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Pastoralists' perceptions on the impact of Rift valley fever disease following an outbreak in North Eastern Kenya

Caroline M. Mburu^{1*} , Salome A. Bukachi¹ and Bernard Bett²

Abstract

Rift Valley fever (RVF) is a zoonotic disease which leads to livestock losses and human fatalities, thus impoverishing pastoralists who largely depend on livestock for their livelihood. These losses lead to both short- and long-term effects that perpetuate poverty and disrupt family order and structure. We used qualitative methods to understand the lived experiences of pastoralists with RVF after a major outbreak in Kenya. Using narratives, we identified the social, economic and psychological effects of this disease, while focus group discussions helped us to understand the experiences of the pastoralists during and after an outbreak. The major impacts were deprivation and impoverishment, abrupt disruption to their way of life and family dynamics and mistrust of the formal healthcare system. The latter was related to the isolation of patients and the presence of foreign medical personnel in the area that fueled mistrust. Efforts need to be made by public health practitioners and policy-makers to enhance dialogue between clinicians and pastoralists and to come up with practical ways of improving local people's livelihoods during and after an RVF epidemic.

Keywords: RVF, Public healthcare services, Livelihoods, Traditional medicine

Introduction

Rift Valley fever (RVF) is a zoonosis that affects animals such as cattle, sheep, camels and goats as well as humans (Bett et al. 2010; Njenga et al. 2010a, b, c). This disease can be transmitted between humans and animals (Macharia et al. 2010). Humans most often acquire RVF infection from bites from infected mosquitoes, exposure to the blood, body fluids and tissues of infected animals as well as inhaling infectious aerosols from body tissues (Njenga et al. 2010a, b, c). In Kenya, there have been outbreaks most recently in 1997–1998 and 2006–2007 (Bett et al., 2010). These outbreaks mainly occurred in the Garissa and Ijara regions of Kenya (Munyua et al. 2016a, b). These are areas characterized by seasonal vector activity as a result of periodic heavy rainfall and

subsequent flooding (Sang et al. 2010). Consequently, these vectors are responsible for the transmission of RVF in these regions. Human behaviour also plays a role in the transmission and spread of RVF (Njenga et al. 2010a, b, c). This relates to several activities associated with human-animal exposure such as contact with the blood, secretions, tissues or body fluids of infected animals during slaughter, food preparation, assisting with animal births or conducting veterinary procedures (Bett et al. 2010).

This disease leads to deaths in humans and livestock thus interrupting people's ability to meet their basic needs, leads to low milk yield from livestock, causes lower livestock prices and affects the export of livestock products (Chengula et al. 2013a, b; Muga et al. 2015). Rural pastoralist communities are the most affected because of their dependence on livestock and livestock products (Peyre et al. 2015; Sindato et al. 2012). Livestock for pastoralists is not only a source of food and

* Correspondence: mwihakic Carol@gmail.com

¹Institute of Anthropology, Gender and African Studies, University of Nairobi, Nairobi, Kenya

Full list of author information is available at the end of the article



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livelihood but also a source of personal pride and prestige, and thus, livestock losses lead to psychosocial distress (Sindato et al. 2012). Other cultural values attached to livestock include draught power, manure and their role as dowry (Peyre et al. 2015). There are several studies on the economic impact of Rift Valley fever, most focusing on the country level and are quantitative in nature (Pendell et al. 2016; Peyre et al. 2015; Wanyoike and Rich 2010). However, some have observed that the effects of a disease are complex and very few studies access the full scope of these effects and thus the need for qualitative studies of impact (Evans 2006; King and Bertino 2008; Peyre et al. 2015). Some of the effects of RVF are difficult to measure quantitatively especially in pastoralists contexts because of the cultural, emotional and psychological attachment that people have with their animals (Evans 2006). Qualitative studies thus are able to provide additional information that contributes to capturing the full extent of zoonotic diseases in specific contexts, thus aiding in priority setting and the development of very targeted interventions (Evans 2006; Bukachi et al. 2017; Molyneux et al. 2011).

The objective of this qualitative study was to establish the ways in which RVF affected individuals and families and their experiences regarding RVF treatment and health care access during an outbreak in Ijara district, Kenya. Our analysis focused on the lived experiences of individuals in this study area following a devastating outbreak that led to losses of livestock and human fatalities as well.

