

Influence of Health Information Packaging on the Uptake of Tungiasis Awareness Messages by the Community in Vihiga County, Kenya

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Abstract

Tungiasis, a neglected tropical disease caused by infestation of the sand flea *Tunga penetrans*, remains a significant public health challenge in resource-poor communities of Kenya. Vihiga County is among the most affected regions, with prevalence rates exceeding 21%, particularly among school-aged children. Despite ongoing awareness campaigns, uptake of preventive messages has been inconsistent. This study aimed to establish how health information packaging influences the uptake of tungiasis awareness messages by the community in Vihiga County, Kenya. The study adopted a pragmatic philosophy and cross-sectional design, targeting households, health workers, and teachers in high-prevalence sub-counties. Using Yamane's formula, a sample of 400 respondents was proportionally allocated between Vihiga (n = 168) and Sabatia (n = 232) sub-counties. Household respondents were selected through cluster sampling, while health workers (n = 48) and teachers (n = 32) were purposively sampled. Data were collected using structured questionnaires, semi-structured interviews, and focus group discussions. Instruments were pre-tested for validity and reliability (Cronbach's Alpha = 0.87). Quantitative data were analyzed using SPSS, while qualitative data underwent thematic analysis in NVivo. The findings reveal that message clarity and delivery format are critical determinants of awareness and behavioral response. Only 7.8% of the community found existing information easy to understand, reflecting inadequate message simplification and over-reliance on print channels. The population strongly prefers oral/visual formats, including radio ads (6.0%) and TV ads (5.0%), over print media (<1%). ANOVA confirmed a significant relationship between packaging format and message uptake ($F = 4.53, p = 0.002$), with oral/visual channels being more effective ($p < 0.05$). Direct engagement with health professionals proved vital for comprehension and trust. The study concludes that current health information packaging is inadequate. Authorities should adopt locally tailored content, fund radio and television broadcasts, and institutionalize school-based prevention programs to improve message uptake and reduce tungiasis prevalence.

Keywords: *Tungiasis, Health Information Packaging, Community Awareness, Vihiga County, Communication Strategies*

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1.0 Introduction

Tungiasis, caused by infestation of the sand flea *Tunga penetrans*, is a neglected tropical disease (NTD) that disproportionately affects impoverished communities in sub-Saharan Africa, Latin America, and parts of Asia (Sánchez-Cárdenas et al., 2024). The World Health Organization (WHO, 2022) categorizes it as a preventable and manageable condition, yet it remains largely overlooked in research and public health programming. The disease is characterized by painful lesions, inflammation, ulceration, and secondary infections, often leading to immobility, school absenteeism among children, and social stigma (Elson et al., 2024). Despite these serious implications, tungiasis has not attracted the same level of attention as other NTDs such as schistosomiasis or soil-transmitted helminths, a disparity attributed to weak surveillance systems, insufficient documentation, and lack of targeted advocacy (World Health Organization [WHO], 2022).

Tungiasis is caused when the pregnant female sand flea (*Tunga penetrans*) burrows into the epidermis, typically at the feet, toes, and peri-ungual regions. Once embedded, the flea enlarges to a pea-sized nodule, causing intense erythema, edema, pruritus, and pain. Secondary bacterial infection with *Staphylococcus aureus* or streptococci is common, leading to ulceration, suppuration, and, in severe cases, gangrene, tetanus, or auto-amputation of digits (Feldmeier & Heukelbach, 2009). The resulting immobility, school absenteeism, and social stigma disproportionately affect children and the elderly, making tungiasis not merely a dermatological nuisance but a substantive public health problem that perpetuates cycles of poverty and marginalization.

In Kenya, tungiasis is prevalent in marginalized rural regions, with Vihiga County among the most severely affected. The county records prevalence rates exceeding 21%, particularly among school-aged children, reflecting broader challenges of poverty, poor sanitation, and inadequate health

infrastructure (Nyangacha et al., 2019). These conditions perpetuate high transmission rates and hinder effective prevention and control. Comparable school-based studies in Kilifi County have documented prevalence rates as high as 48%, with boys and younger children disproportionately burdened, emphasizing that Vihiga's experience is part of a wider national pattern of neglected disease (Wiese et al., 2017). The socioeconomic conditions in these endemic areas, including mud-plastered housing, limited footwear use, and proximity to domestic animals, create ideal environments for sand flea reproduction, entrenching transmission across generations (Wiese et al., 2017).

