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DEPARTMENT OF ENVIRONMENTAL SCIENCE

AN ASSESSMENT INTO KNOWLEDGE, ATTITUDES AND PRACTICES OF THE EFFECTS AND CONTROL OF DUST RAISED DURING SWEEPING AMONG WOMEN IN BINDURA RURAL

By

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DECLARATION

To be compiled by the student

Registration number B212556B

I Moreblessing Chibhanguza do hereby declare that this project is my own original work and has not been submitted before. All the information derived from other sources is indicated in the project.

Signature of the student……Date2024-06-28

To be compiled by the supervisor

This dissertation is suitable for submission to the faculty and has been checked for conformity with the faculty guidelines.

Signature of the supervisor……Date……. **To be compiled by the student**

DEDICATION

I dedicate this research project to my dear family and my friends for the support and strength they have given me throughout this project.

ACKNOWLEDGEMENTS

I would like to thank my supervisor Mr. T Nyamugure for the guidance, intellectual support, and patience throughout the research project from the start to the end. I would also like to thank the Masembura community for their cooperation. Special thanks to my family for the emotional support and the love throughout the project . Above all, I would like to thank the Almighty for the strength and for the guidance to carry on with the research till the end.

ABSTRACT

Background: *Dust raised during sweeping can have detrimental effects on .people's health and on plant foliage get clogged thus affecting vital processes such as photosynthesis and respiration. Furthermore, sweeping yards can enhance the erosion of soil by runoff. In spite of the known effects of dust, most women continue to sweep their yards without following dust protection and suppression protocols thus running the risk of exposure to dust. This study seeks to find out whether this behavior by women is a result of lack of knowledge or poor attitudes that result in bad practices so that policy makers and other stakeholders can design appropriate interventions*

Materials and Methods: *The study made use of a cross sectional descriptive survey design to collect data from 120 respondents with the use of a standardized questionnaire. The questionnaire contained information on socio-democratic variables, Knowledge, Attitudes and Practices towards sweeping dust and its health and environmental effects. Data were analysed in SPSS version 21 to generate frequencies on each KAP question. A preferred response was awarded a score of 1 and a wrong response was assigned a value of Zero, thus generating mean scores of each KAP question. The Pearson's chi square was used to determine the relationship between KAP and socio-economic variables*

Results: *The total number of respondents was 120. The majority (92%) were female. Most of the respondents (31%) were in the age range of 36-45 years and the least (11%) were in the > 56 years group. Most (80%) respondents were married and the majority (66%) had attained secondary school educational level. Results indicate that the mean score for knowledge was 0.62 or 62%, mean score for attitude was 0.3 or 30% and the mean score for practice was 0.14 or 14%. This means that 60% of the respondents were knowledgeable about the health and environmental effects of dust and how to mitigate them. It also means that 30% of respondents had a positive attitude towards the health and environmental effects of dust and measures of mitigation whilst only 14% exercised good practices in order to avoid the health and environmental effects of dust and control measures. There was no association between KAP and socio-economic variables.*

Conclusion: *The study concludes that in the study area, knowledge was fairly high with a mean score of attitudes were very poor with a mean score of and practices were very poor. It can also be concluded that having knowledge alone is not a sufficient condition to assure good practice.*

Recommendations: *The study recommends awareness and trainings campaigns by health officials or authorities about the adverse environmental and health effects of dust among women in order to save human health and the environment. These awareness campaigns must include the promotion of other methods to keep yards clean with minimal sweeping, water spraying before sweeping, wearing of masks and sustainable yard landscaping.*

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CHAPTER ONE: INTRODUCTION

1.1 BACKGROUND OF THE STUDY

Most women in Zimbabwe engage in sweeping activities in order to keep their yards clean. However, in the process, they are exposed to dust particles that may be respirable with dire consequences on human health. According to Habybabady, *et. al.,* (2018), short term exposure to dust can induce severe but reversible damage, whereas chronic exposure may result in permanent or irreversible impairment. The process of sweeping frequently raises dust to which the sweepers are exposed.as they usually don't wear face masks and do not exercise any dust suppression protocols like spraying water on the surface before sweeping (Johncy, et al, 2013).

Whilst the effects of dust abound in literature, women continue to sweep their yards regularly without taking any action to diminish their exposure to dust and hence to respiratory diseases. The reason why women continue their sweeping in spite of the attendant dangers may be associated to cultural factors as well as lack of knowledge and poor attitudes that precipitate bad practice. It is thus critical to carry out a study on Women's knowledge, attitudes and practices towards dust and measures that can be taken to reduce exposure.

Assessing the knowledge of women in Bindura rural regarding the effects and control of dust raised during sweeping is crucial. It allows researchers to identify knowledge gaps and misconceptions that may exist, providing a foundation for targeted educational campaigns. By increasing awareness about the health risks and proper dust control measures, women can make informed decisions and take appropriate actions to protect their health and that of their families.

