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Awareness, Attitudes, Perceptions and Practices of Scabies Infestation among Caregivers of Children under 5 Years of Age in Villages of Kwale County, Kenya

Mariam Macharia[1*], Charles Nzioka[2], Bridget Kimani[1], Brian Njihia[1], Doris W. Njomo[1]

[1]Eastern and Southern Africa Center of International Parasite Control, Kenya Medical Research Institute, Nairobi, Kenya.
[2]Department of Sociology and Social Work, University of Nairobi, Nairobi, Kenya
Email: *mariammash007@gmail.com

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Abstract

Background: Scabies, an ectoparasitic disease affects over 300 million people globally. In Kenya, scabies prevalence is at 8.3%. In 2017, the World Health Organization listed it among Neglected Tropical Diseases (NTDs) targeted for elimination by 2030. Creating awareness of hygiene practices, community support and behavior change are essential for successful elimination. The objective of this study was to assess knowledge, perceptions, attitudes, practices and health-seeking behaviors among communities of Kwale County, Kenya. **Methods:** A mixed methods cross-sectional survey was conducted in eight purposively selected villages of Kwale County after a review of "Diseases of the skin" report. A close-ended questionnaire was administered to 301 caregivers of children under 5 years with observed scabies lesions or reporting a scabies infestation in the previous six months. Four focus group discussions (FGDs) were held with community members stratified by age and gender. Quantitative data was analyzed using Stata version 15.0 and qualitative data by NVivo version 12. **Results:** Scabies infestation was more common in males, 51.8% than in females, with 56.8% of the infested children below 36 months of age. The main mode of transmission, 59.8% was skin contact with an infected person. The most common symptom of scabies was itching, 90.4% while lack of sleep was the main consequence, 77.1%. Slightly over half, 54.2% indicated that scabies was caused by poor personal hygiene while 41.5% stated that they were not aware of what caused scabies. A majority, 91.7% reported seeking care from a local health facility with, 54.3% indicating a delay in seeking medical care. The qualitative results showed stigma related to scabies infestation and it was

viewed as a sign of HIV/AIDS disease. **Conclusion:** There is a need to create awareness of scabies, causes, prevention, and management, to avert myths and misconceptions and emphasis seeking immediate medical care crucial towards scabies elimination.

Subject Areas

Parasitology, Public Health

Keywords

Scabies, Neglected Tropical Diseases, Knowledge, Practices, Attitudes, Perceptions, Kwale County, Kenya

1. Introduction

Scabies, a water-washed ectoparasitic skin disease is a Neglected Tropical Disease (NTD) caused by human itch mite (*Sarcoptes scabiei var. hominis*) [1] that causes severe itching and stigmatizing skin lesions [2]. It is one of the most common dermatological conditions, accounting for a substantial proportion of skin diseases in developing countries [3]. Scabies directly account for 0.21% of the global disability-adjusted life years (DALYs) [4] [5]. The disease is indicated to be prevalent in hot tropical areas occasioned by poor living conditions including overcrowding, poor sanitation, low water supply and low socioeconomic status [6]. Globally, the disease affects more than 300 million people at any time [7], with recent literature estimating the prevalence at between 0.2% to 71% [8] with average global prevalence in children being 5% - 10% [9]. In Sub-Saharan Africa, scabies prevalence is between 0.2% and 24% [10] with studies conducted in East Africa showing the prevalence of 29.9%, 8.3% and 7.35% in Rwanda, Kenya and Tanzania respectively [11]-[13].

In 2017, the World Health Organization classified scabies as a Neglected Tropical Disease (NTD) in recognition of the burden and impact of the disease globally. Adding scabies to the global health agenda would promote disease awareness and open-up global discussions and collaboration. This would further encourage much needed research into various aspects of the disease leading to achieving global control of scabies [14] [15].

Despite these efforts, scabies and other skin diseases, with a few notable exceptions, remain largely neglected as important public health problems and, have not been regarded as significant health problems in the development of public health strategies in Kenya. This has led to an increased impact of the disease within the communities and a strain on public health resources. In Kwale County, there are significant gaps identified in literature on the incidence, knowledge, and health seeking practice for scabies despite several reports indicating it as one of the most common water-washed diseases particularly affecting children and the elderly

population in the county [16] [17]. Key operational research in the prevention, control, management, elimination, and eradication of scabies at the primary health-care level in line with the WHO NTD Elimination 2030 Road Map is crucial [8]. The current study assessed community knowledge, perceptions, practices and health-seeking behaviors which are important in informing the design of implementation research that would lead to the development of effective control programs.

2. Methods

2.1. Study Design

This was a cross-sectional descriptive mixed methods study. Quantitative and qualitative data were collected concurrently, analysed separately and the results triangulated.

2.2. Study Site

Kwale County was purposively selected after a review of literature which showed scabies as one of the common water-washed skin infections [16] [17]. Located in coastal Kenya, the County has four (4) sub-counties; Lunga Lunga, Msambweni, Matuga and Kinango with a population of 866,820 [18], with 48% of the population being 0 - 14-year-olds [19].

The team reviewed the Kwale County Health Management Team "Diseases of the skin" Pivot Report. The Report showed that there were 75,106 cases of skin diseases from January to June 2023 in the county. Kikoneni location in Pongwe-Kikoneni ward, Lunga Lunga sub-county was selected as the study site because of its rural-urban setting. The location has a total number of thirty-two (32) villages and with guidance from the sub-county health management team, eight (8) villages with high skin disease prevalence were selected.

