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Original Article

Knowledge, Attitudes and Preventive Practices among Communities Living Near a Tobacco Processing Factory in Morogoro Municipality, Tanzania

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ABSTRACT

Background: Tobacco processing factories contribute to environmental pollution through the release of smoke, dust, and chemical pollutants that may negatively affect the health of nearby communities. Despite increasing concerns regarding environmental health risks associated with tobacco processing activities, limited information exists on the knowledge, attitudes, and prevention practices of communities living near tobacco processing factories in Tanzania.

Materials and Methods: A descriptive cross-sectional study using a quantitative approach was conducted among 157 community members living near a tobacco processing factory in Morogoro Municipality, Tanzania. Data were collected using structured questionnaires and analyzed using Statistical Package for Social Sciences (SPSS) version 20 to generate frequencies and percentages.

Results: Of the 157 respondents, 101 (64.3%) demonstrated good knowledge, while 56 (35.7%) had poor knowledge regarding health and environmental risks associated with tobacco processing activities. Most respondents correctly identified health effects and environmental contamination as potential concerns related to tobacco processing. Overall, 91 (58.0%) respondents demonstrated a positive attitude toward environmental health protection and pollution control measures, whereas 66 (42.0%) had a negative attitude. Preventive practices were generally poor, with 103 (65.6%) respondents classified as having poor preventive practices and 54 (34.4%) having good preventive practices. Participation in environmental health awareness sessions, reporting of pollution-related problems, and encouragement of others to adopt preventive measures were relatively low.

Conclusion: Although most community members had good knowledge and positive attitudes regarding health risks associated with tobacco processing factory emissions, prevention practices remained inadequate. Strengthened environmental health education, increased community participation, and improved collaboration between local authorities and public health institutions are needed to reduce environmental health risks among communities living near tobacco processing factories.

Keywords: Knowledge, Attitude, Prevention Practices, Tobacco Processing, Pollution, Tanzania

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INTRODUCTION

Tobacco processing factories are facilities where tobacco leaves are processed and prepared for distribution. They release pollutants into the air, soil and water, which can adversely affect human health and nearby communities. Tobacco use in any form kills and sickens millions of people every year. Over 8 million people died from a tobacco-related disease in 2019. The number of annual deaths can be expected to keep growing even once rates of tobacco use are in decline, because tobacco kills its users and people exposed to its emissions slowly [1]. Since it came into force, parties to the WHO FCTC have worked to minimize the substantial negative impact of tobacco on human health. These efforts have targeted tobacco use and the protection of non-tobacco users from second-hand and third-hand smoke (residual nicotine and other chemicals left on a variety of indoor surfaces by tobacco smoke). But as the world struggles to cope with climate change, some Parties to the WHO and FCTC have become increasingly concerned about the environmental impacts of tobacco too [2].

In 1995, it was estimated that global tobacco manufacturing produced over 2 000 000 tonnes of solid waste, 300 000 tonnes of non-recyclable nicotine-containing waste and 200 000 tonnes of chemical waste. If annual cigarette production had remained constant for the past 20 years (output has actually increased from 5 to 6.3 trillion cigarettes annually), tobacco factories would have deposited a total of 45 000 000 tonnes of solid wastes, 6 000 000 tonnes of nicotine waste and almost 4 000 000 tonnes of chemical wastes during this time [3]. Other toxic by-products of tobacco manufacturing or chemicals used in manufacturing include ammonia, hydrochloric acid, toluene and methyl ethyl ketone [3]. The health impacts of environmental tobacco smoke exposure include lung cancer, cardiovascular disease and pulmonary disease. Exposure to residual chemicals in environments where smoking has taken place may also have human health impacts. The WHO Framework Convention on Tobacco Control (FCTC) emphasizes the need to reduce the harm caused by tobacco production and processing, including protecting vulnerable populations from exposure. However, the implementation of these measures remains inconsistent in developing countries [4].