Study area and population

Ijara sub-county is located in North Eastern Kenya and is an arid area with predominantly mobile pastoralists who keep cattle, goats, sheep and camels. The map of the study area is shown in Fig. 1. The area receives an average annual rainfall of 250–350 mm (Kiambi et al. 2020). It has a population of 141,591 people mostly of the Somali ethnicity (KNBS, 2019). This study was carried out in the Ijara and Bulla Golol locations. The two locations are approximately 50 km apart. These areas were chosen because they have consistently been affected by RVF outbreaks and to a greater extent than other regions in Kenya (Njenga et al. 2010a, b, c). Generally, the sub-county is sparsely populated with the majority of the population being concentrated in facility and service areas. The population depends on pastoralism for livelihood and has great value for animals.

Methods

This study was part of a large multi-disciplinary study on the transmission dynamics of RVF in livestock and people called the Dynamic Drivers of Disease in Africa Consortium (DDDAC). The purpose of the study

discussed here was to examine the perceived impacts of RVF and the community's experiences with this disease. We conducted eight focus group discussions with 85 participants and narratives with six participants. The participants consisted of both males and females and were all aged 18 years and above. Focus group discussions were gender-specific to allow the participation of both genders without dominance from either one. The focus group participants were asked open-ended questions about the benefits of livestock for livelihood, specific ways in which RVF affected them as individuals, families and community as well as both the short- and long-term effects of the RVF outbreaks. The focus group discussions were held in the village either in the morning or in the afternoon under a tree or shed for between 60 and 75 min. Local male elders were also present during the interviews to clarify issues once the discussion was over.

Following the conclusion of the focus group discussions, a total of six narratives were conducted with four men and two women who had an immediate family member infected with RVF (5) or had been infected in the last outbreak with RVF (1). Narratives were used to obtain a detailed profile of the personal lived experience with RVF including their ability to meet their basic needs, impact of the illness or death on the family and their health-seeking behaviour related to this illness. These narratives were conducted in a location suitable to the interviewee such as their home or in a quiet location within the local shopping centre. Each interview took place within 60 to 90 min. The discussions and interviews were moderated by the lead author with a notetaker present in all the interviews. An interpreter, who was fluent in both the local language (Somali) and English, was also present. This research was conducted for 3 months in 2013. Purposive sampling was used to select the informants for the narratives and focus group discussions. This was done to increase the likelihood of generating appropriate and useful data by interviewing those who were knowledgeable on the study subject. The people were recruited from a wide age range (18–60 years) to provide a wide scope of information. Nine to 11 people were recruited in each focus group. Four focus groups were conducted with members of each gender. All the focus group discussions and narratives were audio-recorded and notes taken. The audio files were transcribed and translated into English by CM. Field notes were used as data to verify the translated transcripts. Thereafter, coding was done manually by CM who categorized the data to identify related ideas and the codes were verified by SB as recommended for qualitative analysis (Richards et al. 2018). Afterwards, the codes were grouped into themes according to the

