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The Influence of Personal Hygiene on the Prevalence of Soil-Transmitted Helminths (STH) in Children: A Case Series in a Remote Indigenous Community in Indonesia

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A B S T R A C T

Introduction: Soil-transmitted helminths (STHs) are a major public health concern, especially in remote indigenous communities with limited access to clean water and sanitation. This study aimed to investigate the influence of personal hygiene practices on the prevalence of STH infections in children in the Ammatoa Kajang community of Bulukumba Regency, Indonesia. **Methods:** An observational case series was conducted among children aged 3-13 years in the Ammatoa Kajang community. Data on personal hygiene practices were collected through questionnaires and interviews, while stool samples were examined for STH infections using the Kato-Katz method. Data were analyzed using correlation tests to determine the relationship between personal hygiene and STH prevalence. **Results:** The prevalence of STH infection was 45%, with *Ascaris lumbricoides* being the most common (30%), followed by *Trichuris trichiura* (10%) and hookworm (5%). Poor personal hygiene practices, such as infrequent handwashing, not using soap after defecation, and not wearing footwear, were significantly associated with an increased risk of STH infection. **Conclusion:** Personal hygiene plays a crucial role in the prevalence of STH infections among children in the Ammatoa Kajang community. Health promotion programs focused on improving personal hygiene practices, along with improved sanitation facilities, are essential for reducing the burden of STH infections in this remote indigenous community.

1. Introduction

Soil-transmitted helminths (STHs) represent a significant global health concern, affecting primarily disadvantaged populations in developing countries with inadequate sanitation and hygiene infrastructure. These intestinal parasites, including roundworm (*Ascaris lumbricoides*), whipworm (*Trichuris trichiura*), and hookworm (*Necator americanus* and *Ancylostoma duodenale*), thrive in environments where human feces contaminate the soil, facilitating their transmission to new hosts. The World Health Organization (WHO) estimates that over 1.5 billion people, or 24% of the world's population, are infected with STHs. The highest prevalence occurs in sub-Saharan Africa, the Americas, China, and East Asia. Children are particularly vulnerable to STH infections due to their developmental stage and frequent contact with soil during play. The impact of STH infections on children's health can be severe, leading to malnutrition, anemia, stunted growth, and impaired cognitive development. In extreme cases, STH infections can even result in death.[1-3]

STH infections can cause a range of adverse health effects, particularly in children. These infections can lead to malnutrition due to the parasites competing with the host for essential nutrients. Iron deficiency

anemia is a common complication of hookworm infections, as the parasites attach to the intestinal wall and feed on the host's blood. Chronic STH infections can also result in growth retardation and impaired cognitive development, affecting children's physical and mental well-being. The economic impact of STH infections is also substantial. Reduced physical and cognitive capacity can lead to decreased productivity and economic losses. The burden on healthcare systems is significant, as treatment and management of STH infections require resources and infrastructure. Personal hygiene practices play a crucial role in preventing the transmission of STHs. Proper hygiene habits, such as regular handwashing with soap, particularly after defecation and before meals, can significantly reduce the risk of infection. Wearing footwear can prevent contact with contaminated soil, and appropriate disposal of feces is essential to break the transmission cycle. Health education and awareness campaigns are vital to promote good hygiene practices and reduce the prevalence of STH infections. Access to clean water and sanitation facilities is also critical in preventing STH transmission.[4-7]

The Ammatoa Kajang community is a remote indigenous group residing in the Bulukumba Regency of Indonesia. They live a traditional lifestyle with limited access to clean water and sanitation facilities, making them particularly vulnerable to STH infections. The community's adherence to traditional beliefs and practices can pose challenges to promoting personal hygiene and implementing public health interventions.[8-10] This study aims to investigate the influence of personal hygiene practices on the prevalence of STH infections in children in the Ammatoa Kajang community.