Tobacco use tends to be greater in low- and middle-income countries, until recently, only vague estimates of the environmental costs of tobacco manufacturing and transport were available – but even those were ominous. Pollution from tobacco smoke in outdoor air has also come under increased scrutiny, with high local concentrations in proximity to smoking (178–182). In addition to localized high levels, tobacco smoke can measurably contribute to ambient (widespread) air pollution in a city, with a measurable contribution to outdoor air pollution demonstrated for cities This form of tobacco smoke pollution is completely invisible to anyone exposed to it [2].

In Africa, more than 20 countries grow tobacco of which Malawi and Zimbabwe are leading in production which together account now for about half of Africa's production. Over the past 50 years, tobacco farming has shifted from high- to low- and middle- income countries. During this time, Africa has seen a significant increase in tobacco farming. Many farmers and government officials believe that tobacco is a cash crop essential to their economic success [5]. The rapid increase in tobacco production may lead to an increase in the number of tobacco processing factories, which may contribute to environmental damage and other health risks for communities living near these facilities. Tobacco products are the most littered item on the planet, containing over 7000 toxic chemicals, which leech into our environment when discarded. Roughly 4.5 trillion cigarette filters pollute our oceans, rivers, parks, soil and beaches every year [5].

Morogoro Municipality is an agricultural and industrial hub in Tanzania, hosting the main tobacco processing factory, but available data are limited. Despite the economic benefits these factories provide, they contribute to environmental pollution and health challenges for nearby communities [6]. Initial observations suggest a high prevalence of respiratory issues and other health problems among residents, but comprehensive data on KAP for communities proximate to tobacco processing factories regarding tobacco processing related health risks is lacking in developing countries like Bangladesh and African countries [7]. This gap hinders the development of targeted interventions to reduce health risks and improve community well-being. The primary target population for this study is community members living near tobacco processing plant in Morogoro Municipality who are directly or indirectly exposed to emissions, dusts and waste from the factories. The aim of this study was to assess the knowledge, attitudes, and prevention practices of community living near tobacco

processing factory in Morogoro Municipality on associated health risks. The findings of this study will provide valuable insights into level of awareness among communities living near tobacco processing factories on the health risk associated with exposure to tobacco-related pollutants. This information can be used to develop targeted health education programs and interventions to improve the health outcomes of communities.

MATERIALS AND METHODS

Study Area

The study was conducted in Morogoro Municipality, Tanzania, among communities living near a tobacco processing factory. The study focused on selected communities within Kiwanja cha Ndege and Uwanja wa Taifa wards, where residents live in proximity to tobacco processing activities. These areas were selected because of their proximity to the tobacco processing facility and the relevance of environmental health concerns associated with industrial activities in the surrounding communities.

Research Design

A descriptive cross-sectional study design was used to provide a snapshot of knowledge, attitudes, and practices at a specific point in time, which utilized a quantitative approach.

Study Population

The study population comprised adult community residents aged 18 years and above who lived in the selected communities near the tobacco processing factory in Morogoro Municipality. Only community residents who met the eligibility criteria were included in the study.

Sample Size

The total sample size of respondents was determined using Cochran's formula (1977) as follows:

$$n = \frac{Z^2 \times P\,(1-p)}{E^2}$$

Where;
n = Sample size required
Z =Value for confidence level
P = Population proportion and
E = Margin of error

A 90% confidence level was used, corresponding to Z = 1.645. An anticipated proportion of 17.5% (P = 0.175) was used as the planning estimate, while a margin of error of 5% (d = 0.05) was applied. The 17.5% estimate was selected from preliminary information available to the investigators before data collection and was used to provide a feasible planning estimate for this exploratory community-based study.
Then,
$n = (1.645)^2 \times 0.175\,(1-0.175) \div (0.05)2$
n= 157.224
n = 157
Then, Sample size (n) = 157

Sampling Techniques

The study employed stratified sampling, where the population was divided into strata, such as residents, community leaders, and health workers. Simple random sampling was then used to select individuals from each stratum, ensuring equal representation.

Sampling Frame

The sampling frame was constructed from local administrative records and community health databases that listed the population in Kiwanja cha ndege and Uwanja wa taifa urban wards.