2.3. Study Population and Sample Size

For the quantitative data, caregivers of children under five years with observed scabies-like lesions or reporting a scabies infestation in their children in the previous six months were recruited to participate in the study. The sample size was calculated using the Slovin's formula [20]. The researcher drew study population data from the Kwale County Integrated Development Plan (2018-2022) [19] which gave a projected growth of over 300,000 children under five by 2022. The margin of error /level of precision was at 6% or 0.94. The amount of uncertainty the study tolerated in our study was set at a confidence interval of 95%. Using a margin of error (e) of 0.94, the final estimated sample size was 267 households with children under five years with scabies infestation. The figure was then adjusted for non-response.

For the qualitative data, four FGDs were conducted with community members stratified by age and gender. The CHPs familiar with the selected villages helped

to mobilise adult participants (18 years old and above) who were purposefully selected. The groups consisted of adults, ≥36 years and youths, 18 - 35 years groups stratified by age and gender. Single-sex male and female groups of homogenous characteristics were interviewed.

2.4. Household Entry

Four research assistants (RAs) were trained on the study procedures and protection of human participants by the research team in a three-day session. Further, to build capacity for identification of active scabies lesions, a dermatologist trained the RAs and community health promoters (CHPs), in a one-day training session where they were able to observe and identify scabies-like lesions in children. A one-day mobilization was conducted by the CHPs who identified households with children under five years of age who had a scabies infestation and informed the study participants to expect research assistants accompanied by CHPs at their homesteads for data collection.

2.5. Data Collection

Both quantitative and qualitative data were collected from 26th June and 15th July 2023. Piloting of the quantitative data collection tool was conducted for validity, reliability and cultural sensitivity. The questionnaire was divided into various sections such as socio-demographic variables, WASH practices, knowledge of scabies, perception and attitudes towards scabies and health-seeking behavior for scabies within Kwale County. The study aims and procedures were explained to participants using Swahili, the local language. The interviewer-based questionnaire was then administered to the study participants, and the responses were entered electronically into Open Data Kit (ODK) using a tablet. The data collection took place within participants' homes and took approximately 30 minutes.

For qualitative data collection, a structured FGD guide was used to moderate the discussions. The guide contained questions on community perceptions of scabies, health seeking behavior and knowledge about causes, transmission and prevention of scabies. The interviews were guided by a trained moderator, a note taker took the notes and audio recorded the discussions which took approximately one hour. FGDs were stopped once saturation was deemed achieved.

2.6. Statistical Analysis

The quantitative data was cleaned and verified for entry errors. This included checking for missing values, duplicates, and outliers. Descriptive analysis was conducted involving computing frequencies and percentages for categorical variables related to attitudes and perceptions towards scabies infestation, computation of measures of central tendency (mean and median), and measures of variability (standard deviations and variance) for continuous variables related to attitudes and perceptions. The association between the dependent and the independent variables was checked using a chi-square test at 95% confidence interval (CI).

Factors associated with scabies infestation were analyzed first in univariable analysis and the strength of association was measured as odds ratios using a binary logistic regression at 95% CI. All the analysis was done using STATA version 15.0.

The qualitative data were transcribed verbatim, and the scripts were translated into English. A second set of two research assistants listened through the interviews to ensure that the English transcript reflected the actual interview in Kiswahili. Once this was established, the scripts were thoroughly read by the Principal Investigator and another social scientist within the study team and organized in Word for manual analysis. Thematic areas were identified, and a codebook was developed. The data were further entered into NVivo version 12 for further analysis. The codes within and across transcripts were compared, and the summarized coded extracts were grouped into sub-themes and themes as appropriate. The analyzed data was then presented in text form.

2.7. Ethics Statement

The Kenya Medical Research Institute Research Ethics Committee approved this study under reference number SERU 4371. A research permit No. NACOSTI/P/23/25936 was obtained from the National Commission for Science, Technology, and Innovation (NACOSTI). Permission to conduct the study was obtained from Kwale County Health Management Team (CHMT), Kwale County Commissioner, Lunga Lunga Sub-County Health Management Team and the sub-county commissioner. All the quantitative and FGD participants provided written informed consent. Names of the participants were not collected, and the qualitative participants were informed of the audio recording process and group settings for the FGDs.

3. Results

3.1. Socio-Demographic Characteristics of the Quantitative Study Respondents

Of the 301 respondents who took part in the quantitative arm, 87.0% were female and 13.0% male with, 40.5% being aged between 25 and 35 years. More than three-quarters, 78.7% were married, and a large majority, 80.7% were Muslims. A majority, 64.8% reported having attained primary level schooling, while slightly more than one-quarter, 26.9% had never attended school (Table 1).

Table 1. Socio-demographic characteristics of quantitative survey respondents.