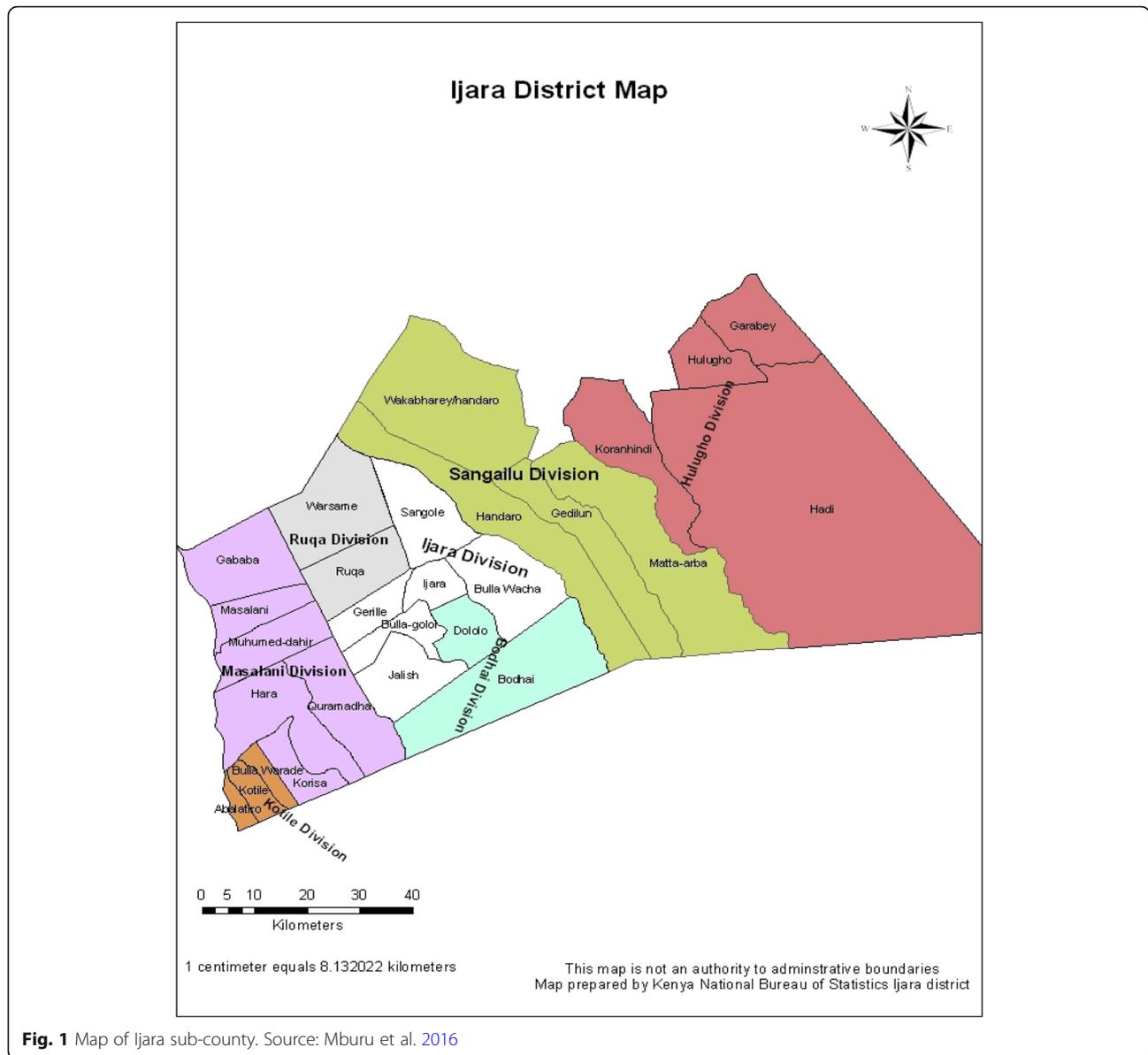


Fig. 1 Map of Ijara sub-county. Source: Mburu et al. 2016

study objectives. Translated verbatim quotes have been used to illustrate some key points in this study.

Ethics statement

This study was part of a larger study titled Dynamic Drivers of Disease in Africa Consortium (DDDAC) carried out by the International Livestock Research Institute (ILRI). The ethical clearance was issued by the Ethical Review Committee of AMREF in Kenya. The research permit was obtained from the National Council of Science and Technology in the Ministry of Higher Education, Science and Technology. Verbal and written consent for participation in the study was sought from all the adults recruited. Only those who consented in

writing to participate in the study were interviewed. No personal identifying information was collected. Additionally, to ensure the anonymity and confidentiality of the participants, pseudonyms were used in the data collection tools and in the final report.

Results

This study sought to understand the social, economic and psychological effects of Rift Valley fever (RVF) and the health-seeking behaviour of the pastoralists during an RVF outbreak. Therefore, we discuss the major perceived impacts of this disease as well as the management of RVF disease in humans.

Deprivation and impoverishment

Pastoralists in this study area reported a great loss of livestock and especially sheep during the RVF outbreak. Participants in the study observed that this adversely affected them as they depended on livestock for their sustenance and so they lost a great deal of their means of livelihood. For example, men in an FGD opined that, *people here depended on livestock for everything so when they died, we were adversely affected*. Women also collaborated this by adding that they lost about 60% of their livestock. For instance, they said, *RVF killed a lot of our livestock. If you had 100 of them, 60 died as a result of RVF*.

The most immediate effect of this loss therefore was immense hunger which was noted by both men and women. This was mainly a result of the closure of livestock markets and the ban on slaughter and consumption of meat products. This is exemplified in the quotes below:

People here depended on goats and sheep for sustenance. We sold them to buy food and slaughtered them for food too. Therefore, when all of them died we were affected deeply. (Men FGD, Ijara)

When there was the RVF outbreak, the livestock markets were closed so we just stayed home ...hungry. (Women FGD, Ijara)

Pastoralists also noted that following these losses there was impoverishment and poverty as a result of the loss of their means of livelihood as demonstrated in the quote below:

We became destitute and RVF reduced the population of livestock to zero. People who were rich become beggars and that was devastating. (Women FGD, Ijara)

Rift Valley fever led to the loss of human lives, and the pastoralists noted that this led to a sense of hopelessness, fear and anxiety. Participants in this study for example observed, *RVF is dangerous...people die very fast on acquiring RVF. We were scared, when we heard of RVF anxiety developed* observed a 45-year-old woman whose husband died of RVF in 2007.