Data Collection Methods, Analysis and Presentation

Data were collected using structured questionnaires to obtain information on participants' knowledge, attitudes, and practices. The collected data were analysed using the Statistical Package for Social Sciences (SPSS), version 20.0. Descriptive statistics, including frequencies and percentages, were generated. The findings were presented in tables and descriptive text. The levels of knowledge, attitudes and practices were categorized into two groups: high (≥60) and poor (<60%) [8-11].

RESULTS

Socio-demographic Characteristics of Respondents

A total of 157 respondents participated in the study. More than half of the respondents, 89 (56.7%), were aged 18–30 years, followed by 50 (31.8%) aged 31–40 years, while 18 (11.5%) were aged 41 years and above. The majority of respondents were female, 103 (65.6%), while 54 (34.4%) were male. Regarding education level, most respondents had secondary education 61 (38.9%), followed by primary education 56 (35.7%), higher education 33 (21.0%), and only 7 (4.5%) had no formal education. In terms of occupation, business persons constituted the largest group 61 (38.9%), followed by farmers 55 (35.0%), others 28 (17.8%), and factory workers 13 (8.3%). Concerning duration of residence near the tobacco processing factory, nearly half of the respondents 74 (47.1%) had lived in the area for 1–5 years, while 32 (20.4%) had stayed for 6–10 years, 26 (16.6%) for more than 10 years, and 25 (15.9%) for less than one year, as shown in Table 1.

Table 1: Socio-demographic Characteristics of Respondents (N = 157)

Variable	Frequency (n)	Percentage (%)
Age		
18-30 years	89	56.7
31-40 years	50	31.8
41 and above	18	11.5
Gender		
Male	54	34.4
Female	103	65.6
Level of education		
No formal education	7	4.5
Primary education	56	35.7
Secondary education	61	38.9
Higher education	33	21.0
Occupation		
Farmer	55	35
Factory worker	13	8.3
Business person	61	38.9
Others	28	17.8
Duration of residence in the area		
Less than a year	25	15.9
1-5 years	74	47.1
6-10 years	32	20.4
More than 10 years	26	16.6

The level of Knowledge among Community Members Regarding Health Risks Associated with Tobacco Processing Factory

The findings revealed that 101 (64.3%) respondents had good knowledge regarding health and environmental risks associated with tobacco processing activities, while 56 (35.7%) had poor knowledge, as shown in Figure 1.

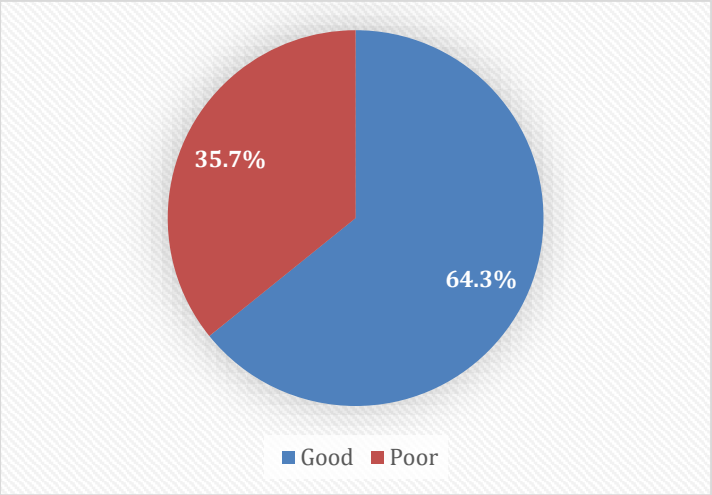


Figure 1: Overall Knowledge of Respondents

Knowledge of Community Members Regarding Health Risks Associated with Tobacco Processing Factory