Characteristic	Frequency	Percentage (%)
Gender		
Male	39	13.0
Female	262	87.0

Continued

Age (years)		
Less than 25	51	16.9
25 - 35	122	40.5
36 - 45	79	26.3
More than 45	49	16.3
Marital status		
Married	237	78.7
Single	30	10.0
Cohabiting	15	5.0
Separated	7	2.3
Divorced	6	2.0
Widowed	6	2.0
Religion		
Islam	243	80.7
Christian	58	19.3
Economic activities		
Farmer	127	42.2
Housewife	70	23.3
Small business	51	16.9
Casual	28	9.3
Salaried worker	9	3.0
Big business	1	0.3
Level of education		
Primary	195	64.8
Secondary	18	6.0
College	3	1.0
Other	3	1.0
Never attended school	81	26.9

Socio Demographic Characteristics of FGD Participants

Four (4) FGDs were conducted with forty-two (42) community members. The average age of participants was 34 years with the youngest being 18 and the oldest 62 years. Slightly over half, 52.4% of the participants were female. Only 23.8% had attained secondary school education with 30.9% being farmers as shown in **Table 2** below.

Table 2. Socio-demographic characteristics of FGD participants.

Characteristic	Frequency	Percentage (%)
Gender		
Male	20	47.6
Female	22	52.4
Age		
18 - 24	9	21.4
25 - 34	11	26.2
35 - 44	15	35.7
45 - 54	7	16.7
Above 54	0	0.0
Level of education		
Not attended school	6	14.3
Primary incomplete	4	9.5
Madrasa	2	4.8
Primary	18	42.8
Secondary	10	23.8
College	2	4.8
Occupation		
Housewife	9	21.4
Farmer	13	30.9
Small business	7	16.7
Casual laborers	2	4.8
Formal employment	7	16.7
Unemployed	4	9.5

3.2. Knowledge About Scabies; Causes, Symptoms, Transmission, and Prevention

From the quantitative study results nearly all, 98.3% of the respondents indicated that their children were suffering from scabies. The infestation was reported to be more common, 51.8% in males than in females with over half, 56.8% of those infested being below 36 months of age.

3.2.1. Causes of Scabies

More than one half, 54.2% of the respondents indicated that scabies is caused by lack of hygiene/dirtiness, and 21.6% stated that it is a result of skin contact with an infected person. A significant proportion, 41.5% however indicated that they did not know the cause of scabies (Table 3).

Table 3. Reported causes of scabies.

Factor	Frequency	Percentage (%)
Reported causes of the skin disease		
Lack of hygiene and dirtiness	163	54.2
Don't know	125	41.5
Skin contact with an infected person	65	21.6
Sharing clothes and beddings	43	14.3
Other	32	10.6
Dirty water	26	8.6
Mosquitoes	19	6.3
Playing with soil	16	5.3
Mites	8	2.7
Germs	6	2.0
Witchcraft	2	0.7

Results from the qualitative arm of the study show that a majority of participants attributed the cause of scabies to poor personal and environmental hygiene. Failure to frequently bathe the child, change their clothes, dry and air clothes and beddings properly were attributes of poor personal hygiene practices reported.

A 36-year-old participant stated that; "*The causes of scabies are many, but in my opinion, it is dirtiness, meaning lack of hygiene. Like in mothers or caregivers in situations where a child wakes up and has urinated in bed and stays the whole day without bathing can also cause scabies.*" (Res 008_Adult Male_Mshiu B)

Further a substantial number of the FGD participants reported that scabies infestation is related to anything that causes itching to the skin such as HIV/AIDS infection, bites by bedbugs, and mosquitoes, allergies from grass, and bites from chicken mites. Only a minority of the participants indicated that scabies are caused by witchcraft.

A 55-year-old participant stated that; "*Scabies is mostly caused by bedbugs and the little mites that live on chicken.*" (Res004_Adult Female_Mwabandari)

A 23-year-old participant further stated that; "*Some say it's caused by dirtiness while others say that you are HIV+ve and so is your child.*" (Res002_Youth Female_Mshiu B).

3.2.2. Symptoms of Scabies

From the quantitative data, the most mentioned symptom was itching, 90.4% followed by rash, 52.2% and skin lesions, 51.5%. The main consequences of scabies were lack of sleep, 77.1%, inability to play, 40.9% and missing school 12.6% (**Table 4**).

Table 4. Reported consequences of scabies infestation on children.

Factor	Frequency	Percentage (%)
How skin disease affects the child		
Lack of sleep	232	77.1
Inability to play	123	40.9
Missing school	38	12.6
Inability to concentrate	34	11.3
Embarrassment	5	1.7
Feelings of rejection	5	1.7
Shame	4	1.3
Teasing by others	3	1.0
Stigma from peers	2	0.7

Results from the FGD participants show that itching due to scabies was common on the hands and private parts of children's bodies which resulted in them being unhealthy and sickly as they were unable to feed due to the itchiness, there is low concentration in class and inability to write.

A 35-year-old participant stated that; "*They become restless, for example, as the rest are busy studying the infected child is busy scratching all over … when will they study?*" *(*Res 009_Adult Female_Mwabandari)

3.2.3. Scabies Transmission

From the quantitative data, over half, 59.8% and 44.3% of the respondents mentioned that skin contact and sharing of clothes and beddings with an infected person respectively are the main modes of scabies transmission. However, 28.6% stated that they did not know how the disease was transmitted (**Table 5**).

From the FGDs, a majority of the participants stated that scabies are transmitted through contact with infected persons and gave examples such as physical contact with an infected child especially when carrying them and when playing together.

A 62-year-old participant stated that; "*In adults, I can say that it's the contact with the infected child, when we carry them, and they infect us…*" (Res006_Adult Female_Mwabandari)

A 45-year-old participant further stated that; "*I believe mostly it is because of physical touch example where one child with scabies touches the ones who do not have scabies.*" (Res010_Adult Male_Mshiu B)

The participants further indicated that sharing of personal effects such as basins, soaps, clothes and beddings were other ways through which scabies is transmitted.

