023 (N=380)

In bivariate analysis, age, sex, days worked per week, level of education, the method used to report signals and having monthly village meetings had a statistically significant relationship with signal reporting while years of residence in the village, primary source of income, having received EBS job aids, having received feedback after sending the public health signal, and having received monthly supervisory visits on EBS reporting were not.

In multivariable analysis, reporting of public health signals in the EBS system was associated with age >45 years (AOR 2.4; CI: 3.3-5.7 and being female (AOR 2.8; CI: 2.0-5.7). Doing VHT work for >5 days per week showed a significant association with reporting (AOR 4.4 CI: 1.2-5.1). Additionally, having secondary school and higher-level education was linked to reporting (AOR 1.1 CI: 1.2-4.8), as well as having monthly village health meetings (AOR 1.2 CI: 4.6-7.9). (Table 4)

Table 4: Factors associated with reporting of public health signals in the event-based surveillance system amongst village health team members in Kabarole District, Uganda, July 2022–March 2023 (N=380)

Characteristic	Reporting of public health signals in EBS system				Bivariate analysis		Multivariate analysis	
	Yes (n=91)		No (n=289)		OR (95%CI)	P Value	Adjusted OR (95%CI)	P Value
	n	(%)	n	(%)				
Age in years								
≤45	26	(29)	180	(62)	Ref		Ref	
>45	65	(71)	109	(38)	2.4 (3.3-5.7)	0.006	1.8 (2.1-6.9)	0.019
Sex								
Male	35	(39)	87	(30)	Ref		Ref	
Female	56	(61)	202	(70)	3.2 (4.5-6.4)	<0.001	2.8(2.0-5.7)	<0.001
Education level								
Primary	17	(19)	86	(30)	Ref		Ref	
Secondary	74	(81)	193	(70)	1.4(1.7-5.6)	0.041	1.1(1.2-4.8)	0.032
Days worked per week as VHT								
≤5 days	39	(43)	280	(97)	Ref		Ref	
>5 days	52	(57)	9	(3)	3.3 (2.5-4.2)	0.001	4.4(1.2-5.1)	0.041
Received training on EBS								
No	25	(27)	51	(18)	Ref		Ref	
Yes	66	(73)	238	(82)	2.1 (1.4-3.3)	0.002	1.5 (0.9-2.7)	0.729
Method used to report signals								
Text message	86	(94)	283	(98)	Ref		Ref	
Telephone call	5	(6)	6	(2)	0.6 (1.3-4.4)	0.041	0.8 (0.4-2.8)	0.652
Held monthly village health meetings								
No	30	(33)	137	(47)	Ref		Ref	
Yes	61	(67)	152	(53)	1.7(1.3-9.7)	0.048	1.2 (4.6-7.9)	0.018

Qualitative results: Factors affecting reporting of public health signals in the event-based surveillance system amongst village health team members in Kabarole District, Uganda July 2022–March 2023 (N=12)

During the interviews with 12 key informants, two themes emerged from the content analysis as being linked to reporting of public health signals: motivation-related factors and communication-related factors.

Motivation-related factors

This theme included two subthemes, renumeration and feedback. It was noted that these factors hindered VHTs from carrying out their EBS reporting activities. Lack of renumeration to carry out EBS activities was believed to affect the reporting of signals by the VHTs in the EBS system. The VHTs conducted EBS activities without any form of compensation for their transport and airtime.

…although the work is voluntary in nature, VHTs need a motivation package which may include a monthly allowance, transport refund or some form of incentive…" KI from Rwenzori Region

"…during the roll out, VHTs were expecting a payment as they carryout EBS activities in their villages, unfortunately, the payment did not come through which made them demotivated and some decided to abandon the program……" KI from Mugusu Town

Lack of feedback after sending signals to the EBS system was believed to be another demotivating factor. Feedback in terms of confirmation of receipt of signals, verification of signals and response after verification is supposed to come from the district health office but never comes through. The district surveillance focal person who is in charge of feedback noted that the district lacks resources to verify signals and thus may not give timely feedback to the VHTs.

"…Sometimes we don't get feedback, even when the district people come on the ground, they don't talk to us about the performance of VHTs in terms of reporting of public health signals……" KI from Rweganju Subcounty.

"…Feedback is among the key motivating factors for the VHTs to continue sending signals, but we have not done much as a district in the last 8 months in giving feedback…we lack resources necessary for signal verification and this affects the process of giving timely feedback …" KI from Kabarole District Health Office

Structural and communication-related factors

This included two subthemes: supervisory meetings and clarity of signals. These factors affected the reporting of signals in the EBS system**.** It was noted that there were very few supervisory meetings held between the VHTs and their respective supervisors. The low frequency of meetings often leaves VHTs on their own without any guidance on reporting.

"…*I usually hold one meeting per quarter with the VHTs and this also depends on the availability of time and resources*…" KI from Rweganju Subcounty.

"…EBS is a quick system for reporting but the VHTs send signals on their wish and they don't report in time… mainly because they are not well supervised in this area…" KI from Kiika Town

It was noted that some VHTs do not have clear information on which signals they should report in the EBS system. This leaves out a large number of unreported signals.

"…some VHTs believe that they should only report major occurrences happening in their villages…this leaves many signals which appear small to them unreported…" KI from Kabarole District Health Office

"…currently, the task of the signal verification at the district is done by the District Surveillance Focal Person, we need a team to do this instead of an individual who may ignore some signals because they lack clarity…" KI from Kabarole District Health Office

Discussion

We assessed the level of reporting of public health signals and factors influencing reporting of public health signals by VHT members in the EBS system in Kabarole District. Less than a quarter of VHTs in Kabarole District reported public health signals in the EBS system during the eight-month period following implementation. Reporting was associated with being aged >45years, being female, working for more days of the week, having secondary level education and having regular monthly village health meetings. This study provides opportunities to improve on the reporting rates of public health signals amongst VHTs in the EBS system.