The findings showed that 120 (80.0%) of the 150 respondents who provided a valid response had correct knowledge regarding health risks associated with tobacco processing factories, while 30 (20.0%) had incorrect knowledge. The majority of respondents, 147 (93.6%), correctly identified health effects associated with tobacco processing factory activities, whereas 10 (6.4%) provided incorrect responses. Similarly, 145 (92.4%) respondents correctly identified environmental contamination associated with tobacco processing factories, while 12 (7.6%) provided incorrect responses. However, only 55 (35.0%) respondents correctly identified the specific effects associated with tobacco processing factories, while 102 (65.0%) demonstrated incorrect knowledge. In addition, only 36 (22.9%) respondents correctly identified local regulations controlling pollution from tobacco factories, while 121 (77.1%) demonstrated incorrect knowledge. Overall, respondents demonstrated relatively good knowledge of general health and environmental effects but limited knowledge of specific effects and local pollution-control regulations, as shown in Table 2.

Table 2: Knowledge of Community Members Regarding Health Risks Associated with Tobacco Processing Factory

Variables	Correct n (%)	Incorrect n (%)	Valid n (100%)
Knowledge on health risks associated with tobacco processing factory	120 (80.0)	30 (20.0)	150
Knowledge on health effects associated with tobacco processing factory	147 (93.6)	10 (6.4)	157
Knowledge on environmental contamination caused by tobacco processing factory	145 (92.4)	12 (7.6)	157
Knowledge regarding effects associated with tobacco processing factory	55 (35.0)	102 (65.0)	157
Knowledge on local regulations controlling pollution from tobacco factories	36 (22.9)	121 (77.1)	157

Note: Percentages are based on the number of valid responses for each item.

Overall Attitude of Community Members Toward Health Risks Associated with Tobacco Processing Factory

The findings revealed that the majority of respondents, approximately 58%, had a positive attitude toward health risks associated with tobacco processing factories, while about 42% demonstrated a poor or negative attitude, as presented in Figure 2.

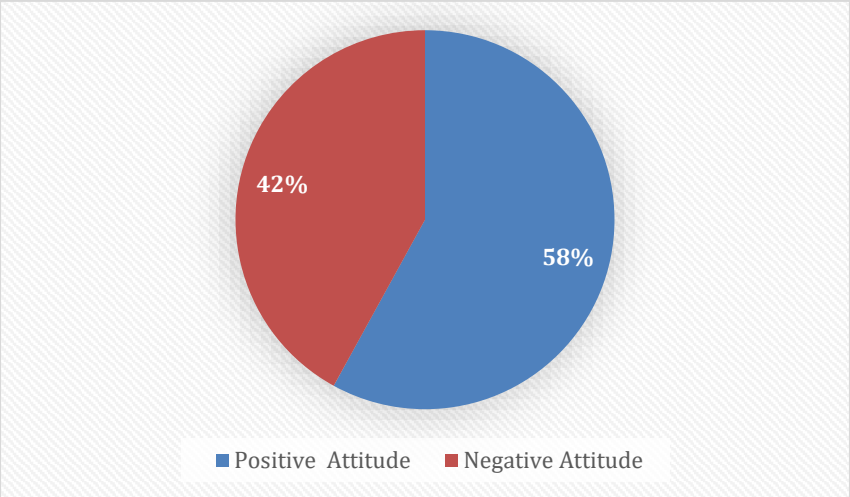


Figure 2: Overall Attitude of Respondents

Attitudes of Community Members Toward Health Risks Associated with Tobacco Processing Factory

The findings showed that the majority of respondents agreed that living near a tobacco processing factory can harm health, with 90 (57.3%) agreeing and 20 (12.7%) strongly agreeing. More than half of the respondents also agreed that the government should enforce stricter pollution control measures on tobacco factories, where 79 (50.3%) agreed and 14 (8.9%) strongly agreed.

Regarding community responsibility, 71 (45.2%) respondents agreed and 10 (6.4%) strongly agreed that the community should take action to reduce exposure to tobacco factory emissions. However, only 61 (38.9%) respondents agreed that local authorities adequately protect communities from environmental health risks, while 33 (21.0%) disagreed. Furthermore, the majority of respondents supported health intervention programs aimed at reducing risks associated with tobacco factories, with 90 (57.3%) agreeing and 12 (7.6%) strongly agreeing. Overall, the findings indicate that most respondents had a positive attitude toward environmental health protection and pollution control measures related to tobacco processing factories, as shown in Table 3.

