
Knowledge, Attitudes, and Practices Regarding Rabies Among People in Mogadishu, Somalia: A Cross-Sectional Study

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Abstract: Rabies is a severe viral zoonotic disease with significant public health implications, especially in regions with limited healthcare infrastructure like Somalia. This study aimed to assess the knowledge, attitudes, and practices of residents in Mogadishu regarding rabies. A cross-sectional study was conducted from May 2022 to February 2023 in five districts of the Banadir region, focusing on areas with a higher stray dog population. Data were collected from 384 respondents through a structured questionnaire. The majority of respondents were female (52.1%) and aged 32-38 (31.3%), with a literacy level of education (53.1%). Hamarweyne, Abdiiziiz, and Dharkeynley districts had the highest participation. Although 98.4% had heard of rabies, misconceptions regarding its cause, transmission, and clinical signs were prevalent. Only 60.9% knew vaccination could prevent rabies, and 76.6% recognized its zoonotic transmission. The study revealed an inadequate understanding of the role of stray dogs in rabies transmission, with only 34.9% considering dog population control essential. Furthermore, 68.5% did not believe reducing dogs would decrease rabies. This study underscores the urgent need for targeted educational campaigns in Mogadishu to enhance knowledge and awareness about rabies. Emphasis should be placed on accurate information about rabies' etiology, transmission, clinical presentation, and prevention. Initiatives promoting responsible pet ownership and dog population control should be implemented. Addressing these knowledge gaps and attitudes will empower public health authorities to develop effective rabies prevention and control strategies in Mogadishu, reducing its devastating impact on the population.

Keywords: Rabies, Knowledge, Attitudes, Practices, Mogadishu, Somalia

1. Introduction

Rabies is a deadly viral disease that affects mammals, including humans. It is primarily transmitted through the bite or scratch of an infected animal, with dogs being the most common source of transmission to humans [1].

Globally, rabies is still a public health concern, resulting in 59,000 annual human mortality in over 150 countries [2].

Children make up a large portion of dog bite victims. One of the worst issues nowadays is the excessive number of stray dogs, which harms the environment, public health, and the

community [3].

Once symptoms appear, rabies is almost always fatal. Despite the availability of vaccines for both humans and animals, rabies remains a significant public health problem, particularly in regions with limited healthcare infrastructure and resources [4].

In Africa, rabies is recognized as a neglected zoonotic disease that poses a substantial threat to public health. The continent accounts for approximately 95% of human deaths from rabies, with the majority of cases attributed to dog bites [5].

Somalia, located in the Horn of Africa, is no exception to this problem. However, accurate data on the incidence and prevalence of rabies in Somalia are scarce, and the disease is often underreported.

Mogadishu, the capital city of Somalia, faces numerous challenges in terms of healthcare infrastructure and disease control. The country has experienced prolonged periods of political instability and conflict, resulting in the deterioration of healthcare services and limited access to medical care [1, 3]. In such settings, the burden of zoonotic diseases like rabies can be particularly high due to inadequate veterinary services, limited awareness about preventive measures, and the scarcity of vaccines and post-exposure treatment [3, 4].

Veterinarians, healthcare professionals, and relevant government agencies must take action to raise the level of awareness and consideration [6].

Assessing the knowledge, attitudes, and practices (KAP) of people towards rabies in Mogadishu is vital for designing effective control and prevention strategies. Such assessments help identify gaps in public awareness, misconceptions, and barriers to seeking appropriate healthcare services [7].

Dog rabies can be prevented and controlled by vaccination campaigns, KAP assessment can help with dog vaccination program planning and evaluation [8].

2. Materials and Methods

2.1. Study Design

A cross-sectional study was conducted from May 2022 to February 2023, following the STROBE guidelines for reporting observational studies. A cross-sectional study was chosen because it allows researchers to collect data from a diverse sample of individuals within a defined timeframe. It provides a snapshot of the population's characteristics, knowledge, attitudes, and practices related to rabies at a particular moment. Cross-sectional studies are relatively cost-effective and less time-consuming, making them practical for assessing public health issues in resource-limited settings.