A 33-year-old participant stated that; "*If you share soap with someone who is suffering from scabies or even a basin, you will get infected.*" (Res004_Youth Male_Mwabandari)

Table 5. Reported modes of transmission of scabies.

Reported modes of transmission	Frequency	Percentage (%)
Skin contact with an infected person	180	59.8
Sharing clothes and beddings	133	44.3
Don't know	86	28.6
Lack of hygiene	35	11.6
Dirtiness	18	6.0
Other	16	5.3
Dirty water	11	3.7
Mosquitoes	5	1.7
Playing with soil	4	1.3
Witchcraft	2	0.7
Mites	1	0.3

3.2.4. Prevention of Scabies

On how to prevent scabies infestation, 45.5% of the caregivers stated that maintaining personal hygiene was one of the key measures while, 36.9% mentioned avoiding skin contact with infected people. Other prevention measures reported included keeping clothes clean, 35.2%, having infected people treated, 29.2%, and maintaining home hygiene 17.9% (Table 6).

Table 6. How to prevent scabies.

Factor	Frequency	Percentage (%)
Reported prevention measures		
Keep personal hygiene	137	45.5
Avoid skin contact with infected people	111	36.9
Keep clothes cleaned	106	35.2
Infected people should be treated	88	29.2
Keep home hygiene	54	17.9
Avoid contact with dirty water	20	6.6
Eat safe food	13	4.3
Avoid playing on the ground	7	2.3

The qualitative results indicated that maintaining personal and household hygiene particularly, regular washing of clothes, frequent bathing of children and

drying clothes under the sun are preventive measures against scabies.

A 26-year-old participant stated that; "*We should really give emphasis on cleanliness, whenever we wash our clothes, we should make sure that we give them time to dry up, and we should avoid dressing the children in wet clothes.*" (Res 007_Youth Male_Mwabandari)

Further, some FGD participants were of the opinion that seeking early treatment for infected persons and treating all members of the household would prevent and control scabies infestation. They further indicated the need to avoid direct contact with infected persons.

A 23-year-old participant stated that; "*I am saying, any case of scabies that arise, someone should seek immediate medical attention…and any child with scabies should be separated and not play with others to avoid infection.*" (Res 001_Youth Female_Mshiu B)

A 20-year-old participant further indicated that; "*After receiving treatment for the one who is infected, make sure the rest of the household members also get the same treatment regardless of whether or not the disease has manifested in them.*" (Res 004_Youth Female_Mshiu B)

3.3. Attitudes and Perceptions Towards Scabies Infestation

Slightly more than half, 53.3% of the respondents in the quantitative arm of the study reported that the community members viewed scabies in children as a normal skin disease, and 22.3% as a disease to be feared. A large majority, 76.1% stated that the community accepted their children despite them having scabies and only 4.3% did not allow their children to interact with the infected child.

A majority, 80.4%, indicated that they were afraid of contracting scabies while 61.8% reported that they would feel ashamed if they got infected. Over half, 59.8% of the respondents were in agreement that scabies would restrict their lives while 47.8% stated that they would avoid interaction with others if they had the disease. Slightly more than a third, 37.3% of the participants indicated that they would feel the need to hide scabies while 48.5% stated that they would avoid public places if they contracted the disease (**Table 7**).

Findings from the FGDs showed that the community had a stigma towards caregivers of children infested with scabies, due to the perception that they were infected with HIV/AIDs which resulted in their experience of shame and made them keep away from social gatherings.

A 29-year-old participant stated that; "*When a child gets scabies, the parent has no freedom to attend celebrations or events because she is embarrassed to be around people there.*" (Res 008_Youth Male_Mwabandari)

A 33-year-old participant further stated that; "*In children, people view scabies as a result of not taking a bath and dirty environment, but in an adult, it can be scary because they think its HIV/AIDS. When an adult is seen with lesions on the skin and scratching, even if someone may not say a thing, they will keep their distance.*" (Res 004_Youth Male_Mwabandari)

Table 7. Attitudes towards scabies (FSS-10 Scale).

Question	Agree (%)	Strongly agree (%)	Neutral (%)	Disagree (%)	Strongly disagree (%)
Afraid of contracting scabies	103 (34.2)	139 (46.2)	13 (4.3)	28(9.3)	18 (6.0)
Feel ashamed if I had scabies	91 (30.2)	95 (31.6)	24 (8.0)	78 (25.9)	13 (4.3)
Feel the need to hide this disease	73 (24.3)	39 (13.0)	24 (8.0)	129 (42.9)	33 (11.0)
Avoid interaction with others if I had scabies	110 (36.5)	34 (11.3)	33 (11.0)	97 (32.2)	27 (9.0)
Would try to seek medical help if I had scabies	106 (35.2)	175 (58.1)	12 (4.0)	5 (1.7)	3 (1)
Scabies would greatly restrict my life	144 (47.8)	36 (12.0)	27 (9.0)	73 (24.3)	21 (6.9)
Not afraid if I catch scabies because of all the treatment available	64 (21.3)	32 (10.6)	25 (8.3)	101 (33.5)	79 (26.3)
If I knew someone has scabies, I would stay a way from that person.	77 (25.6)	36 (11.9)	30 (10.0)	111 (36.9)	47 (15.6)
If I had scabies, I would be open about it and let others know about	126 (41.8)	37 (12.3)	52 (17.3)	70 (23.3)	16 (5.3)
I would avoid public bathrooms, theaters and other public places where I can possibly get scabies.	92 (30.6)	54 (17.9)	31 (10.3)	84 (27.9)	40 (13.3)

