



*Original Research Article*

# Contemporary approaches to jigger flea control in the pastoralist environment of the Maasai Community in Hai District, Kilimanjaro Region, Tanzania

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In this qualitative study, we delve into the crucial issue of controlling jigger fleas within the pastoralist environments of the Maasai community in Tanzania. Jigger fleas pose a significant health threat to the Maasai people and their livestock, and understanding the control methods employed is vital for effective intervention. Through in-depth research and community engagement, we aimed to shed light on the controlling strategies and challenges in mitigating the persistent jigger infestations. A total of 62 participants were involved in the qualitative study conducted in the first phase. This phase consisted of 20 in-depth interviews (IDIs) and four focus group discussions (FGDs), each involving eight participants. Participants were selected from 10 villages in the Naepo ward and 10 villages in the Nasinyai ward. The study focused on the most effective interventions for eradicating flea infestations caused by jiggers in the dung-built huts of the Maasai environments. Purposive and convenience sampling methods were employed to recruit family members for participation in IDI and FGD. Findings were analyzed using a thematic process to identify sub-themes and themes. Themes derived from the findings encompass different aspects of the jigger infestation problem, including neglected cattle care, hygiene solutions, jigger transmission from livestock, tackling the jigger worm, and controlling fleas through animal husbandry. The research has highlighted the profound impact of jigger infestations on livestock and human communities, emphasizing the urgency of improving neglected cattle care practices. Addressing these issues through hygiene solutions, understanding livestock-based jigger transmission, and effective jigger worm management are crucial steps toward alleviating widespread suffering and fostering positive change in affected pastoralist environments.

**Keywords:** Control, jigger fleas, pastoralist, environment

## INTRODUCTION

In settings with constrained financial and human resources, neglected tropical conditions related to parasitic skin

disease, including those caused by penetration of the jigger flea, also called sand flea or *Tunga penetrans*, are usually

experienced. Following penetration, the burrowed sand flea induces acute inflammation of the skin, which is usually compounded by secondary bacterial infections. Furthermore, Tungiasis, known as sand flea disease, is a parasitic skin disease with origins in South America. It was introduced into sub-Saharan Africa in the 19th century (Oranges et al., 2022) (Muehlen et al., 2006). Complications of tungiasis, such as bacterial super-infection and debilitating sequels, are often seen in communities from endemic areas with poor sanitation and among the neglected Public health Problems (Gitau et al., 2021). Furthermore, tungiasis is a public health disease in many rural and urban slums in sub-Saharan Africa (SSA), primarily affecting children and the elderly. Yet, this disease has received little attention in many sub-Saharan African countries, including Tanzania. (Mazigo et al., 2011)(Obebe and Aluko, 2020).

Tungiasis can facilitate the transmission of blood-oriented diseases, e.g. hepatitis B and HIV, if non-sterilized instruments are used to extract the embedded flea (Oranges et al., 2022). The problem is worsened if these instruments are shared among family members (Richmond, 2022). Such a condition is because many pathogenic bacteria have been detected at the point of flea entry, the swollen area. Where it is pierced by a thorn normally used by the affected community to remove the jigger fleas from the skin, bacteria enter the infected area. Many times, it has become difficult to control tungiasis and the associated health problems due to the experience of stigma and the social patterns and beliefs among jigger-infected communities (Richmond, 2022). In most infested household families, domestic animals are usually set free to roam in the compound where they easily interact with wild animals around the household environment facilitating the spread of the sand flea (Dvorak and Shaw, 2018). When human-biting sandflies occur, various sandfly species from the genus *Phlebotomus* are anticipated to facilitate the connection between wild and peri-domestic animals. Thus, animals exacerbate the jigger problem in endemic communities, increasing the risk of human infection (Velev, 2022). Most jigger-infected settlements especially the pastoralist communities, do not know the role played by domestic animals in exacerbating tungiasis and thus freely interact with these animals, oblivious of the exposure (Köbrunner et al., 2020). Other risk factors include presence of ground floor (earthen floor), irregular use of shoes, contact with animals, and residence in rural areas. According to most authors, jigger infestations are related to exposure and environmental factors (Gitau et al., 2021; Oranges et al., 2022). The prevalence of tungiasis associated with the exposure of the foot when walking with bare foot, a condition which is usually common and is highest in children aged 5-14 years play barefoot and adults ≥60 years in marginalized community and those from pastoralist environments, most often prefer to work barefoot on farms. Such adults are more likely to overlook or under-see a flea bite because of poor eyesight and the lack of ability to remove it from their skin in a timely manner as people of active age. Research studies report