2.2. Setting

The study was conducted in five purposively selected districts of Mogadishu: Dharkenley, AbdiAziiz, Hamarweyne, Waberi, and Hodan. These districts were chosen due to their significant dog population. Mogadishu is a densely populated urban area with a diverse population, making it an appropriate setting for studying the KAP related to rabies. The selection of these districts aimed to ensure representation from different socioeconomic backgrounds and communities.

2.3. Participants

The target population consisted of residents living in Mogadishu, Somalia. A purposive non-probability sampling technique was used to select the study participants from the five selected districts based on the presence of an animal population. Researchers ensured that participants understood

the purpose of the study, the voluntary nature of their participation, any potential risks or benefits, and how their confidentiality and privacy would be protected. A total of 384 participants were included in the sample based on the sample size estimation using Cochran's formula.

Data Sources and Measurements: The primary data collection tool was a self-administered questionnaire in English. The researchers and trained research assistants collected the data. The questionnaire included both closed-ended and open-ended questions to capture a wide range of information. It covered topics related to knowledge about rabies transmission, symptoms, prevention, and treatment, as well as attitudes and practices related to rabies prevention and animal bite management. The questionnaire was pretested in Waberi District to ensure clarity and comprehensibility.

Bias: Information bias may have arisen due to inaccuracies in the measurement or reporting of data. Participants might have provided ambiguous responses to questions about their knowledge, attitudes, or practices due to social desirability bias. To minimize bias, validated measurement tools were used, survey administrators were appropriately trained, and questions were formulated to be clear and unambiguous.

Data Variables and Analysis: The primary exposure variable was knowledge, attitudes, and practices related to rabies. The outcome variable was rabies prevention. The data on knowledge, attitude, and practices were quantitatively analyzed using SPSS version 26. Descriptive statistics, including frequency tables, were used to present the results.

3. Results

3.1. Background Information of the Respondents

Gender: A relatively balanced gender distribution was observed among the respondents, with 52.1% being female and 47.9% male. This indicates that both genders were equally represented in the study population.

Age of the respondents: The largest age group of respondents fell within the 32-38 years old category (31.3%). This suggests that individuals in their early to mid-adulthood were more likely to participate in the survey. Additionally, the age group 18-24 years old represented a significant portion (26.0%) of the respondents, indicating the engagement of younger adults in the study.

Educational level: More than half of the respondents (53.1%) were literate, indicating a reasonable level of education among the participants. Notably, a considerable portion (23.4%) had a university education, which can contribute to increased awareness and understanding of health-related issues like rabies.

District of Origin of Respondents: The study included respondents from different districts, with Hamarweyne, AbdiAziiz, Dharkenley, Hodan, and Waberi being the most represented districts. This distribution suggests that the survey aimed to capture a diverse sample of individuals from various areas within the region.

3.2. Outcome Variable: Rabies Prevention

The majority of respondents (60.9%) were aware of the availability of a vaccine to prevent rabies, indicating a significant level of knowledge or awareness regarding rabies prevention through vaccination. However, 39.1% of the respondents either did not know or were uncertain about the existence of a vaccine for rabies prevention.

3.3. Exposure Variable: Knowledge, Attitude, and Practices on Rabies

Awareness of Rabies Disease: An overwhelming majority of respondents (98.4%) had heard of rabies, indicating a high level of awareness regarding the disease in the surveyed population.

Knowledge of the Cause of Rabies: Approximately half of the respondents (50.8%) correctly identified the virus as the cause of rabies, while a significant proportion (31.3%) indicated that they didn't know the cause, suggesting a need for further education.

Transmission of Rabies: The majority of respondents (52.1%) correctly identified bites as the primary mode of rabies transmission, but a notable percentage (19.5%) were unsure about the transmission modes.

Clinical Signs of Rabid Animals: Respondents mentioned a range of clinical signs associated with rabid animals, with aggression (28.6%) and barking (20.1%) being the most commonly recognized signs.

Source of Animal Rabies: The majority of respondents correctly identified dogs as the primary source of animal rabies (77.9%), while others mentioned different animals or were unsure about the source.

Incubation Period of Rabies: A significant proportion of respondents (40.1%) were unsure about the incubation period of rabies, indicating a need for disseminating accurate information on this topic.

Knowledge of Vaccination for Rabies Prevention: A majority of respondents (60.9%) were aware of vaccination as a means to prevent rabies, while 15.1% indicated that they were not aware, and 24% responded that they didn't know about a vaccine to prevent rabies.