3.4. Practices Towards Scabies Infestation

3.4.1. Practices Related to Water, Sanitation and Hygiene

The main source of water, 55.2% as reported by the quantitative respondents, was the public tap, followed by open well, 15.0%, river 8.0% and rainwater 7.6% (Table 8). Only 10.0% of the respondents stated that they boiled their water to make it safe for drinking. A majority, 86.7% of the respondents stated that water is usually available with 71.4% taking less than 15 minutes to the water source.

Table 8. Sources of water.

Factor	Frequency	Percentage (%)
Source of water		
Public tap	166	55.2
Other sources	62	20.6
Open well in compound	45	15.0
River	24	8.0
Rainwater	23	7.6
Piped into compound	14	5.3
Pond	14	4.7
Covered public well	4	1.3
Spring	1	0.3

More than three-quarters, 78.7% of the respondents in the quantitative arm of the study indicated that they have toilet facilities within their homesteads with 21.3% stating that they do not have. The traditional pit latrine was the most common, 71.3% type of toilet facility with 72.2% stating that the floor is made of earth.

A large majority, 98.3% of the respondents stated that they bathed their children daily with, 72.8% indicating that they bathed them at home. On washing clothes, 26.9% reported that they wash their clothes daily, 20.6%, once a week and, 25.9% twice a week. The frequency of washing clothes was influenced by waiting for clothes to pile up as reported by 38.5% of the respondents, being busy, 15.3% and distance to the water source, 4.0%. A large majority, 80.7% reported that their children did not share clothes with the other siblings.

The FGD participants indicated that they maintained good hygiene practices that included bathing their children daily and washing their clothes frequently. They, however, stated that their children still contracted scabies.

A 27-year-old participant stated that, "*Most people say it's caused by dirtiness, but we bath our children every day, where does the disease come from?*" (Res005_Youth Female_Mshiu B)

3.4.2. Practices Related to Sharing of Beds

According to the quantitative study results, slightly more than two-thirds, 67.8% of the households had more than five members. On sleeping arrangements, most participants, 89.7% had their children (or household occupants) sharing one bed where, 43.2% shared beds with one, 35.2% with two, 10.3% with three, and 1.0% with four other family members.

3.4.3. Practices Related to Health Seeking Behavior

1) Time taken to seek treatment

From the quantitative data, a majority, 91.7% of participants reported seeking medical care for their children. Of these, 45.7% stated that they sought treatment for their children in less than a week after onset of scabies symptoms while 39.5% took more than a week. However, only 11.2% reported seeking treatment immediately. The reasons determining the time taken to seek treatment included beliefs that scabies would resolve on their own, 56.2%, financial constraints,10.6%, and failure to detect the infestation early enough 5.3% (**Table 9**).

From the qualitative results of the study, reasons being given for delayed seeking of treatment were fear of them being viewed as HIV positive and getting subjected to HIV tests when they presented at the health facility.

A 29-year-old participant stated that; "*As soon as an adult gets signs of being infected with scabies he really fears going to the hospital. In our minds we think when you go there, the doctor will test you for HIV. Now you already fear yet scabies is spreading more*. (Res 008_Youth Male_Mwabandari)

2) Preferred treatment center and factors influencing choice of treatment center

According to the quantitative study arm respondents, local health facilities were

the most preferred treatment centers for scabies infestation, 93.5%, with a smaller proportion resorting to purchasing drugs from shops and pharmacies, 4.3% and use of home-based remedies, 1.4%. The decision to visit a local health facility was reported to be influenced by factors such as the experiences of others, 46.2%, advice by family and friends, 33.2%, distance to the health facility, 21.3% and economic factors including cost of treatment, 10.3% (Table 10).

Table 9. Reported factors that influenced time taken before seeking treatment.

Factor	Frequency	Percentage (%)
Reported factors that influenced time taken before seeking treatment		
Belief that scabies goes away by itself	169	56.2
Financial constraints	32	10.6
Limited early detection	16	5.3
Time	9	3.0
Stigma	3	1.0
Embarrassment	2	0.7
Loss of earnings	1	0.3
Other reasons	53	17.6

Table 10. Factors that influenced choice of treatment center.

Factor	Frequency	Percentage (%)
Reported factors that influenced choice of treatment		
Experience from other individuals	139	46.2
Advice from family and friends	100	33.2
Distance to health facility	64	21.3
Cost of treatment	31	10.3
Cost of transportation	14	4.7
Lack of trust in modern healthcare	5	1.7
Time spent at facility	5	1.7
Trust in traditional medicine	3	1.0
Inadequate access to services	2	0.7
Lack of enough personnel in the facility	2	0.7
Stigma	2	0.7
Embarrassment	1	0.3

However, the participants in the qualitative arm of the study indicated that the majority of community members used home remedies to treat scabies infestation before visiting the health facility. The remedies mentioned included bathing in salty or sea water, use of herbs, coconut oil, and medicated soaps. The home remedies were reported to give relief for a short time, although the itching continued forcing them to visit the health facilities for further treatment.