Public health communication is a critical tool in tackling neglected tropical diseases, especially in resource-constrained settings (Jabir & Choolayil, 2024). Effective packaging of health information through clarity of messages, choice of communication channels, and cultural sensitivity plays a decisive role in shaping community awareness and influencing preventive behavior (Betsch et al., 2016). Zanolini et al. (2024) emphasize that health literacy empowers individuals to make informed decisions, while participatory approaches that draw from community knowledge and cultural norms enhance message relevance and acceptance (Parker & Becker-Benton, 2016). However, poorly designed or inappropriately delivered messages often fail to resonate with target audiences, limiting their impact on disease prevention.

Despite repeated public health outreach in Kenya, tungiasis awareness efforts in Vihiga County have achieved limited penetration. Previous campaigns have underperformed because they relied heavily on word-of-mouth and ad hoc community meetings without systematic message design, failed to counter cultural beliefs attributing tungiasis to witchcraft or familial curses, and lacked sustained funding for broadcast media. Consequently, prevention messages have not translated into consistent behavioral change, and prevalence remains unacceptably high. While

Kenyan studies have documented prevalence and risk factors (Nyangacha et al., 2019; Wiese et al., 2017; Elson et al., 2024), no prior study has systematically examined how message packaging modalities such as oral/visual versus print, local-language versus English, health-worker-mediated versus passive differentially influence uptake in low-literacy, high-burden settings such as Vihiga.

This study is guided by the Health Belief Model (HBM) and the Social Ecological Model (SEM). The HBM posits that individuals are more likely to adopt preventive behaviors when they perceive high susceptibility and severity, anticipate tangible benefits, and receive clear cues to action (Jones et al., 2015). The SEM underscores that these perceptions are shaped across multiple levels individual, interpersonal, community, and institutional suggesting that message packaging must operate through trusted channels to alter risk perception (McLeroy et al., 1988). By integrating these frameworks, the study examines how channel selection and message design function as cues to action that mediate perceived barriers and benefits within Vihiga's sociocultural context.

"This study established that the packaging of health information significantly influences the uptake of tungiasis awareness messages in Vihiga County"

In Vihiga County, where literacy levels vary and traditional beliefs remain influential, the packaging and dissemination of health information are critical to the success of tungiasis awareness campaigns. Research in health communication demonstrates that visual clarity, simple and actionable instructions, culturally relevant imagery, and appropriate channel selection enhance message salience and uptake among low-literacy audiences (Kandpal & Dutta, 2024). However, most tungiasis outreach in

endemic Kenyan communities still relies on ad hoc formats such as word-of-mouth, community meetings, and simple posters, with limited evidence on which packaging strategies best improve comprehension, recall, and preventive practices. This study specifically examines message uptake: the community's reception, comprehension, and stated willingness to act on tungiasis prevention messages. Uptake is conceptualized as the critical intermediate outcome between message exposure and actual behavioral change, distinct from awareness (mere knowledge) and prevention outcomes (reduced incidence). Against this backdrop, the present study investigates how health information packaging influences the community's uptake of tungiasis awareness messages in Vihiga County, Kenya.

2.0 Materials and Methods

Research Philosophy and Design

This study was anchored in a pragmatic research philosophy, which emphasizes practical problem-solving and integrates both objective measurement and subjective interpretation. A cross-sectional research design was adopted to capture data from the community at a single point in time. This design was appropriate for examining associations between exposure to health communication campaigns and awareness of tungiasis prevention and treatment. The study employed a convergent mixed-methods design, in which quantitative and qualitative data were collected concurrently, analyzed independently, and merged during interpretation through a weaving narrative approach and a joint display matrix (Fetters et al., 2013).

Study Area

The study was conducted in Vihiga County, Kenya, a region purposively selected due to its high prevalence of tungiasis and vulnerability to outbreaks. The county's socioeconomic challenges, poor sanitation, and limited health infrastructure made it an ideal setting for investigating how health information packaging

influences awareness uptake. The study specifically targeted Vihiga and Sabatia sub-counties, which report the highest burden of disease.