Knowledge of Rabies Transmission from Animals to Humans: The majority of respondents (76.6%) were aware that rabies can be transmitted from animals to humans, while 14.3% were not aware, and 9.1% responded that they didn't know about such transmission.

Perception of Rabies Risk to Human Health: A majority of respondents (58.3%) identified stray dogs as a problem in their districts, emphasizing the importance of reinforcing the severity of rabies as a public health concern.

Perception of Stray Dogs as a Problem in the District: A significant proportion of respondents (58.3%) identified stray dogs as a problem in their districts, while others (12.0%) did not perceive stray dogs as an issue, and some (29.7%) were unsure about the problem's existence.

Belief in the Elimination of Dogs to Reduce Rabies: Most respondents (52.9%) did not believe in mass elimination of

dogs as a strategy to reduce rabies. However, a notable percentage (34.9%) believed in the importance of controlling the dog population, while others (12.2%) were unsure.

Perception of the Importance of Controlling District Dog Population: The majority of respondents (50.8%) indicated that they would take action immediately by visiting the nearest health facility for treatment after a bite by a suspected rabid animal, while others had different responses or were unsure.

Actions to Take after a Bite by a Suspected Rabid Animals: Respondents displayed varying knowledge about the incubation period of rabies, with a significant proportion (40.1%) being unsure. This finding highlights the importance of disseminating accurate information about the incubation period to enhance public understanding and inform timely medical interventions.

Knowledge of Washing Bite Wounds with Soap and Water: Respondents had different responses regarding what to do with an animal suspected of rabies, with the majority (42.7%) preferring to chase the animal away, while others had alternative responses.

Knowledge of Staying Away from Aggressive Animals: The majority of respondents (94.5%) expressed their intention to stay away from aggressive animals, which is a sensible precaution to prevent potential harm.

4. Discussion

To the best of our knowledge, the findings of this study reveal several important insights into the knowledge, attitudes, and practices of residents in Mogadishu regarding rabies. While there is a high level of awareness about rabies, there are significant gaps in understanding its cause, transmission, prevention, and management. These results have several implications for public health efforts in the region.

The study found a high level of awareness regarding rabies, with 98.4% of respondents having heard of the disease. This is a positive outcome, as awareness is a crucial first step in addressing rabies. Similar high levels of awareness were reported in studies conducted in China [9] and Ethiopia [10], although awareness levels can vary by region.

Despite high awareness, more knowledge was needed among the respondents. While approximately half correctly identified the virus as the cause of rabies, a significant proportion (31.3%) did not know the cause. This highlights the need for education campaigns to improve understanding of the disease's etiology; this finding also supports the results of [11].

Furthermore, while most respondents correctly identified bites as the primary mode of rabies transmission, a substantial proportion (19.5%) were unsure about transmission modes. This suggests that misconceptions or uncertainty about how rabies is transmitted exist and should be addressed through targeted education efforts similar to what was stated [12].

The study also revealed varying levels of knowledge about

the clinical signs of rabid animals. While aggression and barking were commonly recognized signs, there may be other clinical signs that respondents were unaware of public health campaigns should aim to provide comprehensive information on identifying potential threats [13].

The majority of respondents correctly identified dogs as the primary source of animal rabies (77.9%). However, there were mentions of other animals and uncertainty about the source. This indicates the need for targeted education to dispel misconceptions and reinforce accurate information about the primary sources of rabies. It also underscores the importance of responsible pet ownership practices to reduce the risk of transmission [14].

A significant proportion of respondents identified stray dogs as a problem in their districts (58.3%). This perception aligns with the understanding that stray dogs can contribute to rabies transmission. It emphasizes the importance of preventive measures and public awareness campaigns to address the issue effectively. Promoting responsible pet ownership and implementing dog population control measures should be considered as part of rabies prevention strategies. These findings are consistent with a previous study conducted in Ethiopia, Kenya, and Malaysia [15, 16].

The majority of respondents recognized the importance of seeking medical treatment after a bite by a suspected rabid animal (50.8%). This indicates an understanding of the need for prompt medical intervention to prevent the onset of rabies in humans [17].