Abrupt disruption to the way of life and family dynamics

Pastoralists reported that another major effect of this disease was the abrupt disruption to their way of life and family dynamics. This was reported by those who had lost an immediate family member due to RVF. The women, for instance, had to fend for themselves and their children and in other cases even get married so as

to get male support. In a focus group discussion one woman said that, *It was very difficult for a woman if the husband died. This is because the woman had to look after the children and also look after the remaining livestock on her own and that was a very difficult life*. In a focus group discussion, the men said that, *whenever a husband died the wife was affected psychologically, she lost weight, and the children went hungry because there was no one to provide for them*.

Narratives with two female informants exemplify this dilemma. This is an excerpt from a 45-year-old woman whose husband died of RVF in 2007:

His death affected me because I had no companion to raise my children. I had to do everything for them including paying school fees. It was very hard.

Another female informant whose mother died when she was 15 years old observed that she had undergone a lot of problems including having to look after her younger siblings who were aged 3 years and one and a half. She expressed her predicament in the following quote:

I went through a lot of problems when my mother died. I got married after she died so that I could get support to raise my younger siblings. I did not want to get married since I was only 15 years old but I had to.

Men on the other hand expressed the difficulties of raising children alone when the wife died. In one focus group discussion the men said that, *whenever a mother died life became very difficult for the husband and the children. It would even have been better if the husband died and the woman remained. There was nobody to look after the children when the mother died. There was no one to fetch water, wash the clothes and cook*. The men also reported that there was also the psychological turmoil experienced as a result of not being able to provide for one's family. Starting life afresh after RVF was described as very difficult by the discussants. For example, in a focus group discussion, women expressed it as follows, *when all the livestock died both husband and wife had to look for casual jobs like cutting firewood for sale or pushing handcarts and that was a very tough life that we were not used to*.

Community members therefore had to resort to alternative means of livelihood which forced them to adjust to other ways of living. Women in a focus group discussion opined that, *when all the livestock died the men went to Mombasa to seek employment and the wives had to remain here. Most women got so frustrated that they went back to live with their parents*. This was reported to be very difficult because they moved from being

owners of livestock to becoming herdsmen, loaders and cart pushers in local towns to make a living. This is exemplified below:

There is even a village in Garissa called “iskadek” which means “just surviving”. It is behind Garissa High School and 100% of the people there are from Ijara. They went there after the RVF outbreak in 1997 and all of them lost their livestock. So, they went to start life again as cart pushers and loaders. Others became herdsmen for other people and this really affected them psychologically. (32-year-old male)

Mistrust of the formal healthcare system

Pastoralists reported that they did not trust the formal healthcare system during the RVF outbreak because most of those who sought hospital treatment died while those who used home and traditional remedies recovered. For example, men in one focus group discussion said that, *the patients who were taken to hospital did not survive but those whom we refused to take to hospital survived*. Participants observed that they administered various remedies at home which they believed would cure RVF such as raw blood, milk, honey and over-the-counter medicines such as paracetamol. Furthermore, the Koran was read aloud to the RVF patients and this was believed to assure recovery from the disease. There were rumours too of suspicious activity by clinicians especially foreign doctors in hospitals that led to the death of RVF patients as shown in the excerpt below:

A 57-year-old man whose son was sick was interviewed and he collaborated this observation as expressed in the following narrative:

I refused for the doctors at the hospital to attend to him because I had heard rumors that the doctors were administering a lethal injection to the patients. I took him back home and by then he was still bleeding from the nose. At home we continued reading the Koran to him and he fully recovered despite the fact that he was very sick. Those who remained in hospital all died.

The following narratives by caregivers of RVF patients in the last outbreak also support these sentiments:

Narrative 1: Thirty-five-year-old male whose brother was infected with RVF but recovered

My brother was then 28 years old and a herdsman and in Garissa at the time of his illness. I heard that he was sick and I travelled to Garissa where I found him very sick and unconscious. He was bleeding from his nose and had wounds all over his body. He

and other RVF patients were together outside under a tent. Since people said that RVF had no cure, I decided to take him back home with me. I slaughtered a goat and he took some soup. After 7 days he started recovering. I gave him honey and water and he recovered fully after 14 days. At home I was able to take good care of him since all they did at hospital was give him blood intravenously. All the people who remained in the hospital died and they were more than 100. I think it is because the doctors from abroad were injecting medicine to RVF patients to try and see if it would work. After all there was no cure for RVF.