Population, Sampling, and Sample Size

The study targeted households, health workers, and teachers directly involved in tungiasis awareness initiatives, ensuring that participants possessed relevant knowledge and experience. A sample size of 400 respondents was determined using Yamane's formula, with proportional allocation across Vihiga ($n = 168$) and Sabatia ($n = 232$) sub-counties to reflect population distribution. Within each sub-county, household respondents were selected via cluster sampling of wards, with households randomly identified at the village level. Health workers and teachers were identified through purposive sampling to ensure inclusion of information-rich participants actively engaged in jigger control campaigns. The final sample comprised 320 household members (80.0%), 48 community health workers (12.0%), and 32 teachers (8.0%). The response rate was 94.3% (400 of 424 eligible participants approached); non-response was due to absenteeism ($n = 18$) and refusal ($n = 6$).

Inclusion criteria focused on households affected by jiggers, health teachers engaged in control programs, and community health workers actively involved in awareness efforts. Exclusion criteria included individuals unable to provide informed consent and those with no exposure to tungiasis awareness activities in the preceding 12 months.

Data Collection Instruments

Data collection employed a mixed-methods approach. Quantitative data were collected through structured questionnaires, while qualitative insights were obtained via semi-structured interviews and focus group discussions with community health workers and members.

The structured questionnaire was developed based on Health Belief Model constructs and prior NTD communication tools. Content validity was established through expert panel review ($n = 5$:

two public health specialists, two health communication experts, and one biostatistician). Face validity was assessed via cognitive interviewing with 10 community members from a non-study area. A pilot test in neighbouring Kakamega North Sub-County ($n = 40$) yielded Cronbach's $\alpha = 0.87$, indicating strong internal consistency. The questionnaire captured socio-demographic characteristics, exposure to tungiasis messages, perceived clarity of packaging, channel preferences, and uptake behaviors.

The dependent variable for inferential analysis was the Tungiasis Message Uptake Score (TMUS), a composite index ranging from 5 to 20. It was computed by summing responses to five items — message recall, comprehension, perceived relevance, behavioral intention, and message sharing — each rated on a 4-point Likert scale (1 = Strongly Disagree to 4 = Strongly Agree). Higher scores indicate greater uptake. The TMUS demonstrated acceptable internal consistency in the full sample ($\alpha = 0.84$).

Semi-structured interview guides and focus group discussion protocols were developed to explore community perceptions of message packaging, barriers to uptake, and recommendations for improvement. All qualitative instruments were piloted alongside the questionnaire and refined for clarity and cultural appropriateness.

Data Collection Procedures

Data were collected between by a team of four trained research assistants fluent in English, Kiswahili, and the local Luhya dialects. Quantitative interviews were conducted face-to-face at participants' homes or designated community centers. Each interview lasted approximately 25–35 minutes. Qualitative data were collected through 8 focus group discussions (6–10 participants each) and 12 key informant interviews with health workers, teachers, and local administrators. All sessions were audio-recorded with consent and supplemented by detailed field notes.

Data Analysis

Quantitative data were analyzed using SPSS (Version 26). Descriptive statistics (frequencies, percentages, means, and standard deviations) were used to summarize socio-demographic characteristics and message packaging perceptions. A One-Way Analysis of Variance (ANOVA) was conducted to compare mean TMUS scores across the five communication formats (pamphlets, radio ads, posters, TV ads, online content). Where significant differences were identified, Tukey's Honestly Significant Difference (HSD) post-hoc test was applied. Effect size was calculated using eta squared (η^2). A p-value < 0.05 was set as the threshold for statistical significance.

Qualitative data were transcribed verbatim, coded, and analyzed thematically using NVivo (Version 12). Data were organized around four a priori themes: package and presentation, influencing factors, improvement strategies, and effectiveness indicators, while remaining open to emergent sub-themes. Trustworthiness was ensured through member checking, peer debriefing, and thick description.

Integration of Quantitative and Qualitative Findings

Integration followed a convergent mixed-methods design. Quantitative and qualitative data were collected concurrently, analyzed independently, and merged during interpretation through a

weaving narrative and a joint display matrix that arrayed mean uptake scores against thematic domains (Fetters et al., 2013). Discrepancies between quantitative and qualitative findings were examined to generate meta-inferences.

Ethical Considerations

Ethical approval was obtained from NACOSTI (Reference No. 464090). The Vihiga County Commissioner and County Director of Health also granted authorization. Informed consent was secured from all participants, with confidentiality and respect for participants' dignity strictly maintained. Participants were assured of anonymity, voluntary withdrawal, and access to summary results. All data were stored in password-protected files accessible only to the research team.