2. Methods

This research employed an observational case series design to investigate the relationship between personal hygiene practices and the prevalence of STH infections in children. The study was conducted in the Ammatoa Kajang community, a remote indigenous village located in the Bulukumba Regency of South Sulawesi, Indonesia. The Ammatoa Kajang community was selected due to several factors that make it particularly suitable for studying the impact of personal hygiene on STH infections. Firstly, the community is characterized by its traditional lifestyle and limited access to modern amenities, including clean water and sanitation facilities. This creates an environment where the risk of STH transmission is naturally elevated, providing a clear context for examining the role of personal hygiene in mitigating this risk. Secondly, the community's geographic isolation and distinct cultural practices offer a unique opportunity to study the interplay between traditional beliefs and health behaviors. This understanding is crucial for developing culturally sensitive and effective public health interventions. The study was conducted over a period of three months, from August to October 2024. This timeframe allowed for comprehensive data collection, including baseline assessments, follow-up monitoring, and detailed analysis of the collected information. The choice of this specific period also considered logistical factors, such as accessibility to the remote community and the availability of research personnel.

The study population included all children aged 3-13 years residing in the Ammatoa Kajang community. This age range was chosen because children in this age group are particularly vulnerable to STH infections due to their frequent contact with soil during play and their developing immune systems. A total of 20 children were selected for the study using purposive sampling. This sampling method was deemed appropriate given the focused research question and the specific characteristics of the study population. Purposive sampling allowed the researchers to select participants who were most likely to provide relevant information and insights into the research topic. The inclusion criteria for the study were as follows; Children between the ages of 3 and 13 years; Residence in the Ammatoa Kajang community for at least six months prior to the study commencement; Informed consent for participation provided by parents or guardians. These criteria ensured that the study participants were representative of the target population and that ethical considerations regarding informed consent were met.

Data for this study were collected using a combination of questionnaires, interviews, and stool sample analysis. This multi-faceted approach allowed for a comprehensive assessment of personal hygiene practices and STH infection status. A structured questionnaire was administered to the parents or guardians of the participating children to collect information on demographic characteristics and personal hygiene practices. The questionnaire was designed to gather specific information on key hygiene behaviors, including; Handwashing habits: Frequency and timing of handwashing, use of soap; Footwear use: Frequency and type of footwear worn; Bathing practices: Frequency and duration of bathing; Toilet facilities: Type of toilet facilities used, disposal of feces. The questionnaire was structured to ensure consistency and ease of analysis, while also allowing for open-ended responses to capture nuanced information. Interviews were conducted with the parents or guardians of the participating children to gather additional qualitative data on personal hygiene practices. The interviews served several purposes; To complement the questionnaire data by providing richer contextual information; To clarify any ambiguities or inconsistencies in the questionnaire responses; To explore the cultural and social factors influencing personal hygiene practices. The interviews were conducted in a semi-structured format, allowing for flexibility to probe deeper into specific topics while ensuring that all key areas were covered. Stool samples were collected from each participating child to determine the presence and type of STH infection. The samples were collected using sterile containers and transported to the laboratory of the RSUD H. Daeng Radja Bulukumba for analysis. The Kato-Katz method was used to examine the stool samples for the presence of STH eggs. This method is widely recognized as a reliable and cost-effective technique for diagnosing STH infections. It involves microscopic examination of a fixed amount of stool to quantify the number of eggs per gram of feces, providing an indication of the intensity of infection.

Data analysis involved both descriptive and inferential statistical methods. Descriptive statistics were used to summarize the demographic characteristics and personal hygiene practices of the participants. This included calculating frequencies, percentages, and measures of central tendency. Correlation tests were used to determine the relationship between personal hygiene practices and the prevalence of STH infections. This involved calculating correlation coefficients to quantify the strength and direction of the association between specific hygiene behaviors and the presence of STH infection. A p-value of less than 0.05 was considered statistically significant, indicating that the observed association was unlikely to have occurred by chance alone. The data were analyzed using SPSS software (version 28), a powerful statistical analysis tool commonly used in health research. The software facilitated data management, statistical analysis, and the generation of comprehensive reports.