A 48-year-old participant indicated that; "*When someone manifests with scabies, first they buy Detrex or Protex soap, you bath with it, if you feel like scabies is still getting worse you go to the hospital.*" (Res 008_Adult Female_Mwabandari)

A 23-year-old participant further stated that; "*There is also herbal medicine, you mix it with coconut oil then apply on the child's body after they have been bathed.*" (Res002_Youth Female_Mshiu B)

3) Type of treatment received

The quantitative study arm respondents who sought treatment indicated that they received varied treatments with ointments being the most common, 72.1%, other forms of treatments, 22.1% and antibiotics 5.1% (Table 11). However, the respondents indicated that the offered treatment took time before the scabies lesions disappeared. The duration for lesions and symptoms to disappear after treatment varied, with 23.9% reporting that they experienced relief in less than a week, 32.8% within a week, and 43.4% within two weeks or more.

Table 11. Treatment received at facility.

Factor	Frequency	Percentage (%)
Treatment used		
Ointment	199	72.1
Antibiotics	14	5.1
Other	63	22.8

The FGD participants indicated that the available forms of treatments offered for scabies at the health facility were oral medication, creams and liquid-like treatments.

A 23-year-old male participant stated that; "*I could say there are different types, there is an oral one that you swallow, then there is the one that looks like Colgate (a brand of toothpaste) and there is the one that is watery like liquid oil. How do you call it? I could just say it is liquid. They are 3 different types as far as I know. Their names are what I do not remember.*" (Res009_Youth Male_Mwabandari)

3.5. Health Education

Slightly below three-quarters, 73.2% of the quantitative participants reported not receiving any specific advice on scabies preventions especially when they sought care from health facilities.

Findings from FGD participants show that only a minority had received infor-

mation about scabies control. The indicated source of information were healthcare workers upon visiting the facility to seek treatment, radio, television and teachers in schools. The indicated information received for control of scabies mainly focused on hygiene practices such as drying bedding under direct sunlight and avoiding sharing of clothes and soaps used by persons with scabies. They however indicated the need for more community education and scabies drug distribution especially using the community health volunteers (CHVs),

A 36-year-old participant stated that; "*The CHV should also bring treatment for this disease and educate us on the same*." (Res010_Adult Male_Mshiu B)

4. Discussion

This study assessed the awareness of scabies etiology, attitudes and perceptions towards the disease, practices related to water, sanitation and hygiene and health seeking behavior of a coastal Kenya community.

The present study showed that scabies were more prevalent among males than females and among children less than 36 months of age. These findings agree with those of studies conducted in Cameroon, Ethiopia and Solomon Islands where being male was indicated as a risk factor for scabies infections due to poor personal hygiene and social practices [21]-[23]. On age, similar findings have been reported in other studies which have shown that children are more susceptible to scabies infestation because they have low immunity levels [24] [25].

The current study results have demonstrated that a significant proportion of community members are not aware of the causes of scabies, although a majority attributed it to a lack of personal hygiene. Similar findings have been reported in various studies on scabies and other skin NTDs (yaws and yaw-like) conducted in West Africa [26] [27]. On transmission, the present study shows that community members had adequate awareness of how scabies are transmitted and attributed it to direct skin contact and sharing of clothes and bedding with an infected person. Regarding prevention of scabies, the community members were also aware that it can be prevented by maintaining personal hygiene, avoiding direct skin contact and seeking immediate treatment and treating all members of the household, findings similar to a study conducted in Guinea Bissau [26].

The current study results showed that a majority of the participants associated the experience of itching and rashes with scabies infestation. The current study results also showed that scabies were perceived to have a negative impact on sleep of children leading to delayed milestones in younger children and lack of concentration in class for school-going children. Our findings are consistent with other studies assessing impact of scabies and other ectoparasitic diseases [26] [28].

The study observed that the majority of community members were of the view that persons infested with scabies had HIV/AIDS disease. This is due to failure by the community to differentiate between the scabies lesions and itching consequences and the severe paralytic palp eruption, common in people living with HIV/AIDS which occurs especially in the second stage and generally comprises rashes in the skin, and it is very itchy. This perception led to stigma, and delayed

seeking of treatment among those infested. Studies conducted in Brazil and Guinea Bissau have reported findings of stigma on scabies related to fear of transmission [26] [29].

The current study results have demonstrated that although availability of water was not an issue, the practice of open defecation was common among community members. Our study findings further report good hygiene practices including frequent bathing and washing of clothes although sharing of beds was common, a contributing factor to scabies transmission. Other studies conducted in Bangladesh and Egypt showed a significantly lower risk of scabies acquisition in children who did not share beds than those who shared with others [30] [31].

From our study findings, the preferred treatment facility for scabies was the local health center although there was a delay in seeking medical care. Our study identified some barriers to seeking medical care which included financial constraints, and stigma which is similar to the findings of a study conducted in Guinea Bissau [26]. The current study results further show that some factors influencing choice of facility to seek medical care for scabies included, shared experiences, advice from family friends and community members, distance to the health facility and associated costs. On the contrary, findings of a study conducted in Ghana showed that the opinions of family members or individual's experiences were infrequent considerations in guiding treatment seeking behaviors [27].