In addition to knowledge, exploring the attitudes of women towards the importance of dust control during sweeping is essential. Attitudes shape behaviours, and understanding the factors that influence women's attitudes towards dust control can help in designing effective interventions. Factors such as cultural beliefs, perceived benefits and barriers, and social norms can influence their willingness to adopt and maintain healthier sweeping practices.

Assessing the actual practices of women in Bindura rural concerning dust control measures during sweeping is equally important. It provides insights into their existing behaviours and routines. By identifying the barriers and challenges they face in implementing dust control measures, interventions can be designed to address these specific issues. Practical solutions and strategies can be developed to promote sustainable behaviour change and improve the overall indoor air quality in their households.

Ultimately, conducting a comprehensive assessment of the knowledge, attitudes, and practices of women in Bindura rural regarding the effects and control of dust raised during sweeping is crucial for their well-being. The findings will serve as a foundation for developing targeted interventions and educational programs that empower women with the necessary knowledge and skills to protect themselves and their families from the potential health risks associated with dust. By improving their practices and promoting healthier behaviours, the overall living conditions and respiratory health of women in Bindura rural can be enhanced. In most households in urban areas, one of the major chore done by women is sweeping of the yard. . In spite of the negative effects of dust being so much promulgated in literature, women continue to sweep their yards in the twilight of dawn and dusk. This may be due to lack of knowledge, bad attitudes that infringe their practices. This research seeks to fill that gap.

1.2 Problem statement

Despite the potential health risks associated with dust raised during sweeping activities, women in rural areas and urban, areas continue to sweep their yards largely without masks or other protective clothing. This usually may be due to lack of knowledge or poor attitudes that fuel bad practice. As such, it is important to analyse the women's knowledge, attitudes and practices towards dust raised during sweeping. This research is an attempt to cover that gap.

1.3 Justification

The results from this study are important for policy makers to design appropriate interventions based on empirical evidence. Based on scientific findings, results from this study can act as baseline standard against which the effects of future intervention can be benchmarked. The inclusion of socio-economic factors as determinants of KAP can act as a decision support activity to identify specific interventions to target at a specific group according to their KAP

1.4 Aim

To carry out an assessment into people's, knowledge, attitudes and practices towards dust raised during sweeping of yards.

1.4.1 Objectives

1. To determine the magnitude of knowledge among people about the effects and control of dust raised during sweeping?
2. To determine the attitudes of people towards dust raised during sweeping and the possible control measures.

3. To determine the practices of people towards dust raised during sweeping and the possible control measures.
4. To relate people's KAP towards dust raised during sweeping and the possible control measures to socio-economic variables

1.5 Research questions

1. What is the extent of people's knowledge about the effects of dust raised during sweeping and the possible control measures?
2. What are people's attitudes towards the effects of dust raised during sweeping and the possible control measures?
3. What are people's practices towards the effects of dust raised during sweeping and the possible control measures?
4. How are KAP towards the effects of dust raised during sweeping and the possible control measures related to socio-economic variables?

1.8 Scope of the Study

This study focuses on assessing the knowledge, attitudes, and practices of women in Bindura rural regarding the effects and control of dust raised during sweeping activities. The study will specifically target women who regularly perform sweeping tasks as part of their daily household chores. The research will be conducted in Bindura rural, with a particular emphasis on understanding the unique contextual factors that may influence the participants' knowledge, attitudes, and practices.

The study will employ a mixed-methods approach, combining qualitative and quantitative data collection methods. Qualitative methods such as interviews and focus group discussions will be utilized to gather in-depth insights into the participants' knowledge, attitudes, and beliefs. Quantitative methods, such as surveys, will be used to collect data on the prevalence of specific practices related to dust control during sweeping.

The study will assess various aspects, including the participants' awareness of the health risks associated with dust exposure during sweeping, their understanding of appropriate dust control measures, the factors influencing their attitudes towards dust control, and their current practices in implementing dust control measures during sweeping activities.

The scope of the study is limited to the specific context of Bindura rural and the target population of women engaged in sweeping tasks. The findings of this study will provide

valuable insights and recommendations for interventions and educational campaigns tailored to the needs of women in Bindura rural. However, the generalizability of the findings may be limited to similar rural areas and populations with comparable socio-cultural and environmental contexts.

The study has several limitations that should be considered when interpreting the findings. Firstly, the sample size and the specific focus on women in Bindura rural may limit the generalizability of the results to other populations or settings. The reliance on self-reported data introduces the possibility of recall bias or social desirability bias, potentially impacting the accuracy of participants' responses. Additionally, the study's scope primarily focuses on assessing knowledge, attitudes, and practices, while other influential factors such as socioeconomic status or access to resources are not extensively explored. There is a possibility of response bias, as participants may not always provide completely accurate information. The study's findings are specific to the context of Bindura rural and may not be fully applicable to urban areas or regions with different cultural practices. The cross-sectional design limits the ability to establish causal relationships or track changes over time. Lastly, potential language or communication barriers may arise during data collection, affecting the depth and accuracy of the information obtained. Despite these limitations, the study provides valuable insights into dust control practices among women in Bindura rural and can inform targeted interventions, but caution should be exercised when extrapolating the findings to other contexts or populations.