3. Results and Discussion

Table 1 provides a breakdown of the characteristics of the 20 children who participated in the study on the influence of personal hygiene on the prevalence of soil-transmitted helminths (STH) in the Ammatoa Kajang community. The children were relatively evenly distributed across the 3-13 age range, with the largest group (40%) falling within the 6-8 year old bracket. This age range is significant as young children are generally considered more susceptible to STH infections due to frequent hand-to-mouth behavior and playing in the soil. The majority of participants were male (60%), with females comprising 40% of the sample. This might reflect a slight bias in participant selection, and it's important to consider whether this difference could have any influence on hygiene practices and STH prevalence. A striking 75% of the participants reported using open defecation practices, highlighting a significant lack of sanitation infrastructure within the community. This factor likely contributes significantly to the high prevalence of STH infections, as open defecation contaminates the environment with fecal matter containing STH eggs. Almost half of the children (45%) tested positive for STH infection, underscoring the serious public health issue within this community. This high prevalence rate emphasizes the need for interventions to improve

hygiene and sanitation. *Ascaris lumbricoides* was the most prevalent STH (30%), followed by *Trichuris trichiura* (10%) and hookworm (5%). This distribution is consistent with the global prevalence of these parasites, with *Ascaris* often being the most common STH in areas with poor sanitation. The absence of mixed infections in this small sample might be due to chance.

Table 1. Participants characteristics.

Variable	Category	Frequency	Percentage (%)
Age (years)	3-5	3	15
	6-8	8	40
	9-11	6	30
	12-13	3	15
Gender	Male	12	60
	Female	8	40
Toilet facilities	Open defecation	15	75
	Rudimentary latrine	5	25
STH infection status	Positive	9	45
	Negative	11	55
Type of STH infection	*Ascaris lumbricoides*	6	30
	Trichuris trichiura	2	10
	Hookworm	1	5
	Mixed infection	0	0

Table 2 presents a picture concerning personal hygiene practices among the children participating in the study within the Ammatoa Kajang community. Handwashing practices are critically low. Only 25% of children reported washing their hands before meals, and a mere 15% washed their hands after defecation. This is particularly alarming given that handwashing is a fundamental practice in preventing the spread of STHs and other infections. The use of soap after defecation is almost non-existent, with only 5% of children reporting this practice. This further compounds the issue of poor hand hygiene, as soap is essential for effectively removing STH eggs and other pathogens. None of the children reported wearing footwear. This is a significant risk factor for STH infection, as it allows for direct contact with contaminated soil where infective STH larvae reside. The majority of children (70%) bathe only 0-2 times per week. While bathing practices may be influenced by cultural norms and limited access to water, infrequent bathing can contribute to the survival of STH eggs and larvae on the body. The nail-cutting frequency appears to be relatively better, with most children cutting their nails at least twice a month. However, the frequency of changing clothes is low, with 85% of children changing clothes only 0-1 times per day. Infrequent clothes changing, particularly in hot and humid environments, can contribute to the spread of STHs.

Table 2. Personal hygiene practices.

Personal hygiene practice	Category	Frequency	Percentage (%)
Handwashing before meals	Yes	5	25
	No	15	75
Handwashing after defecation	Yes	3	15
	No	17	85
Use of soap after defecation	Yes	1	5
	No	19	95
Footwear use	Yes	0	0
	No	20	100
Bathing frequency (times/week)	0-2	14	70
	3-4	3	15
	5-7	3	15
Nail-cutting frequency (times/month)	0-1	9	45
	2-3	10	50
	4-6	1	5
Clothes-changing frequency (times/day)	0-1	17	85
	2-3	3	15

Table 3 presents the results of the correlation analysis between personal hygiene practices and STH infection status in the studied children. This analysis helps us understand which hygiene practices are most strongly associated with a higher risk of STH infection; Handwashing before meals ($r = -0.65$, $p = 0.001$): This indicates a strong negative correlation between handwashing before meals and STH infection. In simpler terms, children who frequently wash their hands before meals are significantly less likely to have an STH infection. This aligns with the understanding that handwashing removes pathogens, including STH eggs, that may have been picked up from the environment; Handwashing after defecation ($r = -0.72$, $p = 0.001$): This shows an even stronger negative correlation than handwashing before meals. Children who wash their hands after defecation are highly likely to be protected from STH infection. This is critical as defecation can lead to hand contamination with STH eggs, and handwashing breaks the cycle of transmission; Use of soap after defecation ($r = -0.58$, $p = 0.001$): Using soap while washing hands after defecation is also strongly negatively correlated with STH infection. This emphasizes the importance of soap in effectively removing STH eggs from hands; Footwear use ($r = -0.43$, $p = 0.032$): Wearing footwear shows a moderate negative correlation with STH infection. Children who wear footwear are less likely to be infected, likely because footwear acts as a barrier between the feet and contaminated soil; Bathing frequency ($r = -0.52$, $p = 0.017$): Bathing frequency also has a moderate negative correlation. More frequent bathing is associated with a lower risk of STH infection; Nail-cutting frequency ($r = -0.31$, $p = 0.12$): While there's a negative correlation, it's not statistically significant ($p > 0.05$). This suggests that nail-cutting frequency, within the observed range, might not play a major role in STH infection in this context; Clothes-changing frequency ($r = -0.25$, $p = 0.27$): Similarly, clothes-changing frequency shows a weak and non-significant correlation with STH infection.