Table 3: Attitudes of Community Members Toward Health Risks Associated with Tobacco Processing Factory (n=157)

Statements	Strongly Disagree n (%)	Disagree n (%)	Neutral n (%)	Agree n (%)	Strongly Agree n (%)
Living near tobacco processing factory can harm your health	0 (0.0)	6 (3.8)	41 (26.1)	90 (57.3)	20 (12.7)
The government should enforce stricter pollution control measures on tobacco factories	0 (0.0)	13 (8.3)	51 (32.5)	79 (50.3)	14 (8.9)
The community should take action to reduce exposure to emissions from the tobacco factory	5 (3.2)	30 (19.1)	41 (26.1)	71 (45.2)	10 (6.4)
Local authorities protect community from environmental health risks	2 (1.3)	33 (21.0)	53 (33.8)	61 (38.9)	8 (5.1)
You support health intervention programs that aim to reduce risks from tobacco factory	0 (0.0)	10 (6.4)	45 (28.7)	90 (57.3)	12 (7.6)

Overall Prevention Practices of Community Members Toward Health Risks Associated with Tobacco Processing Factory

The findings revealed that 103 (65.6%) respondents had poor preventive practices toward reducing potential health risks associated with tobacco processing activities, while 54 (34.4%) demonstrated good preventive practices, as shown in Figure 3.

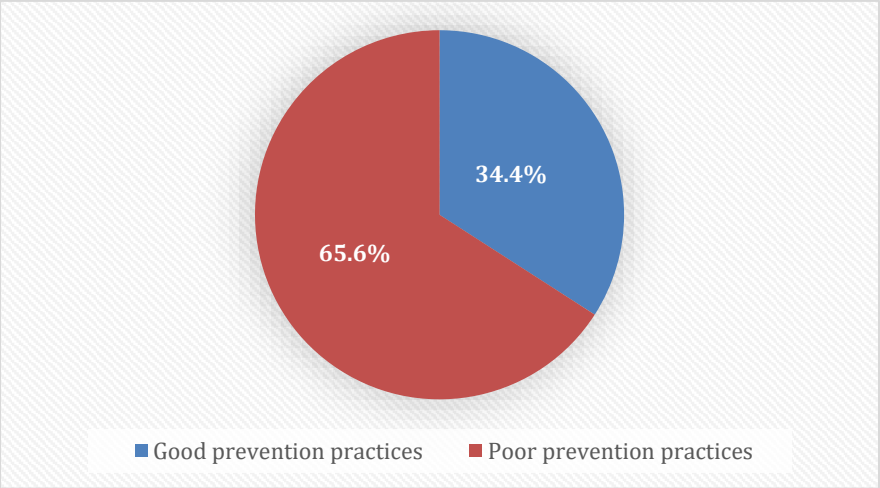


Figure 3: Overall Preventive Practices

Prevention Practices Adopted by Community Members to Reduce Health Risks Associated with Tobacco Processing Factory

The findings showed that 83 (53.2%) of the 156 respondents who provided valid responses reported taking precautions to protect themselves from factory emissions, while 73 (46.8%) reported that they did not take such precautions. In addition, 39 (26.2%) of 149 respondents reported having attended awareness sessions concerning environmental health risks associated with tobacco processing factories, whereas 110 (73.8%) had not attended such sessions. Furthermore, 37 (23.7%) of 156 respondents reported encouraging others to protect themselves from tobacco factory pollution, while 119 (76.3%) did not. Regarding reporting practices, 55 (35.0%) respondents reported health or pollution-related problems to local authorities or health centres, whereas 102 (65.0%) had never reported such problems, as shown in Table 4.