However, some respondents mentioned alternative actions or were unsure, highlighting the need for educational efforts to promote appropriate post-exposure prophylaxis measures [18].

Most respondents did not believe in the mass elimination of dogs as a strategy to reduce rabies (52.9%). This finding aligns with the understanding of responsible dog ownership [19].

Vaccination programs and effective control measures are more humane and sustainable approaches to managing zoonotic diseases, including rabies [20]. Mass elimination is ethically problematic and less effective in the long term.

Appendix

Table 1. Background Information of the Respondents in Mogadishu.

| Variable | Responses | Frequency | Per cent | Cumulative Percent |
|-------------------|--------------|-----------|----------|--------------------|
| Gender | Male | 184 | 47.9 | 47.9 |
| | Female | 200 | 52.1 | 100.0 |
| | Total | 384 | 100.0 | |
| Age | 18-24 | 100 | 26.0 | 26.0 |
| | 25-31 | 89 | 23.2 | 49.2 |
| | 32-38 | 120 | 31.3 | 80.5 |
| | 39-45 | 60 | 15.6 | 96.1 |
| | More than 45 | 15 | 3.9 | 100.0 |
| | Total | 384 | 100 | |
| | | Primary | 40 | 10.4 |
| Educational Level | Secondary | 50 | 13.0 | 23.4 |
| | University | 90 | 23.4 | 46.9 |
| | Literacy | 204 | 53.1 | 100.0 |
| | Total | 384 | 100 | |

5. Conclusion

This study provides valuable insights into the knowledge, attitudes, and practices of residents in Mogadishu, Somalia, regarding rabies. While there is a high level of awareness about rabies, significant knowledge gaps exist, particularly regarding the cause, transmission, and prevention of the disease. These gaps highlight the need for targeted educational campaigns to improve understanding and awareness about rabies.

Efforts should be made to provide accurate information about rabies' etiology, transmission, clinical signs, and prevention. Public health authorities should collaborate with local communities, healthcare providers, and veterinary services to develop and implement effective strategies.

Authors' Contributions

The contributions of each author to this study were as follows:

Shafii Abdullahi Mohmed: Conceptualization, Methodology, Data Collection, Writing - Original Draft.

Fahmo Abdulkadir Mohamed: Conceptualization, Methodology, Data Analysis, Writing - Review & Editing:

Ismahan Mustapha Mahmoud: Data Collection, Data Analysis, Writing - Review & Editing: Visualization:

Faiza Mohamed Abdi and Abdirahman Barre: Methodology, Writing - Review & Editing, Funding Acquisition, Supervision:

Further Information

This research did not receive any funding. Its self-funded research.

Conflicts of Interest

The authors declare no conflicts of interest related to this research.

| Variable | Responses | Frequency | Per cent | Cumulative Percent |
|----------------------------------|-------------|-----------|----------|--------------------|
| District of origin of respondent | Abdiaziz | 77 | 20.1 | 20.1 |
| | Dharkeynley | 76 | 19.8 | 39.8 |
| | Hamarweyne | 78 | 20.3 | 60.2 |
| | Hodan | 77 | 20.1 | 80.2 |
| | Waberi | 76 | 19.8 | 100.0 |
| | Total | 384 | 100.0 | |

Table 2. Respondents' understanding of Rabies prevention in Mogadishu.

| | | | | |
|-----------------------|-------|-----|-------|------|
| Prevention of Rabies: | Yes | 234 | 60.9 | 60.9 |
| | No | 150 | 39.1 | 100 |
| | Total | 384 | 100.0 | |

Table 3. Respondents' Knowledge, attitude and the level of awareness on rabies In Mogadishu.

| Variable | Response | Frequency | Per cent | Cumulative Percent |
|---|---------------------|-----------|----------|--------------------|
| Knowledge on how did they hear about rabies | Yes | 378 | 98.4 | 98.4 |
| | NO | 6 | 1.6 | 99.7 |
| | Total | 384 | 100.0 | |
| Knowledge of the Cause of Rabies | Bacteria | 40 | 10.4 | 10.4 |
| | Virus | 195 | 50.8 | 61.2 |
| | Parasite | 13 | 3.4 | 64.6 |
| | Fungi | 16 | 4.2 | 68.8 |
| | don't know | 120 | 31.3 | 100.0 |
| | Bite | 200 | 52.1 | 52.1 |
| Transmission of Rabies | Food | 10 | 2.6 | 54.7 |
| | contact with saliva | 90 | 23.4 | 78.1 |
| | Inhalation | 9 | 2.3 | 80.5 |
| | I don't know | 75 | 19.5 | 100.0 |
| | Total | 384 | 100.0 | |