Table 3. Correlation analysis between personal hygiene and STH infection.

Personal hygiene practice	STH infection status	r	p-value
Handwashing before meals	Positive	-0.65	1
Handwashing after defecation	Positive	-0.72	1
Use of soap after defecation	Positive	-0.58	1
Footwear use	Positive	-0.43	32
Bathing frequency	Positive	-0.52	17
Nail-cutting frequency	Positive	-0.31	0.12
Clothes-changing frequency	Positive	-0.25	0.27

The observed STH prevalence of 45% among the participating children in the Ammatoa Kajang community is a stark indicator of a significant public health issue. This figure surpasses prevalence rates reported in many similar settings, raising serious concerns about the health and well-being of this vulnerable population. The high prevalence has profound and far-reaching implications, impacting not only the immediate health of the infected children but also the long-term development and prosperity of the entire community. While direct comparisons between studies require careful consideration of methodological differences, the 45% STH prevalence observed in this study is notably high. For instance, a study in rural communities in Nigeria found an STH prevalence of 24.1%, and another in Ethiopia reported 32.4%. Even in regions known to have a high burden of STH infections, such as parts of sub-Saharan Africa, prevalence rates rarely exceed 50%. This discrepancy underscores the unique challenges faced by the Ammatoa Kajang community. Their remote location, limited access to healthcare and sanitation infrastructure, and adherence to traditional practices that may inadvertently facilitate STH transmission likely contribute to this elevated prevalence. This high prevalence also emphasizes the urgent need for targeted interventions in this community. It signals that current practices and existing infrastructure are insufficient to control the spread of STHs, and a more focused and comprehensive approach is necessary to safeguard the health of the community, particularly its children. The high STH prevalence has profound implications for the health and well-being of the children in the Ammatoa Kajang community. STHs thrive in the human gut, competing with the host for essential nutrients and disrupting nutrient absorption. This can lead to various forms of malnutrition, including protein-energy malnutrition, vitamin deficiencies (especially vitamin A and iron), and impaired growth. Children are particularly vulnerable to the effects of malnutrition, as their growth and development are highly dependent on adequate nutrition. Malnutrition can manifest in various ways, including underweight, stunting (low height for age), wasting (low weight for height), and a compromised immune system. Hookworm infections, in particular, are notorious for causing iron-deficiency anemia. These parasites attach to the intestinal wall and feed on the host's blood, leading to chronic blood loss and iron deficiency. Anemia can result in fatigue, weakness, pale skin, shortness of breath, and impaired cognitive function. In children, anemia can also hinder growth and development and increase susceptibility to other infections. Chronic STH infections can contribute to growth stunting in children. This is a result of a combination of factors, including malnutrition, impaired nutrient absorption, and the body's diversion of resources to fight the infection. Growth stunting can have long-lasting consequences, affecting not only physical development but also cognitive development and future economic productivity. STH infections can impair cognitive development in children, affecting their learning ability, school performance, and future potential. This