Narrative 2: Thirty-year-old male whose father died of RVF in 2007

My father was 63 years old at the time and a cobbler. He got sick for only 6 days, 3 at home and 3 in the hospital. He first developed a fever for which we gave him paracetamol and malaria tablets. The fever did not go away and he also complained of joint pains. Then he started bleeding from the nose, upper jaw and had bloody diarrhea. When he started bleeding that is when we took him to the hospital where the local doctor administered water and quinine intravenously. And then some foreign doctors from abroad came and they gave my father an injection and he started having a lot of pain and died. When he was being treated by the local doctor, he was getting better but the injection from the other foreign doctor made him worse. We believe these foreign doctors accelerated people's death to prevent RVF from spreading.

On the contrary, one respondent who was treated and recovered in a health care facility was glad that he was treated and recovered in spite of the gravity of his illness. He gave the following narrative:

Narrative 3: Forty-nine-year-old male who was infected with RVF and survived

I was herding cattle at the time when I got sick. I had a headache, vomiting and severe diarrhea and general body weakness. I stayed at home for 7 days before going to a health care facility. At first, I did not want to go to the hospital because I thought it was a minor illness which would go away on its own. People said that you only went to the hospital if you wanted to die since all those who went to the hospital died...and that is what I was afraid of. I therefore consumed raw blood from a goat as well as animal fat and milk mixed with water so that I could have diarrhea and recover. However, I did not

recover and I went to a health facility. At the hospital I was given water intravenously. Then a more senior doctor came in a helicopter and gave me medicine and that medicine made me recover. I was admitted for 5 days in total and I recovered fully.

Discussion

Our study sought to understand the effects of RVF as perceived by the pastoralists and their experiences with formal and informal health care during an outbreak of this disease. First, this study showed that deprivation and impoverishment was a major consequence of this disease. The pastoralists lost a lot of livestock, especially sheep. The participants in this current study noted that the great loss of livestock and livestock-related income led to the loss of sustenance for the community since livestock provided them with meat, milk, skin, hide and income. This directly affected them as they lacked food due to their dependence on animal-sourced foods. The closure of livestock markets and ban on the slaughter of animals caused them to lose income and thus their major source of livelihood. Studies have shown that many animals die during an RVF outbreak especially young animals, which affects food availability and the livelihoods of pastoralists (Bett et al. 2010). Similarly, in Tanzania and Kenya, many pastoralists were unable to obtain food due to the loss of livestock, reduced milk production and ban on slaughter and sale of livestock following RVF outbreaks (Bett et al. 2010; Chengula et al. 2013a, b; Muga et al. 2015).

The role of RVF in perpetuating poverty especially in rural communities has clearly been demonstrated in previous studies (LaBeaud et al. 2008; Molyneux et al. 2011; P. Munyua et al. 2016a, b). This is not only as a result of losses from livestock deaths and production but also from intervention measures such as ban on the sale of animal products and the closure of livestock markets (Peyre et al. 2015). In one study conducted in Kenya, the death of the new crop of newborn livestock as a result of RVF led to long-term impoverishment for the pastoralists since livestock were their source of food, livelihood and cultural value (LaBeaud et al. 2008). This disturbance in herd dynamics therefore has long-term effects for pastoralists due to abortions in 90–100% of livestock cases as experienced by livestock producers (Peyre et al. 2015). Other studies demonstrated that the ban on slaughter and the restriction of animal movement caused a devastating impact on livelihoods as the majority of the people depended on livestock for survival (Breiman et al., 2008; Nguku et al., 2010). Notably, the impact of RVF to pastoralists' livelihood and wellbeing is complex because livestock is not only a source of income but a source of cultural pride and identity (Peyre et al. 2015; Reidpath et al. 2011; Sindato et al. 2012). Unfortunately,

too, these outbreaks occur in regions that are least capable of dealing with them (Balkhy and Memish 2003). This is because of marginalization, poor infrastructure, illiteracy and lack of proper medical facilities (LaBeaud et al. 2008). Food insecurity, poverty and effects of livestock diseases therefore are closely intertwined. Poverty eradication therefore becomes a challenge. Endemic zoonoses therefore are an impediment to reducing world poverty.