that tungiasis can lead to shame and stigma, especially in children, which can limit their attendance at school and socialization (Tamene, 2021). Research study reports that living in huts with earth floor gives an easy opportunity for infestation (Richmond, 2022).

According to research studies in the field, modification of flooring, usually with cement, severely limits disease incidence (Enwemiwe et al., 2021; Mukhavali, 2011). Likewise, some studies have shown that no viable forms of *Tunga penetrans* have been detected in outdoor soil samples, but instead, soil samples under beds and hammocks, as well as in indoor dog kennels, are rich in parasite (Velev, 2022)(Köbrunner et al., 2020). Therefore, living in huts with earth floors gives an easy opportunity for infestation (Mukhavali, 2011). All field studies have shown that flooring modification, usually with cement, severely limits disease incidence (Enwemiwe et al., 2021). Severe complications due to tungiasis are common in areas where people suffer from constant reinfestation and where hygiene conditions are precarious (Elson et al., 2022). Bacterial superinfection is often present, and pustules, abscesses and ulcers are commonly seen. Pain, inflammation and fissures hinder individuals from walking normally; sequels include deformation and loss of toenails and digits. In non-toxoid vaccinated individuals, lesions may be a port of entry for tetanus infection (Mazigo et al., 2011; Heukelbach, 2006; Miller et al., 2019). Tungiasis often leads to severe complications, including bacterial superinfection, painful lesions, deformities, and the potential risk of tetanus infection in non-vaccinated individuals. Therefore, the study aimed at controlling jigger infestations in indoor environments of the Maasai community.

### **Problem statement**

The information of jigger burden is limited; unlike for most diseases, which attract a lot of attention and funding; henceforth, it is largely ignored and neglected by the scientific community, the health sector, treatments and policy systems. However, as a consequence, universally, there are no accepted methods to treat and control tungiasis. Jerome et al., 2016; Deka, 2020; Walker et al., 2017). It is highly endemic in rural African countries, including Tanzania, associated with poor families (Mazigo et al., 2011)(Deka, 2020); tungiasis or jigger infestation is a neglected tropical disease caused by penetration of the sand flea into a person's skin and other hosts. The wounds created cause discomfort and may lead to secondary infections such as tetanus.

The Maasai community in remote areas of Hai district live in houses with earthen floors and the soil of the village is sandy, clay and mud-covered houses that lead to the risk of jigger infestations. However, the community lacks knowledge of personal hygiene, environmental hygiene and how to control skin infestation diseases, including jigger fleas. Thus, the study will focus on assessing factors that influence practices towards the prevention and control of tungiasis in remote areas of Maasai villages.



**Figure 1:** Insecticide treatment in progress; mattress removed from the house to eradicate jiggers

## Study purpose and objectives

### Purpose of the study

This project conducted a baseline assessment to learn the environmental set-up of the Maasai remote area in Hai district that favor the growth of jigger infestations in indoor environments. The findings helped to identify the correct process of eradicating jigger infestations in Maasai household environments. In addition, the knowledge is used to develop advocacy educational materials for the community sessions to facilitate understanding the use of insecticides and environment cleanliness to control jigger infestations through community health care workers, including community leaders. Using an approach that intends to involve the three levels, the community health care workers in direct contact with the community through active knowledge transfer sessions to the Maasai routine local community meetings will strengthen the bond between the two and increase community awareness on hygienic standards.

### Objectives

To promote awareness on jigger control in Maasai local community in remote areas in Hai District Kilimanjaro Region Tanzania.

### Specific objectives.

- To establish socio-economic factors related to jigger infestations among rural households.
- To determine environmental factors associated with jigger infestation.
- To assess the type of rural households that favour jigger infestation.