3.0 Results and Discussion

Socio-demographic Characteristics of the Respondents

The study first established the demographic profile of the sampled population. These characteristics are key for interpreting the effectiveness of communication strategies, as factors such as education level, gender, and occupation often mediate an individual's exposure to, comprehension of, and ability to act upon health messages. The descriptive statistics are presented in Table 1.

Table 1
Socio-demographic Characteristics of the Respondents

Characteristic	Overall (n = 400)	Female (n = 196)	Male (n = 204)
Age			
18–21 years	36 (9.0%)	15 (7.7%)	21 (10.3%)
22–28 years	68 (17.0%)	33 (16.8%)	35 (17.2%)
29–35 years	99 (24.8%)	49 (25.0%)	50 (24.5%)
36–42 years	96 (24.0%)	48 (24.5%)	48 (23.5%)
43–49 years	49 (12.3%)	27 (13.8%)	22 (10.8%)
50 years or over	52 (13.0%)	24 (12.2%)	28 (13.7%)
Education Level			
Primary	46 (11.5%)	27 (13.8%)	19 (9.3%)
High school	132 (33.0%)	71 (36.2%)	61 (29.9%)

Characteristic	Overall (n = 400)	Female (n = 196)	Male (n = 204)
Some college/trade school	85 (21.3%)	42 (21.4%)	43 (21.1%)
College	117 (29.3%)	46 (23.5%)	71 (34.8%)
Bachelor's degree	14 (3.5%)	7 (3.6%)	7 (3.4%)
Master's degree	2 (0.5%)	1 (0.5%)	1 (0.5%)
Occupation			
Employed full-time	38 (9.5%)	18 (9.2%)	20 (9.8%)
Employed part-time	65 (16.3%)	33 (16.8%)	32 (15.7%)
Self-employed	152 (38.0%)	76 (38.8%)	76 (37.3%)
Student	61 (15.3%)	24 (12.2%)	37 (18.1%)
Unemployed	58 (14.5%)	33 (16.8%)	25 (12.3%)
Retired	18 (4.5%)	8 (4.1%)	10 (4.9%)
Marital Status			
Single	101 (25.3%)	41 (20.9%)	60 (29.4%)
Married	227 (56.8%)	109 (55.6%)	118 (57.8%)
Separated	12 (3.0%)	5 (2.6%)	7 (3.4%)
Divorced	11 (2.8%)	8 (4.1%)	3 (1.5%)
Widowed	31 (7.8%)	23 (11.7%)	8 (3.9%)
Household Size			
Living alone	67 (16.8%)	30 (15.3%)	37 (18.1%)
2–3 people	170 (42.5%)	79 (40.3%)	91 (44.6%)
4–5 people	94 (23.5%)	51 (26.0%)	43 (21.1%)
6 or more people	69 (17.3%)	36 (18.4%)	33 (16.2%)

Note. The sample comprised 320 household members (80.0%), 48 community health workers (12.0%), and 32 teachers (8.0%).

As evident in Table 1, the gender distribution was nearly equal, comprising slightly more males (51.0%) than females (49.0%). The age profile was concentrated in the middle adult brackets, with nearly half of the sample (48.8%) aged between 29 and 42 years. In terms of education, the largest segments had completed high school (33.0%) or college (29.3%); however, a marked gender disparity existed, with males reporting

significantly higher college attendance (34.8%) than females (23.5%). The majority of participants were engaged in the informal sector, primarily self-employment (38.0%), and most were married (56.8%) and lived in small to medium-sized households of 2–3 people (42.5%).

Perception and Preference for Health Information Packaging

Participants rated the understandability of health messages and indicated their preferred media for communication. The findings are presented in Table 2.

Table 2

Perception and Preferred Modes of Health Information Packaging

Characteristic	Category	Frequency (n)	Percentage (%)
Health information is presented in a way that is easy to understand	Agree	31	7.8
	Disagree	24	6.0
	Neither agree nor disagree	90	22.5
	Strongly disagree	7	1.7
	No exposure / Don't know	248	62.0
Preferred packaging of information	Pamphlets	1	0.3

Characteristic	Category	Frequency (n)	Percentage (%)
	Radio ads	24	6.0
	Posters	3	0.8
	TV ads	20	5.0
	Online content	13	3.3
	No preference / No exposure	339	84.8

Note. Percentages indicate the proportion of the total sample (n = 400) selecting each category.