We did establish that people died during the RVF outbreaks leading to devastating consequences to their families. These consequences included the inability to meet basic needs including funds for education as a result of the death of the breadwinner. The study also established that disruption of family life occurred as husbands went to other towns to look for employment and women had to fend for themselves and their children and in other cases even get married so as to get male support. Men whose wives had died also found it very difficult to look after their children. There was also the psychological turmoil of losing close relatives. Similarly, an assessment of the RVF outbreak of 2006/2007 in Kenya noted that more than 450 people died, most of them in Garissa County (Macharia et al. 2010). In another study by Njenga et al. (2010a, b, c), the case fatality rate for patients hospitalized with RVF was reported to be very high. In one instance between December 14 and December 20, 2006, 11 out of the 12 patients admitted with RVF at the Garissa Provincial General Hospital with RVF died (Njenga et al. 2010a, b, c). Similarly, others have noted that food insecurity and psychological stress are a major result of RVF especially among pastoralists (Chengula et al. 2013a, b; Sindato et al. 2012).

This study found that home-based treatment for RVF was preferred over hospital-based care. Study participants argued that in the last RVF outbreak in 2006/2007, all the RVF patients who were treated at home recovered and those who went to the hospitals died. The findings of this study showed that people suspected to be suffering from RVF were treated using raw goat blood, milk, honey and over-the-counter medicines such as paracetamol. In addition, they had the Koran read to them by a local Islamic leader. They added that they were suspicious of the treatment being administered in hospitals especially by foreign doctors. Some studies observed that the majority of the participants reported that they would seek conventional care for RVF (de St. Maurice et al. 2018; Shabani et al. 2015). On the contrary, one study in Uganda found that alternative providers including traditional and spiritual healers were used in seeking treatment for RVF (Bowmer 2020). Rural populations are known to utilize traditional healers because they are accessible, affordable and trusted by the community (Graz et al. 2011; Miguel et al. 1998). Traditional

medicine thus is often valued because it is perceived to be more effective than conventional medicine (Makundi et al. 2006).

Limitations of the study

This study entailed the use of qualitative data to understand the impact of RVF on a pastoralist community. Although the results of this study cannot be generalized, this study provides detailed and context-specific information that can be used to develop locally acceptable and relevant mitigation measures. This study utilized narratives and focus group discussions several years after the RVF outbreak which could have led to recall bias. Nevertheless, because the outbreak was very impactful due to the animal and human losses encountered, the data collected was valid and accurate. Future studies should quantitatively assess the economic impact of livestock and human losses and be conducted soon after an outbreak.

Conclusion and implications

In conclusion, this study demonstrates that RVF impacted the community adversely especially because of the loss of large numbers of livestock, loss of human life and a disruption in people's way of life. This loss led to hunger, impoverishment, frustration, loss of self-worth, broken homes and poverty. In this regard, this study demonstrates the importance of community perceptions and qualitative assessments of the impact of the disease. These help in understanding the in-depth effects of a zoonotic disease in a community and putting into place mitigation measures that are practical, realistic and contextually relevant. Solutions need to help local people deal with both short- and long-term effects. Response programmes and mitigation strategies during an RVF outbreak ought to include nutrition programmes and other longer-term economic empowerment options.

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Authors' contributions

Conceptualization: Bett, B and Bukachi, S. Data collection: Mburu, C. Formal analysis: Mburu, C and Bukachi, S. Funding acquisition: Bett, B. Writing of original draft: Mburu, C. Writing—reviewing and editing: Mburu, C, Bukachi, S and Bett, B. The authors read and approved the final manuscript.

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Availability of data and materials

All the data used in this study is available through the corresponding author.

Declarations

Ethics approval and consent to participate

This study was part of a larger study titled Dynamic Drivers of Diseases in Africa Consortium (DDDAC) carried out by the International Livestock Research Institute (ILRI). The ethical clearance was issued by the Ethical Review Committee of AMREF in Kenya. The research permit was obtained from the National Council of Science and Technology in the Ministry of Higher Education, Science and Technology. Verbal and written consent for participation in the study was sought from all the adults recruited. Only those who consented in writing to participate in the study were interviewed. No personal identifying information was collected. Additionally, to ensure anonymity and confidentiality of the participants, pseudonyms were used in the data collection tools and in the final report.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

Author details

¹Institute of Anthropology, Gender and African Studies, University of Nairobi, Nairobi, Kenya. ²International Livestock Research Institute (ILRI), Nairobi, Kenya.

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