## METHODOLOGY

This was a baseline assessment that included Focus Group Discussion (FGD), In-depth interview (IDI), and observation to enable the identification of the environmental factors associated with jigger infestations in the Maasai households of hard-to-reach remote areas of Hai District community in Kilimanjaro Region Tanzania. Field notes were recorded during data collection (Creswell, 2007)

### Study settings

Hai District in the Kilimanjaro Region is one of the seven districts in the area occupied by the Maasai community. The district comprises ten administrative wards. The study area was selected from the most hard-to-reach rural Maasai villages (Official Map of Tanzania, 2012). The poor infrastructure hinders easy access to these villages, and there is poor access to water supply and electricity—conditions that deter many people from visiting or showing interest in development. Despite this, some non-Maasai who are not pastoralists and have modern houses have migrated to the Maasai community. The Maasai villages have buildings made of mud and cow dung, which are primary sources of jigger infestations. The fissures in the Maasai mud houses hide jigger eggs (Mazigo et al., 2011; Wiese et al., 2017). Additionally, the dirty indoor environments favor the existence and infestation of jiggers in Maasai communities. Thirty Maasai households from Naepo and 35 households from Nasinyai were visited and sprayed with insecticides. (Figure 1).

### Study population

The study population comprised village family households, community health care workers, community leaders and

key personnel.

### **Study Sample and Recruitment**

The study employed a purposive and convenience sampling to obtain ten households with the highest reported jigger cases, ten Community Health care workers from the ten selected villages and 3 Key personnel (local government leader, community social groups, district health officer) from the ten selected villages; to participate in the baseline assessment (Borg, 2003). The sample of participants required for the study was determined from the saturation point (Saunders et al., 2018).

### **Inclusive and Exclusive Criteria**

Those who met the required criteria, i.e., Community healthcare workers of the selected villages. Participants who signed a written consent. (Community leaders) and families from the selected households. Those out of the selected villages were excluded.

### **Data collection tools**

#### **Interview Guide**

A semi-structured interview guide for In-depth interviews (IDI) and Focus Group discussions (FGD) was developed based on reviewed literature and objectives. The guiding points comprised the demographic and socio-economic factors related to jigger infestations, environmental sanitation and views of the household members on jigger infestations. The interview guide was written in Swahili and included open-ended prompts that focused on the nature and sources of the jigger infestations in the Maasai environments. The guide was piloted with four families who met the required criteria. Minor modifications were made following the feedback obtained.

#### **The approach of the data collection**

Convenient places and times for the interviews were agreed with participants before the interviews. Participants' consent and confidentiality were maintained. The study procedure followed the consolidated criteria for reporting qualitative research (Creswell, 2007). Social scientists experienced in moderation conducted the FGDs and IDIs. The FGD comprised 5-10 participants (Krueger and Casey, 2014). Participants' non-verbal responses were noted and connected with the findings. Interviews last 60-90 minutes.

### **The Approach of the project was in three steps**

#### **Step one**

Baseline assessment for informative information through FGD and IDI focuses on the Maasai community from hard-to-reach villages, inclusive of villages from remote areas. The baseline assessment data was processed from January

to February 2022. Information helped to get the views of the Maasai community on jigger infestation and ways of eradicating jigger fleas by use of insecticides from their home environments.

#### **Step two**

The reviewed literature, including the problems and needs identified from the Baseline Survey, helped to develop the advocacy material. At the same time, results of the survey were presented at the village authority inclusive to the Maasai community village routine local meetings to orient the households on the use of insecticides.

Maasai villagers conducted community sensitization sessions that included the selected Health Care Workers community leaders, including the local government officers and community social groups from March to April 2022. They embarked on producing a manual titled 'Control jigger infestations in Hai District' and Brochures, Posters inclusive leaflets aimed at building awareness of the community on control of the jigger infestations in the target villages. The reviewed literature, including the problems and needs identified from the Baseline Survey, helped develop a training manual. The survey results were presented to the village authority inclusive the Maasai community village routine local meetings to orient the households on the use of insecticides.