| Variable | Responses | Frequency | Per cent | Cumulative Percent |
|---|-----------------------|-----------|----------|--------------------|
| Knowledge Clinical Signs of Rabid Animals | Salivation | 30 | 7.8 | 7.8 |
| | Aggression | 110 | 28.6 | 36.5 |
| | loss of fear | 10 | 2.6 | 39.1 |
| | Hydrophobia | 70 | 18.2 | 57.3 |
| | change of voice | 20 | 5.2 | 62.5 |
| | mouth of paralysis | 10 | 2.6 | 65.1 |
| | Barking | 77 | 20.1 | 85.2 |
| | Staring | 5 | 1.3 | 86.5 |
| | Eating abnormal items | 12 | 3.1 | 89.6 |
| | I don't know | 40 | 10.4 | 100.0 |
| | Total | 384 | 100.0 | |
| what is the source of animal rabies | Dog | 299 | 77.9 | 77.9 |
| | Cat | 40 | 10.4 | 88.3 |
| | Cattle | 20 | 5.2 | 93.5 |
| | Raccoon | 10 | 2.6 | 96.1 |
| | I don't know | 15 | 3.9 | 100.0 |
| Incubation Period of Rabies | Total | 384 | 100.0 | |
| | >14 days | 163 | 42.4 | 42.4 |
| | 1-3 month | 43 | 11.2 | 53.6 |
| | <1 year | 24 | 6.3 | 59.9 |
| | I don't know | 154 | 40.1 | 100.0 |
| Perception of Rabies Risk to Human Health | Total | 384 | 100.0 | |
| | Yes | 224 | 58.3 | 58.3 |
| | No | 46 | 12.0 | 70.3 |
| Perception of Stray Dogs as a Problem in the District | I don't know | 114 | 29.7 | 100.0 |
| | Total | 384 | 100.0 | |
| | Yes | 102 | 26.6 | 26.6 |
| Belief in the Elimination of Dogs to Reduce Rabies: | No | 263 | 68.5 | 95.1 |
| | I don't know | 19 | 4.9 | 100.0 |
| | Total | 384 | 100.0 | |
| | Yes | 134 | 34.9 | 34.9 |
| Perception of the Importance of Controlling District | No | 203 | 52.9 | 87.8 |
| | I don't know | 47 | 12.2 | 100.0 |
| | Total | 384 | 100.0 | |
| visit the nearest health facility for | 195 | 50.8 | 50.8 | |

| Variable | Responses | Frequency | Per cent | Cumulative Percent |
|--|---|-----------|----------|--------------------|
| Dog Population | treatment | | | |
| | wash the site with soap and water | 91 | 23.7 | 74.5 |
| | do nothing | 9 | 2.3 | 76.8 |
| | use traditional treatment | 14 | 3.6 | 80.5 |
| | I don't know | 75 | 19.5 | 100.0 |
| Awareness of actions to Take After a Bite by a Suspected Rabid Animals | Total | 384 | 100.0 | |
| | visit the nearest health facility for treatment | 195 | 50.8 | 50.8 |
| | wash the site with soap and water | 91 | 23.7 | 74.5 |
| | do nothing | 9 | 2.3 | 76.8 |
| | use traditional treatment | 14 | 3.6 | 80.5 |
| Knowledge of what is done to animal that is infected with rabies: | I don't know | 75 | 19.5 | 100.0 |
| | Total | 384 | 100 | |
| | kill it | 120 | 31.3 | 31.3 |
| | throws stones | 28 | 7.3 | 38.5 |
| | chase away from the area | 164 | 42.7 | 81.3 |
| Knowledge of stay away from aggressive animals: | send to the veterinary clinic | 72 | 18.8 | 100.0 |
| | Total | 384 | 100.0 | |
| | Yes | 363 | 94.5 | 94.5 |
| | No | 21 | 5.5 | 100.0 |
| | Total | 384 | 100.0 | |

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