Table 4: Prevention Practices Adopted by Community Members to Reduce Health Risks Associated with Tobacco Processing Factory

Variables	Yes n (%)	No n (%)	Valid n (100%)
Taking precautions to protect yourself from factory emissions	83 (53.2)	73 (46.8)	156
Attending awareness sessions on environmental health risks from tobacco factory	39 (26.2)	110 (73.8)	149
Encouraging others to protect themselves from tobacco factory pollution	37 (23.7)	119 (76.3)	156
Reporting health or pollution problems to local authorities or health centers	55 (35.0)	102 (65.0)	157

Note: Percentages are based on the number of valid responses for each practice item

DISCUSSION

This study assessed the knowledge, attitudes and preventive practices of communities living near a tobacco processing factory in Morogoro Municipality regarding potential health and environmental risks associated with tobacco processing activities. Overall, 64.3% of respondents demonstrated good knowledge, while 35.7% had poor knowledge. Respondents were generally knowledgeable about health effects and environmental contamination, but knowledge of specific effects and local pollution-control regulations was limited. These findings suggest that community members may recognize general environmental health concerns while having less understanding of specific pollution-control measures and regulatory mechanisms.

The findings are comparable with a study conducted in Mtwara, Tanzania, which reported high levels of awareness and knowledge regarding environmental health issues among community members and students exposed to environmental hazards [12]. Similarly, a study conducted in South Africa

among communities exposed to outdoor industrial air pollution found that residents were generally aware of respiratory and environmental health risks associated with industrial emissions, although detailed knowledge regarding pollution monitoring and environmental regulation was limited [13]. These similarities may indicate that communities living near industrial environments are often more familiar with direct and observable health effects such as coughing, breathing difficulties, and unpleasant odors than with environmental protection policies and regulatory systems.

The present study found that respiratory problems were among the health effects most frequently recognized by respondents in relation to tobacco processing activities. This observation is supported by global evidence showing that exposure to industrial and tobacco-related air pollutants contributes significantly to respiratory illnesses, including asthma, bronchitis, and chronic obstructive pulmonary disease (COPD) [1]. Similar findings were reported in Bangladesh, where communities living near tobacco farming and processing areas associated tobacco-related environmental pollution with respiratory and environmental health problems [14]. The consistency of these findings across different countries suggests that air pollution from tobacco-related industrial activities remains a growing environmental health concern in low- and middle-income countries.

Regarding attitude, the findings revealed that 58% of respondents had a positive attitude toward environmental health protection and pollution control measures. The majority agreed that living near a tobacco processing factory can harm health and supported stricter government regulation of factory emissions. In addition, many respondents supported community involvement and health intervention programs aimed at reducing exposure to tobacco factory pollutants. These findings indicate that communities are increasingly recognizing the importance of environmental health protection despite limited regulatory awareness.

Comparable findings have been reported in Saudi Arabia, where community members demonstrated positive attitudes toward environmental pollution control and recognized the relationship between air pollution and cardiopulmonary diseases [1]. Similarly, studies conducted in African countries have shown that women and younger populations are more likely to support environmental health interventions and pollution control strategies due to increased exposure to health information through media and education programs [15]. In the current study, most respondents were young adults and females, which may partly explain the relatively positive attitudes observed. However, despite these positive attitudes, a considerable proportion of respondents expressed dissatisfaction with the role of local authorities in protecting communities from environmental health risks. This may reflect weak communication between environmental authorities and affected communities.

Despite relatively good knowledge and generally positive attitudes, preventive practices were less favourable. Overall, 103 (65.6%) respondents were classified as having poor preventive practices. Although more than half of the respondents reported taking some precautions, participation in environmental health awareness sessions, encouraging others to adopt preventive measures, and reporting health or pollution-related problems remained limited. These findings indicate a gap between knowledge, attitudes and reported preventive practices. However, because the study was cross-sectional and based on self-reported information, the findings describe reported practices at the time of the study and do not establish the reasons for the observed gap.