#### **Step three**

From May to July 2022, the project conducted monitoring of the acquired knowledge on the application of insecticides to earthen household environments inclusive of evaluation at the end.

Based on the brochures, posters developed from the training were used during local community meetings to make the knowledge self-explainable among community members in a natural, costless and sustainable manner. This process is intended to strengthen the coordination mechanism within the village for minimizing jigger infestations and solution findings. At the time of the evaluation, participants reviewed the results of the Baseline Survey together to establish a common understanding of the community's actual situation. They discussed the problems and needs identified from the Baseline Survey to determine whether the strategies the community employed to cope with their ability to eradicate jigger infestation were effective by updating the information of the achievements. In the current status of various social groups in the village, the community leader's inclusive community members were given time to assess their own experience and capacities in solving the problems associated with the jigger infestations in their community.

#### **Data Analysis and Rigor**

Explanations provided to participants about the study were a Swahili language they understand. The participants were free to deny participation or discontinue the study at any

**Table 1.** Shows Sociodemographic Characteristics of the Family Members

Study Setting	No. of family members				
		Non-formal	Primary	Secondary	Type of farming
Rural*	65	8	50	15	Animal farming
Hard to reach Villages**	62	40	15	7	Animal farming
Other groups and Community Social group (Rural)	Government leaders	-	4	2	-
	Health care officer	-	-	2	-
	Community Activists	-	4	-	-
Other groups and Community Social group (Hard to reach villages)	Government leaders	-	4	1	-
	Health care officer	-	-	2	-
	Community Activists	-	4	-	-

Naepo\*\*, Iotoito\* and Kimuingani\*  
Naisinyai\*\*, Naibini\*\* and Njorogine\*\*

**Note:** Only two villages were selected where the families had the interest and time to participate in the study. The study focused on Maasai houses, excluding the nearby houses built by migrants, as those were well developed and free of jiggers.

time. The written Informed Consent form was provided and signed before participating in the research and names were not used, but identification numbers were. However, informed consent was sought from participants below 18 years old but are married (mature minors). In cases where participants have low literacy levels, study staff, in the presence of a trusted family member/friend of the participant, was requested to read the informed consent form out loud; consent was taken by fingerprint and witnessed by a study staff/family member/friend. Participants were given a copy of both the Participant information sheet and the consent form. All explicitly retain copies of the informed consent form were stored in a locked filing cabinet at KCMUCO. Confidentiality was maintained throughout.

### Data management and analysis

All FGDs and IDIs were conducted in Kiswahili, a national language spoken by most Tanzanians. Audio recordings of the interviews/discussions were transcribed verbatim into Kiswahili and then translated into English by a bilingual linguist to minimise the loss of meaning during translation. After that, two researchers who are fluent in both languages checked the transcripts against the audio recordings. The thematic analysis process involved analysis of reading and review of the data, followed by coding and category construction based on data characteristics to uncover sub-themes and themes pertinent to the findings, guided by the analytical framework described by (Braun and Clarke, 2019) trailed credibility in combining and comparing the identified themes (Smithson, 2000).

### Study Findings

#### Socio demographic Characteristics

The study consisted of 73 and 62 family members purposively selected from rural and hard-to-reach villages, respectively. The participants were chosen based on their

convenience. However, participant selection focused on the Maasai community, known for their nomadic lifestyle with their families, except for those who moved to the hard-to-reach villages in search of green pastures for their animals Table 1. The majority of participants had a primary education level, as they could not settle in one village for an extended period due to their need to move with their flock of animals to villages with green pastures. Furthermore, the investigation highlighted that the hard-to-reach villages suffered from a lack of permanent housing, healthcare facilities, access to clean water, and essential social interaction services.

#### Identified Study themes

Hygiene solution addressing worm infestation in this study, community could not know the hygiene solution. Jigger Worm Transmission from Livestock, Tackling jigger worms. Environmental Fly Breeding Environment, Health Risks of Jigger Worm Infestation and Control of fleas in animal husbandry Table 2.

#### Description of the themes

##### Jigger worm infestations

The jigger worm's remarkable ability to reproduce when infested by fleas leads to the laying of numerous eggs, giving rise to multiple bugs. Even if the worms are physically extracted from an infected host, their resilient eggs can persist, ensuring an ongoing cycle of new worm generations.