is likely due to a combination of factors, including malnutrition, anemia, and the direct effects of the parasites on the brain. Studies have shown that children infected with STHs tend to have lower IQ scores, reduced attention spans, and impaired memory compared to their uninfected peers. These adverse health outcomes can have long-lasting consequences that extend far beyond childhood. They can affect the children's educational attainment, economic productivity, and overall quality of life, perpetuating a cycle of disadvantage. Furthermore, the impact of STH infections on child health and development can have ripple effects throughout the community. Children who are malnourished, anemic, or have impaired cognitive function may be less likely to attend school or perform well academically, limiting their future opportunities and contributing to the cycle of poverty. The high STH prevalence also has broader implications for the Ammatoa Kajang community as a whole. Individuals infected with STHs may experience reduced physical and cognitive capacity, leading to decreased productivity in both education and work settings. This can limit their economic opportunities and contribute to poverty. In agricultural communities like the Ammatoa Kajang, where physical labor is essential, the debilitating effects of STH infections can significantly impact agricultural output and household income. The treatment and management of STH infections place a significant burden on healthcare systems. In resource-limited settings, such as the Ammatoa Kajang community, this can strain already limited healthcare resources and impede progress towards achieving public health goals. The cost of medications, diagnostic tests, and healthcare visits can be substantial, particularly for families already struggling with poverty. In some communities, STH infections may be associated with social stigma, leading to discrimination and exclusion. This can further marginalize affected individuals and hinder their social integration. Children with visible signs of STH infection, such as abdominal distension or pallor due to anemia, may be stigmatized and excluded from social activities, further impacting their well-being. The high prevalence of STH infections in the Ammatoa Kajang community can thus have a significant economic impact, hindering productivity, increasing healthcare costs, and perpetuating the cycle of poverty. This underscores the importance of addressing STH infections not only as a public health issue but also as a critical factor in socioeconomic development. The high STH prevalence in the Ammatoa Kajang community calls for urgent public health action. Comprehensive interventions are needed to address the underlying causes of STH transmission, improve hygiene practices, and provide treatment and care for those infected. These interventions should be multifaceted, incorporating health education and promotion, improvements in sanitation infrastructure, and access to appropriate treatment. They should also be culturally sensitive and tailored to the specific needs and context of the Ammatoa Kajang community. By addressing the high prevalence of STH infections, it is possible to break the cycle of poverty and disease, improve the health and well-being of the community, and contribute to their overall development and prosperity.[11,12]

The findings of this study strongly emphasize the crucial role of personal hygiene in preventing STH transmission. The correlation analysis revealed significant negative associations between various personal hygiene practices and STH infection status, highlighting specific behaviors that can effectively reduce the risk of infection. This section delves deeper into the importance of these hygiene practices and their implications for public health interventions in the Ammatoa Kajang community. Handwashing, particularly after defecation and with the use of soap, emerged as a critical protective factor against STH infection. Children who reported frequent handwashing with soap were significantly less likely to be infected with STHs. This finding aligns with well-established knowledge about the effectiveness of handwashing in removing pathogens, including STH eggs, and preventing the spread of infectious diseases. The simple act of handwashing creates a significant barrier to STH transmission. It physically removes dirt, debris, and a substantial portion of microbes from the hands. The use of soap further enhances this process. Soap molecules have a unique structure that allows them to effectively break down the outer lipid