Similar findings have been reported in China, where communities exposed to industrial air pollution demonstrated moderate awareness of pollution-related health risks but low participation in environmental protection and reporting activities [16]. In Tanzania, studies on environmental pollution and air quality have also reported limited community participation in environmental monitoring and reporting systems due to inadequate environmental education and weak institutional trust [17]. Furthermore, global studies have shown that low community engagement in environmental protection activities is often associated with socioeconomic barriers, limited access to protective resources, and insufficient public health outreach programs [18].

Overall, the findings of this study demonstrate that communities living near tobacco processing factories are generally aware of environmental and health risks associated with tobacco-related pollution. However, inadequate knowledge regarding environmental regulations and poor preventive practices may increase community vulnerability to long-term environmental health effects. Strengthening environmental health education, improving public awareness regarding

pollution control regulations, and promoting community participation in environmental reporting systems are essential to improve environmental health protection among populations living near tobacco processing factories.

STRENGTHS AND LIMITATIONS

This study provides important baseline information regarding the knowledge, attitudes, and prevention practices of communities living near a tobacco processing factory in Morogoro Municipality, where limited environmental health studies have been conducted. The inclusion of respondents directly exposed to factory emissions increased the relevance of the findings, while the use of a structured questionnaire helped ensure consistency in data collection.

However, the cross-sectional design limited the ability to establish causal relationships between tobacco factory emissions and community health outcomes. In addition, the study relied on self-reported information, which may have been affected by recall and response bias. The absence of environmental or clinical assessments and the focus on selected communities may also limit the generalizability of the findings to other settings.

CONCLUSION

The study found that most community members living near the tobacco processing factory in Morogoro Municipality had good knowledge and positive attitudes regarding the health and environmental risks associated with tobacco factory emissions. However, prevention practices remained poor, particularly in participation in awareness programs, reporting pollution-related problems, and community involvement in environmental health protection activities. In addition, knowledge regarding local pollution control regulations was low among respondents. These findings highlight the need for strengthened environmental health education, improved community engagement, and stronger collaboration between local authorities and public health institutions to reduce the health risks associated with tobacco processing factory emissions.

DECLARATIONS

Ethical Approval: Research clearance was obtained from the Ruaha Catholic University, while permission to conduct the study was also obtained from the office of the Director of Morogoro Municipal council.

Informed Consent: Written informed consent was obtained from all participants prior to data collection.

Consent for Publication: Not applicable.

Conflict of Interest: The authors declare no conflict of interest.

Funding: This research received no external funding.

Authors' Contributions: Study design, methodology, data collection, data analysis, writing of the original draft, review, and editing: NM. Conceptualization, study design, methodology, resources, data collection, and data analysis: AK.

Data Availability: The datasets generated and analyzed during this study are not publicly available due to ethical and confidentiality restrictions. However, they may be obtained from the corresponding author upon reasonable request, subject to approval by the relevant ethics committee.