Less than a quarter of VHTs reported public health signals in the EBS system eight months after roll out. This reporting rate of public health signals observed by the VHTs was low. A study conducted in Sudan among community health workers reported an 85% (45/53) incidence of reporting of signals in the EBS system [1]. The high performance of the EBS in Sudan was attributed to the positive attitude of the CHWs and their willingness to continue performing the EBS activities. Other factors were regular training and supportive supervision received from the national level. The low performance from our study is possibly because of lack of supervision of VHTs by their supervisors on reporting of public health signals. In our study, we found that 342 (90%) of VHTs did not receive supervision on EBS signal reporting. Consequently, as noted by one KI, the resultant effect of this inadequate supervision was that VHTs reported signals as they so wished. Support supervision of community health workers is a crucial component of a successful public health surveillance system in the delivery of quality service [18]. It is likely that individuals who are provided with support supervision report accurate and timely public health signals. It is advised that routine regular support supervision be provided to VHTs about reporting of signals in EBS signals. This will help

in identifying and addressing barriers to reporting in order to facilitate adequate reporting of public health signals.

Older aged VHTs were more likely to report public health signals than younger ones. This may be because older people may have more experience and knowledge about health issues due to longer periods of service hence, making them more likely to notice and report public health signals [19]. Studies have demonstrated that older workers generally have higher levels of performance than younger ones and this is attributed to the cumulative increase in work experience and confidence over the years [20]. This suggests that older VHTs could be a vital human resource in implementation of EBS activities. In contrast to our findings, a study conducted in Benin showed that performance of health workers declined with increasing age where younger health workers outperformed old ones [21]. The reason for this was that younger health workers are more eager to look for new knowledge to improve on their performance while older health worker relied on prior knowledge and experience.

Females were more likely to report public health signals than the males. Females may have a different communication style as compared to males. Female health workers are more likely to be more empathetic, approachable and open in their communication than males [22, 23]. This attribute makes them receive more reports of public health signals than their male counterparts. Although there seems to be a gender disparity in reporting, training of VHTs in communication skills could be beneficial to all community health workers.

Respondents with at least a secondary school level of education were more likely to report public health signals. That is VHTs with a secondary school level education have high literacy levels and as such possess stronger communication skills and knowledge on public health issues [24]. This makes them have higher reporting possibilities of public health signals than those with primary school level of education. A study conducted in Uganda in 2019 amongst community health workers demonstrated that attaining secondary level of education was associated with higher performance of community health activities [25] including regular reporting. Recruiters of VHTs could take the advantage of high literacy levels exhibited by secondary school level of education for good performance.

VHT members who worked for more days in a week reported more public health signals as compared to those who worked less days. This could possibly be because VHTs who worked more frequently may have had more opportunities of interacting with community members and were able to identify and report potential public health signals. The extensive daily interactions and ties of community health workers with their respective communities provides an avenue for building trusted relationships and health promotion [26, 27] which facilitates easy reporting of public health events and signals. Different motivation factors that have enabled VHTs smoothly carryout their daily routine activities have been identified. In our study one KI stressed that renumeration of VHTs with a monthly stipend, airtime or another form of motivation would improve performance. We recommend provision of incentives that facilitate the regular interaction of VHTs with community members where they serve.

Holding regular monthly VHT meetings was associated with reporting of public health signals in the EBS system. It is likely that regular meetings provide an opportunity for VHTs to share more about public health issues affecting their communities and how to detect and report signals. This study supplements the findings of an Ethiopian study which demonstrated that regular interaction through meetings amongst community health workers builds trust, team work and improves performance [28]. It is advisable that VHTs have regular meetings as a tool for performance review, planning and performance improvement.

Study limitations and strengths

We acknowledge several limitations in our study. Firstly, relying on self-reported data regarding the submission of public health signals in the Event-Based Surveillance (EBS) system introduces the risk of response bias, including the possibility of social desirability bias. Secondly, the cross-sectional design of the study restricts our ability to establish causal relationships between the study variables. However, despite these limitations, our study employed a mixed-methods approach, combining both qualitative and quantitative methods, which enhanced the robustness of our findings. Furthermore, the insights gained from this study offer valuable evidence to the Ministry of Health (MoH) regarding the primary drivers of reporting public health signals in the EBS system. This evidence can inform the development of policies aimed at supporting the effective implementation of the EBS system.

Conclusion

The results of our study reveal a low incidence of reporting public health signals in the EBS system by VHTs in Kabarole District during the initial eight-month period following system implementation associated with older age, female gender, increased workdays, secondary school and higher-level education, and regular attendance at monthly village health meetings. These findings offer important considerations for the Ministry of Health to enhance reporting practices among VHTs in the EBS system. Our recommendations include the implementation of routine supervision and mentorship programs focused on improving reporting skills, targeted communication training, recruitment of VHTs with secondary education, regular organization of village health meetings, and provision of incentives to support VHT activities, including the reporting of public health signals.

Conflict of interest

The authors declare that they have no conflict of interest.

Authors' contributions

RZ: participated in the conception, design, analysis, interpretation of the study and wrote the draft bulletin; RM, ZK, AK, RA, JFZ, HNN, PCK, DK, BK, and LB reviewed the report, reviewed the drafts of the bulletin for intellectual content and made multiple edits to the draft bulletin; RM, DK, BK, LB, JK, IM, and ARA reviewed the final bulletin to ensure intellectual content and scientific integrity. All authors read and approved the final bulletin.

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