Study Limitations and Strengths

This study had some limitations. Firstly, there may have been an introduction of recall bias among caregivers who were expected to give a report of their child's scabies infestation during the preceding six-months period. Secondly, the qualitative data was collected in local language and there could have been a loss in variations in dialect during the translation process. Despite these limitations, our study utilized mixed methods and data from the two sources were triangulated to check for consistency and divergence of views thus overcoming weakness of one method having strength over the other.

5. Conclusion

This study demonstrated some gaps in awareness of scabies disease, hygiene practices and health seeking behavior among the study community members. There is a need for community sensitization and awareness creation on scabies etiology, importance of maintaining hygiene standards. Community members need to be made aware of the importance of seeking immediate medical care at the health facility at the onset of scabies symptoms. The findings of this study can be used to develop community mobilization tools and to inform the design of implementation research for control and elimination of scabies.

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List of Abbreviations

Acquired Human Immuno-Deficiency Syndrome **(AIDS);** Community Health Promoters **(CHPs);** Confidence level **(CI**); Focus Group Discussion **(FGD);** Global Disability-Adjusted Life Years **(DALYs);** Human Immuno-Deficiency Virus **(HIV);** Kenya Medical Research Institute **(KEMRI);** Neglected Tropical Disease **(NTD);** Open Data Kit (**ODK**), Sustainable Development Index **(SDI);** Water, Sanitation and Hygiene (**WASH**); World Health Organization **(WHO)**

Data availability statement

All relevant data supporting the conclusions of this paper are provided within the article. The raw datasets analyzed are available from ESACIPAC, KEMRI (www.kemri.org) upon request to the corresponding author.

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Author Contributions

Conceptualization: Mariam Macharia, Doris W. Njomo.
Data curation: Mariam Macharia, and Doris W. Njomo.
Formal analysis: Mariam Macharia.
Funding acquisition: Mariam Macharia.
Methodology: Mariam Macharia, Charles Nzioka and Doris W. Njomo.
Supervision: Mariam Macharia, Charles Nzioka and Doris W. Njomo.
Writing, original draft: Mariam Macharia.
Writing, review & editing: Mariam Macharia, Charles Nzioka, Bridget Kimani, Brian Njihia and Doris W. Njomo.

Conflicts of Interest

The authors declare no conflicts of interest.

References

[1] Hengge, U.R., Currie, B.J., Jäger, G., Lupi, O. and Schwartz, R.A. (2006) Scabies: A Ubiquitous Neglected Skin Disease. *The Lancet Infectious Diseases*, **6**, 769-779. https://doi.org/10.1016/s1473-3099(06)70654-5

[2] Engelman, D. and Steer, A.C. (2018) Control Strategies for Scabies. *Tropical Medicine and Infectious Disease*, **3**, Article 98. https://doi.org/10.3390/tropicalmed3030098

[3] Arlian, L.G. and Morgan, M.S. (2017) A Review of *Sarcoptes scabiei*: Past, Present and Future. *Parasites & Vectors*, **10**, Article No. 297. https://doi.org/10.1186/s13071-017-2234-1

[4] Zhang, W., Zhang, Y., Luo, L., Huang, W., Shen, X., Dong, X., *et al.* (2020) Trends in Prevalence and Incidence of Scabies from 1990 to 2017: Findings from the Global Burden of Disease Study 2017. *Emerging Microbes & Infections*, **9**, 813-816. https://doi.org/10.1080/22221751.2020.1754136

[5] Karimkhani, C., Colombara, D.V., Drucker, A.M., Norton, S.A., Hay, R., Engelman, D., *et al.* (2017) The Global Burden of Scabies: A Cross-Sectional Analysis from the Global Burden of Disease Study 2015. *The Lancet Infectious Diseases*, **17**, 1247-1254. https://doi.org/10.1016/s1473-3099(17)30483-8

[6] Engelman, D., Cantey, P.T., Marks, M., Solomon, A.W., Chang, A.Y., Chosidow, O., *et al.* (2019) The Public Health Control of Scabies: Priorities for Research and Action. *The Lancet*, **394**, 81-92. https://doi.org/10.1016/s0140-6736(19)31136-5

[7] Romani, L., Steer, A.C., Whitfeld, M.J. and Kaldor, J.M. (2015) Prevalence of Scabies and Impetigo Worldwide: A Systematic Review. *The Lancet Infectious Diseases*, **15**, 960-967. https://doi.org/10.1016/s1473-3099(15)00132-2

[8] WHO (2021) World Health Organization. https://www.who.int/neglected_diseases/diseases/scabies-and-other-ectoparasites/en/

[9] Hay, R.J., Steer, A.C., Engelman, D. and Walton, S. (2012) Scabies in the Developing World—Its Prevalence, Complications, and Management. *Clinical Microbiology and Infection*, **18**, 313-323. https://doi.org/10.1111/j.1469-0691.2012.03798.x

[10] WHO (2005) Epidemiology and Management of Common Skin Diseases in Children in Developing Countries. World Health Organization, Geneva.