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REFERENCES

1. Alahmadi NA, Alzahrani R, Bshnaq AG, Alkhathlan MA, Alyasi AA, Alahmadi AM, et al. General public knowledge, attitude, and practice regarding the impact of air pollution and cardiopulmonary diseases in Jeddah, Saudi Arabia. Cureus. 2023;15(11). https://doi.org/10.7759/cureus.48976.
2. World Health Organization (WHO). Tobacco and its environmental impact: an overview. WHO, Geneva; 2017. Available from: https://escholarship.org/content/qt8tp3r5rc/qt8tp3r5rc.pdf. Accessed 08 December 2024.
3. Novotny TE, Bialous SA, Burt L, Curtis C, Costa VL, Iqtidar SU, et al. The environmental and health impacts of tobacco agriculture, cigarette manufacture and consumption. Bull World Health Organ. 2015;93:877-80. http://dx.doi.org/10.2471/BLT.15.152744.
4. Wisdom JP, Juma P, Mwagomba B, Ndinda C, Mapa-Tassou C, Assah F, et al. Influence of the WHO framework convention on tobacco control on tobacco legislation and policies in sub-Saharan Africa. BMC Public Health. 2018;18(Suppl 1):954. https://doi.org/10.1186/s12889-018-5827-5.
5. Kowa JB, Wakibi A, Tairi M. An empirical investigation into viable alternative livelihoods to tobacco growing: a case study involving farmers in Maracha District in Uganda. J Agric Ext Rural Dev. 2019. https://doi.org/10.5897/JAERDXXXXXXX.
6. Masanja AN. The role of Corporate Social Responsibility of Parastatal organizations to the improvement of quality of life of the societies in the project areas in Tanzania (Doctoral dissertation, The Open University of Tanzania. 2023). Available from: https://repository.out.ac.tz/4321/1/AGNES%20NDAGULA%20MASANJA%20tyr.pdf. Accessed 26 January 2025.
7. Hossain MR, Choudhury M, Islam R, Biswas MS, Reja MS, Hossain F. Assessing coastal vulnerabilities impacting drinking water sources and sanitation: spatial, multivariate and ML approach in Satkhira, Bangladesh. Environ Monit Assess. 2025;197(5):570. https://doi.org/10.1007/s10661-025-14002-9.
8. Magwe EA. Knowledge of food safety and handling practices among food handlers in university communities. Egyptian Journal of Nutrition. 2024;39(4):106-18. https://doi.org/10.21608/enj.2024.407046.
9. Magwe EA. Attitudes toward water, sanitation, and hygiene (WASH) among rural and urban students in Iringa Region, Tanzania. AlQalam Journal of Medical and Applied Sciences. 2024:1447-57. *https://doi.org/10.54361/ajmas.247475.*
10. Magwe EA, Varisanga MD, Ng'weshemi SK. Healthcare workers' perceptions of COVID-19 in four regions of Tanzania: A quantitative cross-sectional survey in healthcare facilities. The Nigerian Health Journal. 2023;23(2):666-77. https://doi.org/10.60787/tnhj.v23i2.666.
11. Magwe, EA. Water, Sanitation and Hygiene (WASH) Practices among Rural and Urban School Students in Iringa, Tanzania. Zagazig University Medical Journal, 2025; (435-445): https://doi.org/10.21608/zumj.2024.339646.3704.
12. Bishoge OK, Aremu AK, Ajayi DD, Mfinanga S. Awareness and knowledge of environmental health among secondary school students from Mtwara town in Tanzania. J Public Health Dev. 2022;20(3):1-5. https://doi.org/10.55131/jphd/2022/200301.
13. Mabeba MRA. Evaluation of community perceptions on outdoor air pollution in Marapong and Onverwacht Townships, Lephalale Local Municipality, South Africa. (Master's thesis, University of Limpopo. 2023). Available from: https://ulspace.ul.ac.za/server/api/core/bitstreams/9387b5d6-e637-422c-a366-9d13eafe84cd/content. Accessed 24 January 2025.
14. Ali MY, Shahrier M, Kafy AA, Ara I, Javed A, Fattah MA, et al. Environmental impact assessment of tobacco farming in northern Bangladesh. Heliyon. 2023;9(3). https://doi.org/10.1016/j.heliyon.2023.e14505.
15. Yaya S, Uthman OA, Amouzou A, Bishwajit G. Mass media exposure and its impact on malaria prevention behaviour among adult women in sub-Saharan Africa: results from malaria indicator surveys. Glob Health Res Policy. 2018;3(1):20. https://doi.org/10.1186/s41256-018-0075-x.
16. Liu H, Kobernus M, Liu H. Public perception survey study on air quality issues in Wuhan, China. J Environ Prot. 2017;8(10):1194-218. https://doi.org/10.4236/jep.2017.810075.
17. Gwambene B, Miigo H, Mateka N, Laltaika E. Bridging the gap in environmental rights and duties for enhancing a clean and healthy environment in Tanzania. Ecol Front. 2025. https://doi.org/10.1016/j.ecofro.2025.09.020.
18. Bahrami Z, Sato S, Yang Z, Maiti M, Kanawat P, Umemura T, et al. The perception of air pollution and its health risk: a scoping review of measures and methods. Glob Health Action. 2024;17(1):2370100. https://doi.org/10.1080/16549716.2024.2370100.