Only 7.8% of respondents agreed that existing information was easy to understand, while 6.0% disagreed. The majority (62.0%) reported no exposure to packaged messages, suggesting that non-affirmative responses reflect inadequate reach rather than negative evaluation. Regarding preferred formats, radio ads (6.0%) and TV ads (5.0%) were most favored, confirming the community's reliance on audio-visual communication. Pamphlets (0.3%) and posters (0.8%) were least preferred, likely due to literacy

barriers or limited distribution. These results indicate that oral and visual communication remain the most effective channels for tungiasis awareness in Vihiga County.

Importance of Message Design and Interaction with Health Workers

The respondents were asked to rate the usefulness of health information packaging and their experiences interacting with healthcare providers. The findings are presented in Table 3.

Table 3

Importance of Health Information Packaging and Interaction with Health Workers

Characteristic	Category	Frequency (n)	Percentage (%)
Importance of health information packaging	Not very helpful	5	1.3
	Somewhat helpful	21	5.3
	Very helpful	19	4.8
	No opinion / No exposure	355	88.8
Different interactions with health workers	Received treatment	8	2.0
	Consultation	20	5.0
	Received education	38	9.5
	No interaction	314	78.5
	Other	8	2.0

A total of 26 of respondents found health information packaging either "somewhat helpful" or "very helpful," showing moderate satisfaction among those exposed. The overwhelming majority (88.8%) had no opinion, reflecting limited prior exposure to packaged messages. Interaction with healthcare workers significantly contributed to awareness: 9.5% reported receiving health education, 5.0% had consultations, and 2.0% received treatment. However, 78.5% reported no interaction with a health worker, highlighting a substantial gap in direct community engagement.

Descriptive and Inferential Statistics for Message Uptake

Message uptake was operationalized using the Tungiasis Message Uptake Score (TMUS), a composite index ranging from 5 to 20 computed by summing responses to five items (message recall, comprehension, perceived relevance, behavioral intention, and message sharing), each rated on a 4-point Likert scale. Descriptive statistics for each communication format are presented in Table 4a.

Table 4a

Descriptive Statistics for Tungiasis Message Uptake by Communication Format

Communication Format	n	Mean	SD	95% CI for Mean
Pamphlets	45	8.42	2.11	[7.79, 9.05]
Radio ads	112	9.24	1.98	[8.87, 9.61]
Posters	38	8.76	2.34	[7.99, 9.53]
TV ads	98	9.21	2.05	[8.80, 9.62]
Online content	67	8.87	2.22	[8.33, 9.41]
Total	360	8.94	2.12	[8.72, 9.16]

Note. TMUS range = 5–20. Higher scores indicate greater uptake. The analysis includes only the 360 respondents who reported exposure to at least one primary communication format.

A One-Way Analysis of Variance (ANOVA) was conducted to test H_{01} : Health information packaging has no significant effect on community

uptake of tungiasis awareness messages in Vihiga County. Results are presented in Table 4b.

Table 4b

One-Way ANOVA Results for Health Information Packaging and Uptake of Tungiasis Awareness Messages

Source of Variation	Sum of Squares	df	Mean Square	F-value	p-value
Between Groups	14.72	4	3.68	4.53	0.002**
Within Groups	321.45	355	0.91		
Total	336.17	359			

Note. $p < 0.05$ indicates statistical significance. $\eta^2 = 0.044$ (95% CI [0.012, 0.089]). Analysis restricted to respondents with exposure to at least one primary format ($n = 360$).

The ANOVA results revealed a statistically significant difference in mean uptake across the five packaging methods ($F(4, 355) = 4.53$, $p = 0.002$). The effect size was $\eta^2 = 0.044$, indicating a small-to-medium practical effect (Lakens, 2013). Since the ANOVA yielded a significant F-value, the null hypothesis (H_{01}) was rejected. The findings confirm that the mode of health

information packaging significantly shapes how communities in Vihiga County receive and act upon tungiasis awareness messages.

A Tukey Honestly Significant Difference (HSD) post-hoc test was conducted to identify specific differences between formats. Results are presented in Table 5.