The findings from the study revealed an intriguing phenomenon that sheds light on the persistent nature of the jigger worm infestation in pastoralist environments and its impact on affected individuals. This was evidenced during group discussions:

*Upon infestation by a flea, the jigger worm reproduces by laying countless eggs, resulting in multiple bugs. Even when the worms are physically removed from an infected*

**Table 1.** Indicates Sub-themes and themes

Sub-theme	Theme
Environmental jigger infestations	Hygiene solution addressing worm infestation.
Livestock-mediated Jigger Worm Infestation in Humans	Jigger Worm Transmission from Livestock
Urgent measures combat jigger worms	Tackling jigger worms
Environmental and Health Impacts of Poor Waste Management during the Rainy Season	Environmental fly breeding occurs during the rainy season. Environmental Fly breeding Environment
Transmission of Parasites from Livestock to Humans	Transmission of jiggers from livestock waste
Jigger Worm Infestation in Human Habitation	Health Risks of Jigger Worm Infestation
Innovative and Effective Methods of Flea Control in Animal Husbandry.	Control of fleas in animal husbandry

*individual, their eggs can persist, continuously producing new worms.* (FGD 1 Female).

### Impoverished living conditions

The heightened prevalence of these worms is exacerbated by impoverished living conditions, where there is water scarcity, where limited financial resources hinder individuals from affording the necessary medication to eradicate jigger infestations.

Further, a female from the remote hard to reach villages viewed her experience and said:

*Poor living circumstances make it difficult to maintain living spaces and buy the necessary medication to remove jigger infestations, which contributes to the prevalence of these worms* (IDI Female).

### Primary transmission of jiggers

From the study, we explored the transmission of jigger worms, primarily carried by livestock like cows and goats, which can migrate from cowsheds to homes and infest the human body. From the focus discussions, the views of the participants showed evidence and one with emphasis said *animals primarily transmit jigger worms* (FGD 5 Female)

The study explored the transmission of jigger worms through focused discussions. The views of the participants provided evidence, and one participant emphasized the following from her life jigger experience:

*Jigger worms are primarily transmitted by livestock such as cows and goats. By residing in the cowshed, these animals contribute to the presence of jiggers. Consequently, the jigger worms can migrate from the cowshed to homes, infiltrating the inside and eventually infesting the human body* (FGD 3 Female).

### Neglected cattle care predisposes Jigger infestations

*From the study, there was also a concern regarding the importance of washing cattle with medication to prevent the multiplication and reproduction of jigger worms, which can affect both children and adults. One participant from the male FGD share and said:*

*Oh! I know that jigger worms can come from cattle. If you don't wash the cattle with medication, the jiggers will multiply and reproduce, affecting both children and adults* (FGD 4 Male)

### Infectious cow and goat worms persist resiliently

From the exploration process, the study delves into the remarkable ability of worms to endure various challenges, which pose a significant concern for livestock and human health. The study focused on thoroughness, aiming to uncover insights regarding the diverse challenges prevalent in livestock and human environments. Out of existing practice, it was learnt that:

*The worm is entirely compatible with dirt, and if you continue without bathing without applying oil, its medicine will not help. And inside our houses, we are pouring powdered soap mixed with water, but it doesn't help until we find the drug that will help us, it becomes a huge problem for humans.* (Female IDI)

### Transmission of jiggers from livestock

The study intricate details and implications of jigger worm transmission, aiming at shedding light on its impact on livestock and potential solutions to mitigate its effects. This was supported by a statement from one of the participants from the group:

*The persistence of jigger worms on clothing allows them to be carried indoors, posing an infectious threat. Merely bathing does not alleviate the problem, as the worms remain alive. The lack of an effective medicine to eliminate jigger worms further compounds the issue. Finding a solution to eradicate the worms is crucial to ensure effective prevention and treatment* (4 FGD Female)