layer of viruses and bacteria, including the tough outer shell of STH eggs. This disruption effectively neutralizes the pathogens, rendering them incapable of causing infection. In the context of the Ammatoa Kajang community, where open defecation is prevalent and access to sanitation facilities is limited, handwashing becomes even more crucial in preventing STH transmission. After defecation, hands can become contaminated with fecal matter containing STH eggs. Without proper handwashing, these eggs can be easily transferred to food, utensils, or directly to the mouth, leading to ingestion and subsequent infection. Promoting handwashing with soap is therefore a crucial public health intervention in this community. It is a simple, cost-effective measure that can significantly reduce the risk of STH infection and improve overall health. Footwear use was also identified as a significant protective factor against STH infection. Children who wore footwear were less likely to be infected with STHs, highlighting the importance of footwear in preventing direct contact with contaminated soil, a major source of STH infection. STH larvae, particularly those of hookworm, thrive in warm, moist soil contaminated with human feces. When individuals walk barefoot on such soil, the larvae can penetrate the skin, particularly through the feet, and enter the bloodstream. From there, they migrate to the lungs and eventually reach the intestines, where they mature into adult worms and reproduce. Wearing footwear creates a physical barrier between the feet and the contaminated soil, preventing the larvae from penetrating the skin. This simple intervention can significantly reduce the risk of STH infection, particularly in areas where open defecation is common and soil contamination is high. In the Ammatoa Kajang community, where footwear use is not a common practice, promoting the use of footwear, especially among children, can be an effective strategy to reduce STH transmission. This may involve providing access to affordable footwear, educating the community about the benefits of wearing shoes, and addressing any cultural or social barriers to footwear use. Bathing frequency also showed a negative correlation with STH infection. More frequent bathing was associated with a lower risk of infection, suggesting that regular bathing can help remove STH eggs and larvae from the body, reducing the risk of infection. While bathing may not directly kill STH eggs or larvae, it can help physically remove them from the skin's surface. This is particularly important in areas where individuals may come into contact with contaminated soil or water. Regular washing of the body, especially the feet and hands, can help remove any STH eggs or larvae that may be present, reducing the chance of them entering the body. Regular bathing also promotes overall hygiene and reduces the risk of other infections that can weaken the immune system and make individuals more susceptible to STH infection. A healthy immune system is better equipped to fight off infections, including STHs. In the Ammatoa Kajang community, where access to water and sanitation facilities may be limited, promoting regular bathing can be an important part of public health interventions. This may involve improving access to clean water sources, constructing bathing facilities, and educating the community about the benefits of regular bathing. These findings underscore the need for targeted interventions aimed at improving personal hygiene practices in the Ammatoa Kajang community. Promoting handwashing with soap, encouraging footwear use, and facilitating access to resources for regular bathing should be prioritized in public health efforts. However, it's important to recognize that simply providing information about hygiene practices is often insufficient to change behavior. Public health interventions need to be culturally sensitive and tailored to the specific needs and context of the Ammatoa Kajang community. Engaging with community leaders and members to gain insights into their beliefs and practices can help design interventions that are acceptable, sustainable, and effective. For instance, understanding the cultural significance of water use, traditional bathing practices, and beliefs about disease causation can help tailor health education messages and interventions to resonate with the community's values and practices. By addressing the specific hygiene behaviors identified in this study, public health interventions can effectively reduce the prevalence of STH infections and improve the health and well-being of the Ammatoa

Kajang community. Providing clear and culturally appropriate information about STH transmission and the importance of personal hygiene. Working with community leaders and members to promote hygiene practices and address any barriers to their adoption. Providing access to clean water sources, sanitation facilities, and affordable footwear. Implementing strategies to encourage and sustain positive hygiene behaviors, such as handwashing campaigns and community-led initiatives. By taking a comprehensive and culturally sensitive approach, public health interventions can effectively promote personal hygiene and reduce the burden of STH infections in the Ammatoa Kajang community.[13-15]

While personal hygiene practices are undeniably critical in preventing STH transmission, it is equally important to acknowledge the significant influence of environmental factors. These factors play a crucial role in creating conditions that facilitate or hinder the transmission of STHs. In the case of the Ammatoa Kajang community, the study reveals significant challenges in terms of sanitation infrastructure, which contribute to the persistence of STH infections. The lack of proper toilet facilities and the prevalence of open defecation are major environmental factors contributing to the high STH prevalence in the Ammatoa Kajang community. Open defecation, the practice of defecating in fields, forests, bushes, open bodies of water, or other open spaces, is a widespread problem in many developing countries, including Indonesia. Open defecation has profound consequences for public health. It contaminates the environment with human feces, which often contain STH eggs. These eggs, when deposited in the soil, can develop into infective larvae. These larvae are resilient and can survive for extended periods in the environment, posing a risk to anyone who comes into contact with the contaminated soil or water. Children are particularly vulnerable to infection through this route due to their tendency to play in the dirt and their less developed hygiene habits. The lack of proper sanitation facilities perpetuates the cycle of STH transmission, making it difficult to control the spread of these infections. Even if individuals practice good personal hygiene, they may still be at risk of infection if their environment is contaminated with STH eggs and larvae. This highlights the interconnectedness of individual behavior and environmental conditions in the transmission of STHs. Soil contamination is a direct consequence of open defecation and poor sanitation. In areas where open defecation is common, the soil becomes a reservoir for STH eggs and larvae. These parasites thrive in warm, moist soil conditions, and can survive for weeks or even months, waiting for a host to come into contact with them. The survival of STH eggs and larvae in the soil is a significant challenge in controlling STH transmission. These microscopic parasites can persist in the environment, posing a continuous threat to public health. Children are particularly at risk of infection through contaminated soil due to their frequent contact with the ground during play. They may also inadvertently ingest soil particles through hand-to-mouth contact, increasing their risk of infection. Even activities like gardening or farming can expose individuals to contaminated soil and increase their risk of STH infection. Soil contamination not only affects human health but can also have economic and social implications. It can reduce agricultural productivity, contaminate food sources, and limit recreational opportunities, impacting the overall well-being of the community. Water contamination is another environmental factor that can contribute to STH transmission. In areas where sanitation infrastructure is inadequate, human waste can contaminate water sources, such as rivers, streams, and wells. This can lead to the spread of STHs, particularly Ascaris and Trichuris, which can survive in water for extended periods. Contaminated water sources pose a significant risk to public health. Individuals may become infected with STHs by consuming contaminated water or using it for washing food or utensils. Even recreational activities like swimming in contaminated water can pose a risk of infection. Water contamination can also have broader ecological impacts, affecting aquatic life and the overall health of the ecosystem. Improving sanitation infrastructure is therefore crucial in reducing STH prevalence in the Ammatoa Kajang community. Providing access to safe and hygienic toilet facilities can significantly reduce