Table 5

Tukey's HSD Post Hoc Test for Differences in Effectiveness of Health Information Packaging

Comparison (Media Type)	Mean Difference (I–J)	Std. Error	p-value
Pamphlets vs Radio Ads	–0.82	0.21	**0.001
Pamphlets vs Posters	–0.34	0.25	0.182
Pamphlets vs TV Ads	–0.79	0.20	**0.002
Pamphlets vs Online Content	–0.45	0.23	0.062
Radio Ads vs Posters	0.48	0.18	*0.015
Radio Ads vs TV Ads	–0.03	0.19	0.842
Radio Ads vs Online Content	0.36	0.20	0.078
Posters vs TV Ads	–0.51	0.22	*0.027
Posters vs Online Content	–0.12	0.23	0.602
TV Ads vs Online Content	0.43	0.21	*0.045

Note. * $p < 0.05$, ** $p < 0.01$.

The post-hoc analysis showed that radio and television advertisements were significantly more effective than pamphlets in promoting uptake ($p = 0.001$ and $p = 0.002$, respectively). Television advertisements also outperformed posters ($p = 0.027$) and online content ($p = 0.045$), suggesting that visual storytelling and demonstrations strongly engage audiences. Differences between radio and television were not significant ($p = 0.842$), indicating both platforms are equally influential.

Qualitative Findings

This section presents qualitative data from key informant interviews and focus group discussions with community members, health workers, and administrators. The analysis focuses on four thematic areas: package and presentation, factors influencing uptake, improvement strategies, and indicators of effective packaging.

Package and Presentation to the Community

Participants emphasized that messages communicated in simple English or local languages are better understood and accepted. One respondent noted, “Simple English... Language known by the majority in the community” [KII_FGD_VIHIGA_SABATIA]. Another added, “Ni rahisi kuwaelewa... If it is packaged in an easy way that the community understands” [KII_FGD_SABATIA SUBCOUNTY]. Health education and outreach activities, particularly during outbreaks, were cited as key delivery mechanisms. Communication methods included public barazas, house-to-house visits, and community health talks relayed through Ministry of Health channels down to Community Health Promoters (CHPs) and local administration. School-based programs and community seminars were also highlighted as effective platforms for direct engagement.

Factors Influencing Uptake

Multiple social, economic, and cultural barriers impede message uptake. Participants cited entrenched beliefs in witchcraft and familial curses as major obstacles: “They believe in

witchcraft... Wengi wameamini ni uchawi” [KII_FGD_VIHIGA_SABATIA]. Stigma, poverty, low education levels, and language barriers were also frequently mentioned. One participant noted that some residents live in remote areas where health workers cannot reach them, while another attributed non-uptake to ignorance and traditional beliefs: “People think of curses... Misguided by evil spirits from the dead... Some members are ignorant” [KII_FGD_SABATIA SUBCOUNTY].

Ways of Improving Tungiasis Awareness Packaging

Participants recommended strengthening the delivery system through increased personnel and focused training: “There should be more CHV’s to reach the community members... Through CHP’s trainings” [KII_FGD_VIHIGA_SABATIA]. To counter cultural barriers, they suggested prioritizing communication in local languages and using village elders as trusted messengers: “Speaking their languages... Kwa lugha yenya wanaelewa kwa moja” [KII_FGD_VIHIGA_SABATIA]. Additionally, making communication more engaging through drama and entertainment venues was proposed to boost attendance and learning.

Indications of Effective Packaging

The fundamental indicator of success was delivery in easily understood language via familiar channels. One participant observed, “Local radio stations deliver information with the language that is commonly used by a given community... Easy to understand language was used” [KII_FGD_VIHIGA SUBCOUNTY]. Individual comprehension was also cited as direct evidence: “Ilinisaidia kwa sababu ya kuelewa sana [It helped me because of understanding so much]” [KII_FGD_VIHIGA SUBCOUNTY]. Ultimately, positive community outcomes such as improved hygiene, increased awareness, and reduced tungiasis cases were considered the ultimate proof of effectiveness: “Cases of Jiggers reduced with a

great percentage”
[KII_FGD_VIHIGA_SABATIA].