### Tackling jigger worms

Addressing the menace of jigger worms is of paramount concern, necessitating a comprehensive and practical approach. These pesky jigger infestations have been causing distress and discomfort to humans and animals alike, underscoring the urgency to implement measures

that can effectively mitigate their impact. During the group session, women appeared to be more aware of the hazards posed by jiggers in their surroundings compared to their male counterparts, voicing the following concern:

*There is an urgent requirement for effective measures to combat jigger worms and prevent their transmission indoors. These measures should be implemented promptly to address the pressing issue and protect human and animal well-being. (5FGD Female)*

### **Environmental Fly Breeding Environment**

During male group sessions, the moderator actively investigated the likelihood of flies breeding in discussed environments. The moderator's role is to probe and explore the possibility of fly reproduction in those specific settings. These discussions focused on understanding the probability and conditions under which flies might breed in the given environments. Aiming to gain a comprehensive understanding of potential fly breeding environments during those group sessions attended by males, one of them voiced out and said:

*Environment makes or contributes to the presence of jigger worms. For example, during the rainy season, the presence of significant amounts of garbage, including cow dung and meat, along with nearby slaughter environments and meat boiling areas, attracts flies to the site. These flies can carry microorganisms that lead to jigger infestations in humans and cows upon contact. (Male 2 FGD).*

### **Health Risks of Jigger Worm Infestation**

Through in-depth analysis, the study discovers the importance of early detection and effective prevention strategies to mitigate the impact of Jigger worm infestation on affected individuals and communities. This was supported by a female family member who emphasized the importance of eradicating the jiggers.

*Yee!! Jiggers are dangerous parasites that thrive in unclean environments, such as our livestock sheds, making it challenging to maintain cleanliness. These pests prefer to reside on toes, causing significant trouble for families. I have experienced jigger infestations on my children's toes, as these parasites burrow into the skin of humans and animals, typically targeting the feet and causing painful and itchy lesions. Removing the jiggers from the spaces between their toes is quite tricky. (Female. ID1).*

### **Control of fleas in animal husbandry**

Experience of Jigger worm infestations was a problem among community members. They proposed an intervention through the application of medication:

*As a preventive measure, we burn the manure and apply another red medicine. We performed these steps on the animals today. Afterwards, you use the red powder from the neck to the spinal stripes; this medicine spreads across the whole body with the wetness and effectively eradicates all.*

## **DISCUSSION**

The qualitative study conducted in Hai District, Tanzania, aimed to investigate effective control measures for jigger infestations within Maasai endemic communities. An essential aspect of the study involved examining the transmission of jiggers to animals, with a particular focus on the broader community impact, especially on livestock. Barriers hindering effective control of jigger infestations, such as cultural practices and economic constraints, were also identified. In addition to the themes above, the study had the overarching goal of uncovering viable strategies or interventions for eliminating the jigger infestations. This comprehensive approach aimed to address the issue by applying insecticides to pastoral environments to eradicate jigger infestations.

The study's findings regarding jigger worm infestations in pastoralist communities underscore the profound impact of this parasitic problem on affected individuals and highlight its tenacious nature. One crucial revelation is the jigger worms' remarkable ability to multiply when infested by fleas, shedding light on the intricate and often underestimated life cycle of these parasites. This insight carries significant implications for public health interventions to eradicate jigger infestations. It emphasizes the necessity of comprehensive strategies targeting not only the visible worms but also the persistent eggs to break the cycle of infestation. These findings align with a study that emphasizes the importance of community education and awareness to proactively prevent infestations, recognizing that understanding the intricacies of jigger worm infestations is a pivotal step toward effectively addressing this longstanding health issue in pastoralist environments (Smith et al., 2022). Likewise, our study suggested that while the findings may cast doubt on the immediate impact of the hygiene solution, they also emphasize the need for a holistic approach to public health interventions that encompasses education, cultural awareness, and community involvement.

The study's revelation of the jigger worm's exceptional reproductive resilience further underlines the complex challenges posed by this parasitic infestation within pastoralist communities. This discovery aligns with recent research on parasitic infestations' ecological dynamics, emphasizing the significance of comprehending parasites' life cycles for effective control measures (Johnson and Martin, 2023). . It also resonates with observations regarding enduring health disparities in underserved communities, where persistent infestations like jigger worms continue to impact individuals' well-being. The jigger worms' ability to persist through their eggs, even after physical removal, underscores the need for a holistic approach that prioritizes treatment, prevention, and education to break the infestation cycle and enhance the overall health of affected communities.