[11] Van Hecke, E. and Bucinco, G. (1980) Prevalence of Skin Disease in Rwanda. *International Journal of Dermatology*, **19**, 526-529. https://doi.org/10.1111/j.1365-4362.1980.tb00382.x

[12] Schmeller, W. and Dzikus, A. (2001) Skin Diseases in Children in Rural Kenya: Long-Term Results of a Dermatology Project within the Primary Health Care System. *British Journal of Dermatology*, **144**, 118-124. https://doi.org/10.1111/j.1365-2133.2001.03962.x

[13] Kiprono, S.K., Muchunu, J.W. and Masenga, J.E. (2015) Skin Diseases in Pediatric Patients Attending a Tertiary Dermatology Hospital in Northern Tanzania: A Cross-Sectional Study. *BMC Dermatology*, **15**, Article No. 16. https://doi.org/10.1186/s12895-015-0035-9

[14] WHO (2019) Informal Consultation on a Framework for Scabies Control Meeting Re-port. World Health Organization Regional Office for the Western Pacific Manila.

[15] El-Moamly, A.A. (2021) Scabies as a Part of the World Health Organization Roadmap for Neglected Tropical Diseases 2021-2030: What We Know and What We Need to Do for Global Control. *Tropical Medicine and Health*, **49**, Article No. 64. https://doi.org/10.1186/s41182-021-00348-6

[16] Water Security and Climate Reports. June 2014 and September 2016.

[17] Ongugo, P.O., Wekesa, C., Ongugo, R., Abdallah, A., Akinyi, L. and Pakia, M. (2014) Small-Holder Innovation for Resilience (SIFOR): Qualitative Baseline Study, Mijikenda

Community, Kenyan Coast. Reports, KEFRI.

[18] Kenya National Bureau of Statistics (2019) Kenya Population and Housing Census, 2019.

[19] County Government of Kwale (2018) Kwale County Integrated Development Plan (2018-2022).

[20] Stephanie, E. (2003) Slovin's Formula Sampling Techniques. Houghton-Mifflin.

[21] Ararsa, G., Merdassa, E., Shibiru, T. and Etafa, W. (2023) Prevalence of Scabies and Associated Factors among Children Aged 5-14 Years in Meta Robi District, Ethiopia. *PLOS ONE*, **18**, e0277912. https://doi.org/10.1371/journal.pone.0277912

[22] Osti, M.H., Sokana, O., Phelan, S., Marks, M., Whitfeld, M.J., Gorae, C., *et al.* (2019) Prevalence of Scabies and Impetigo in the Solomon Islands: A School Survey. *BMC Infectious Diseases*, **19**, Article No. 803. https://doi.org/10.1186/s12879-019-4382-8

[23] Kouotou, E.A., Nansseu, J.R.N., Kouawa, M.K. and Zoung-Kanyi Bissek, A. (2016) Prevalence and Drivers of Human Scabies among Children and Adolescents Living and Studying in Cameroonian Boarding Schools. *Parasites & Vectors*, **9**, Article No. 400. https://doi.org/10.1186/s13071-016-1690-3

[24] Feldmeier, H. (2009) Epidermal Parasitic Skin Diseases: A Neglected Category of Poverty-Associated Plagues. *Bulletin of the World Health Organization*, **87**, 152-159. https://doi.org/10.2471/blt.07.047308

[25] Walton, S.F. and Currie, B.J. (2007) Problems in Diagnosing Scabies, a Global Disease in Human and Animal Populations. *Clinical Microbiology Reviews*, **20**, 268-279. https://doi.org/10.1128/cmr.00042-06

[26] Lopes, M.J., da Silva, E.T., Ca, J., Gonçalves, A., Rodrigues, A., Manjuba, C., *et al.* (2019) Perceptions, Attitudes and Practices towards Scabies in Communities on the Bijagós Islands, Guinea-Bissau. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, **114**, 49-56. https://doi.org/10.1093/trstmh/trz102

[27] Marks, M., Kwakye-Maclean, C., Doherty, R., Adwere, P., Aziz Abdulai, A., Duah, F., *et al.* (2017) Knowledge, Attitudes and Practices Towards Yaws and Yaws-Like Skin Disease in Ghana. *PLOS Neglected Tropical Diseases*, **11**, e0005820. https://doi.org/10.1371/journal.pntd.0005820

[28] Walker, S.L., Lebas, E., De Sario, V., Deyasso, Z., Doni, S.N., Marks, M., *et al.* (2017) The Prevalence and Association with Health-Related Quality of Life of Tungiasis and Scabies in Schoolchildren in Southern Ethiopia. *PLOS Neglected Tropical Diseases*, **11**, e0005808. https://doi.org/10.1371/journal.pntd.0005808

[29] Worth, C., Heukelbach, J., Fengler, G., Walter, B., Liesenfeld, O. and Feldmeier, H. (2012) Impaired Quality of Life in Adults and Children with Scabies from an Impoverished Community in Brazil. *International Journal of Dermatology*, **51**, 275-282. https://doi.org/10.1111/j.1365-4632.2011.05017.x

[30] Hegab, D., Kato, A., Kabbash, I. and Dabish, G. (2015) Scabies among Primary Schoolchildren in Egypt: Sociomedical Environmental Study in Kafr El-Sheikh Administrative Area. *Clinical, Cosmetic and Investigational Dermatology*, **8**, 105-111. https://doi.org/10.2147/ccid.s78287

[31] Karim, S.A., Anwar, K.S., Khan, M.A.H., Mollah, M.A.H., Nahar, N., Rahman, H.E.M.R., *et al.* (2007) Socio-Demographic Characteristics of Children Infested with Scabies in Densely Populated Communities of Residential Madrashas (Islamic Education Institutes) in Dhaka, Bangladesh. *Public Health*, **121**, 923-934. https://doi.org/10.1016/j.puhe.2006.10.019