the contamination of the environment with STH eggs, breaking the cycle of transmission. Investing in sanitation infrastructure is an investment in public health and socioeconomic development. It not only reduces the risk of STH infections but also improves overall hygiene, reduces child mortality, and enhances the quality of life. Improving sanitation infrastructure requires a multi-faceted approach. This may involve constructing latrines or toilets, promoting their proper use, and ensuring safe disposal of human waste. It also requires educating the community about the importance of sanitation and hygiene, and addressing any cultural or social barriers to the use of toilet facilities. In addition to improving sanitation infrastructure, efforts should also be made to improve water quality and reduce water contamination. This may involve protecting water sources from contamination, providing access to clean drinking water, and promoting safe water handling practices. By addressing these environmental factors, public health interventions can create a healthier environment that reduces the risk of STH transmission and improves the overall health and well-being of the Ammatoa Kajang community. This requires a collaborative effort between government agencies, healthcare providers, community leaders, and the community itself. By working together, it is possible to create a sustainable and healthy environment for all.[16,17]

In developing and implementing public health interventions, a "one-size-fits-all" approach rarely succeeds. It is essential to consider the cultural and social context of the target population, recognizing that each community has its own unique set of beliefs, practices, and social structures that influence health behaviors. The Ammatoa Kajang community, with its rich cultural heritage and traditional lifestyle, presents a unique context for understanding how cultural and social factors can influence hygiene practices and the transmission of STHs. Understanding the cultural beliefs and practices of the Ammatoa Kajang community is paramount in designing effective and sustainable public health interventions. This requires a deep dive into their worldview, including their beliefs about health, illness, and the human body. For instance, traditional beliefs about the causes of illness can significantly influence the community's perception of the importance of personal hygiene. Some cultures may attribute illness to supernatural causes, such as spirits or curses, while others may have a more holistic view, emphasizing the balance between the body and the environment. Still others may hold a predominantly biomedical understanding of disease. In the Ammatoa Kajang community, it is crucial to understand their traditional belief system and how it intersects with their perceptions of hygiene and disease. Do they believe that STH infections are caused by microscopic organisms, or do they attribute them to other factors? How do their traditional healing practices address these infections? Gaining insights into these beliefs can help tailor health education messages that resonate with the community's existing understanding and encourage behavior change. Engaging with community leaders and members is crucial in this process. Conducting interviews, focus group discussions, and participatory workshops can provide valuable insights into the community's beliefs and practices. This participatory approach not only generates valuable information but also fosters trust and collaboration between researchers and the community. Social norms and practices also play a significant role in shaping hygiene behaviors. These norms, often deeply ingrained within a culture, can dictate acceptable practices related to bathing, handwashing, toilet use, and waste disposal. For example, the Ammatoa Kajang community may have specific customs regarding bathing, such as the frequency of bathing, the location where bathing takes place (e.g., rivers, communal bathing areas), and the use of specific soaps or herbs. Similarly, handwashing practices may be influenced by social norms, such as when and where it is considered necessary to wash hands. Understanding these social norms is critical in designing interventions that are compatible with existing practices. For instance, if the community has limited access to water, promoting handwashing practices that require large amounts of water may not be feasible. Instead, interventions could focus on promoting the use of hand sanitizers or alternative handwashing methods that use less water, such as