Further, the study findings discover the significant impact of impoverished pastoralist living conditions on the prevalence of this parasitic problem. As highlighted in



recent studies (Smith et al., 2022) with evidenced combination of water scarcity and limited financial resources that creates a challenging environment while individuals struggle to access essential medications for eradicating jigger infestations. For more support, the study's participant, a female from a remote and hard-to-reach village, further viewed the link between poor living circumstances and the persistence of jigger infestations. In such conditions, it becomes increasingly difficult for individuals to maintain clean living spaces and afford the necessary treatments, perpetuating the cycle of infestation. These findings call for targeted interventions to improve living conditions and healthcare accessibility to alleviate the burden of jigger worm infestations in vulnerable communities (Johnson and Martin, 2023).

The findings of jigger infestations in the parasitologist community highlight the resilient nature of these infectious cow and goat worms, posing a significant threat to livestock and human health. This study highlights the urgent need for comprehensive solutions to tackle this persistent issue. The worm's adaptability to dirt and resistance to conventional treatments is a pressing concern, as expressed by the community members. These findings underscore the importance of continued research and the development of effective medications to combat jigger infestations, emphasizing the critical intersection of human and animal health in these environments. Recent studies have also echoed the need for integrated approaches to address similar parasitic infections in both animals and humans (Smith et al., 2022).

Addressing jigger worm infestations among the pastoralist community is a pressing issue that requires a multifaceted strategy encompassing prevention and treatment, with active community involvement. The urgency stems from the suffering experienced by the household members and their livestock. Notably, female participants in group discussions highlighted the immediate need for collective efforts to combat and prevent jigger worm infestations in households. A holistic approach that considers the interplay between human and animal health is essential to tackle this issue and promote overall well-being. Recent research underscores the significance of community-based interventions and collaborative endeavors for effective jigger control under the spray of insecticides, ensuring a healthier future for the pastoralist community environment (Johnson and Martin, 2023; Smith et al., 2022; Nyangacha et al., 2022).

The persistence of jigger worms on clothing and their shoes highlights the concerning route channels of jigger spreading they pose, which goes beyond the livestock-human interface; as noted by the community member, the adequacy of current treatments of insecticides application adds complexity to the issue, emphasizing the pressing need for effective insecticides to eradicate the jigger worms. This is also stressed in other research that reinforces the urgency of addressing jigger infestations and their transmission dynamics (Johnson and Martin, 2023). Understanding these complexities is crucial for devising comprehensive strategies that prevent jigger infestations

and facilitate effective permanent prevention in the high endemic environments.

Lastly, a personal account of a community member vividly illustrates the need for immediate action and eradication efforts. The insight from other studies supports the critical need for public health campaigns, improved sanitation practices, and community education to combat the health risks of jigger worm infestations (Nyangacha et al., 2022).

## CONCLUSION

The study gathered evidence from community members regarding the transmission of jigger worms within the community. It was revealed that members of the community who had jigger infestations mentioned neighborhood visits as a potential means of spreading the jigger worms from one house to another. This transmission occurred as the jigger worms were carried in the clothing and shoes of these individuals. This experience underscores the importance of implementing comprehensive intervention strategies to combat jigger worm infestations within the community. These strategies should include a focus on insecticide application as a preventive measure. Furthermore, the community's practices of burning manure, applying medication to animals, and spreading red powder to eradicate fleas are recommended as effective methods for preventing jigger infestations. These findings highlight the significance of community-based approaches in controlling jigger infestations in animal husbandry. Ultimately, these efforts will enhance the well-being and overall quality of life for both animals and humans in pastoralist environments.

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## Author's contribution

A M, AK, HS, and ACM were involved in the conception and design of the study. AM, MO ML and AK. were involved in data collection and AM MO, were involved in the analysis of the data. HS, AM and AK critically reviewed the manuscript. All authors approved the final manuscript.

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