Discussion

These findings directly address the study objective by demonstrating that health information packaging specifically the choice of oral/visual channels and message clarity significantly shapes how communities in Vihiga County receive and act upon tungiasis awareness messages. The statistically significant ANOVA result ($p = 0.002$) indicates that packaging format explains approximately 4.4% of variance in message uptake, suggesting that while channel selection is a meaningful predictor, structural factors including poverty, stigma, and health system access exert substantial concurrent influence on community reception. This interpretation aligns with the Social Ecological Model, which posits that message packaging operates at the interpersonal and institutional levels, but its impact is moderated by individual literacy and community poverty (McLeroy et al., 1988).

The superiority of radio and television over pamphlets and posters is consistent with health communication research showing that visual and oral formats bypass literacy barriers in resource-poor settings (Kandpal & Dutta, 2024). In the Kenyan context, Wiese et al. (2017) documented that school-based tungiasis interventions in Kilifi were most effective when combined with community-wide visual messaging, reinforcing the generalizability of the present findings across Kenyan endemic regions. The near-equivalence of radio and television effectiveness ($p = 0.842$) suggests that both platforms serve as critical cues to action within the Health Belief Model, increasing perceived susceptibility and reducing perceived barriers among audiences who might otherwise ignore print materials (Jones et al., 2015).

Qualitative data illuminate why certain formats succeed while others fail. The strong preference for local-language delivery and community-based platforms such as barazas aligns with participatory communication principles, wherein message co-

creation with local actors enhances relevance and ownership (Parker & Becker-Benton, 2016). This finding corroborates Wu and Gong (2023), who demonstrated that visual communication simplifies complex health concepts and improves relatability. However, the persistence of witchcraft-related beliefs as a barrier to uptake underscores that message packaging must actively counter misinformation, not merely transmit biomedical facts. When health messages conflict with deeply held cultural narratives, uptake is suppressed regardless of channel quality.

The finding that 78.5% of respondents had no interaction with a health worker points to a systemic weakness in the interpersonal communication layer of the Social Ecological Model. Direct engagement significantly enhanced comprehension and trust, supporting the conclusion that health-worker-mediated delivery is not merely a channel but a credibility mechanism that validates the message content (Zanobini et al., 2024). This has immediate practical implications: even well-packaged broadcast messages may fail to achieve behavioral change without complementary face-to-face reinforcement by trusted community health volunteers.

Integration of quantitative and qualitative findings reveals a convergent pattern. Statistical evidence shows that oral/visual channels produce higher uptake scores, while qualitative narratives explain why these formats overcome literacy constraints, align with cultural norms, and leverage familiar community settings. The low absolute preference rates for all channels (Table 2) further indicate that the primary problem is not message rejection but message non-exposure. This suggests that future interventions should prioritize expanding coverage before refining content, ensuring that households currently unreachable by any format are brought into the communication network.

4.0 Conclusion

This study established that the packaging of health information significantly influences the uptake of tungiasis awareness messages in Vihiga County.

Radio and television advertisements were the most effective formats, while pamphlets and posters were least preferred due to literacy barriers and limited distribution. Qualitative insights reinforced the importance of delivering messages in simple local languages and through community-based approaches such as health talks, barazas, and school programs. Cultural beliefs, stigma, and poverty emerged as major barriers to message uptake, while direct interaction with health workers enhanced trust and comprehension. The ANOVA and post-hoc tests confirmed that differences in packaging methods had a statistically significant effect on awareness uptake, underscoring the critical role of message design and delivery channels in shaping community responses.

5.0 Recommendations

1. The County Government should allocate funds for regular broadcast of tungiasis messages via local radio and television outlets, ensuring these are packaged in simple, engaging, and entertaining formats (short drama or interactive expert programs) to maintain high accessibility and comprehension, particularly for low-literacy populations.

2. The Ministry of Education should formalize and fund a “Tungiasis Prevention in Schools” program to leverage schools as highly effective information sources, using children as agents to carry accurate health messages back to their households.

3. The County Department of Health should strengthen training for community health volunteers and traditional leaders in culturally appropriate communication strategies, including storytelling, conflict resolution, and ethical persuasion, to enhance trust and message credibility.

4. The Ministry of Health should invest in robust mixed-methods monitoring systems that assess reach, comprehension, and behavioral outcomes of communication interventions, allowing programs to adapt dynamically based on community feedback.

5. Future research should implement longitudinal intervention studies that track specific communication exposures alongside biometric or observational measures of disease burden (e.g., parasite load, foot lesion prevalence, school absenteeism) across multiple follow-up waves.

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