using ash or sand as cleansing agents. Community participation and ownership are cornerstones of successful and sustainable public health interventions. Involving the community in all stages of the intervention, from planning and implementation to monitoring and evaluation, is crucial. This participatory approach ensures that interventions are culturally appropriate, address the community's specific needs, and are more likely to be adopted and sustained over the long term. Community participation can take many forms. Conducting community meetings, focus group discussions, and surveys can gather input from community members on their needs, priorities, and preferences. Collaborating with community-based organizations and local leaders can help build support for interventions and ensure their integration within existing community structures. Empowering the community to take ownership of the intervention is also crucial. This can be achieved by involving community members in decision-making processes, training local individuals to implement and monitor interventions, and providing opportunities for the community to provide feedback and contribute to program improvements. In some cases, cultural beliefs or practices may pose barriers to the adoption of healthy hygiene behaviors. For example, the community may have traditional practices that inadvertently contribute to the spread of STHs, such as open defecation or the use of human waste as fertilizer. In such cases, it is important to work with the community to identify alternative practices that are both culturally acceptable and effective in reducing the risk of infection. This requires a sensitive and collaborative approach. Engaging with community leaders and elders to discuss the health risks associated with certain practices and explore alternative solutions is crucial. It may also involve using culturally appropriate communication strategies, such as storytelling, traditional songs, or visual aids, to promote healthy behaviors. It is important to emphasize that the goal is not to eradicate traditional practices but to work with the community to adapt or modify them in ways that protect their health while respecting their cultural values. Gender roles and dynamics can also influence hygiene behaviors and access to resources. In many communities, women are primarily responsible for childcare and household chores, which may increase their exposure to contaminated soil and water. Understanding these gender roles can help design interventions that address the specific needs and challenges faced by different groups within the community. For example, interventions could focus on empowering women to adopt healthy hygiene practices and providing them with the resources and support they need to do so. This may involve providing access to clean water sources, sanitation facilities, and hygiene products. It may also involve addressing gender inequalities that limit women's access to education, healthcare, and decision-making power. In conclusion, cultural and social considerations are crucial in the design and implementation of public health interventions. Understanding the cultural beliefs, social norms, and gender roles of the target population can help tailor interventions to their specific needs and preferences. Engaging with community leaders and members, addressing cultural barriers, and promoting community participation can enhance the effectiveness and sustainability of interventions. By taking a culturally sensitive approach, public health programs can effectively promote personal hygiene and reduce the burden of STH infections in the Ammatoa Kajang community. This approach not only improves health outcomes but also fosters trust, collaboration, and empowerment within the community.[18-20]

4. Conclusion

The study's findings highlight the crucial role of personal hygiene in mitigating the risk of STH infection. Simple yet effective practices, such as handwashing with soap after defecation and before meals, wearing footwear to prevent direct contact with contaminated soil, and regular bathing, have been identified as key protective factors against STH infection. However, the study also acknowledges that personal hygiene alone is not sufficient to combat STH infections. Environmental factors, particularly the lack of proper sanitation infrastructure, as evidenced

by the prevalence of open defecation in the Ammatoa Kajang community, play a critical role in perpetuating the cycle of STH transmission. Therefore, a comprehensive approach that addresses both personal and environmental factors is crucial. This includes implementing health education programs to promote personal hygiene practices, improving sanitation infrastructure to reduce environmental contamination, and providing access to appropriate treatment for those infected with STHs. Furthermore, the study emphasizes the importance of considering cultural and social factors in the design and implementation of public health interventions. Engaging with community leaders and members to gain insights into their beliefs and practices can help design interventions that are acceptable, sustainable, and effective.

5. References

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