1.9 Chapter summary

The chapter commences by providing an overview of the research problem, identifying the existing research gap, and outlining the objectives, research questions, and significance of the study. It emphasizes the importance of addressing dust-related issues in domestic settings, particularly the specific roles women play in maintaining clean and healthy households. The chapter underscores the need to investigate the knowledge, attitudes, and practices of women in Bindura Rural concerning the effects and control of dust raised during sweeping activities. Furthermore, it concludes by giving a concise summary of the subsequent chapters, delineating the structure and content of the study. Specifically, Chapter 2 will present a comprehensive review of the pertinent literature, Chapter 3 will explicate the research methodology, and Chapter 4 will showcase the findings and analysis. Lastly, Chapter 5 will delve into the

implications of the study, provide recommendations, and propose potential avenues for future research.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

The literature review chapter plays a fundamental role in research by providing a comprehensive overview of the existing body of knowledge and research related to the topic of interest. This chapter critically examines and synthesizes relevant scholarly sources to identify gaps, inconsistencies, and areas for further investigation. In the context of the effects and control of dust raised during sweeping among women in Bindura rural, the literature review chapter aims to explore the current understanding, research findings, and theoretical frameworks surrounding this issue.

2.1: KNOWLEDGE OF PEOPLE AND UNDERSTANDING OF THE EFFECTS AND CONTROL OF DUST RAISED DURING SWEEPING

This literature review focuses on the knowledge and comprehension of the impacts and management of dust generated during sweeping tasks in Bindura rural. Understanding these factors is vital for safeguarding the health and overall well-being of individuals, particularly women who are actively involved in domestic duties. The primary objective of this review is to delve into the existing research and understanding concerning women's awareness of the effects and control measures associated with dust raised during sweeping activities in the specific rural setting of Bindura. Through an extensive examination of the literature available, this review aims to pinpoint any existing gaps, identify prevailing trends, and highlight areas that require further investigation, ultimately contributing to the ongoing study in this field.

2.1.1. Health Effects of Dust Exposure

The focus of this literature review is on the health effects associated with dust exposure during sweeping activities, particularly respiratory and allergic reactions. Numerous studies have highlighted an increased risk of respiratory diseases, such as asthma, chronic obstructive pulmonary disease (COPD), and bronchitis, among individuals exposed to dust particles. For example, Smith et al. (2018) conducted a population-based study and found a significant

association between dust exposure and the development of asthma symptoms. Similarly, Johnson et al. (2020) demonstrated a correlation between dust exposure and increased respiratory symptoms in individuals engaged in sweeping activities.

In addition to respiratory effects, dust exposure during sweeping has been linked to allergic reactions, including rhinitis and dermatitis. Lee et al. (2019) conducted research indicating that prolonged exposure to dust particles during sweeping can trigger allergic responses in susceptible individuals, resulting in symptoms such as nasal congestion, itching, and skin irritation. These findings underscore the need to understand the potential health risks associated with dust raised during sweeping and the importance of implementing effective control measures

Apart from the aforementioned respiratory and allergic effects, prolonged dust exposure during sweeping activities has been associated with other health issues. Studies have shown that individuals exposed to dust particles may experience eye irritation, coughing, wheezing, and throat irritation (Jones et al., 2021; Martinez et al., 2019). These symptoms can significantly impact the quality of life and overall well-being of individuals, particularly women who regularly engage in sweeping tasks.

Furthermore, the composition of dust particles raised during sweeping can vary, depending on the environment and sources of dust. Studies have identified the presence of various particulate matter, including pollen, fungal spores, bacteria, and chemical pollutants (Thomas et al., 2020; Wong et al., 2018). These particles can act as respiratory irritants and allergens, exacerbating existing respiratory conditions and triggering allergic reactions in susceptible individuals.

Moreover, long-term exposure to dust raised during sweeping has been associated with the development of chronic respiratory diseases. Rodriguez et al. (2022) conducted research demonstrating a significant link between occupational dust exposure, including sweeping activities, and an increased risk of developing chronic bronchitis and COPD. These chronic conditions can have debilitating effects on individuals' respiratory function and overall health, highlighting the importance of implementing effective dust control measures.

To mitigate the health risks associated with dust exposure during sweeping, it is crucial to implement proper control measures. Studies have explored various strategies to minimize dust dispersion and exposure, such as the use of damp mops, vacuum cleaners with high-efficiency particulate air (HEPA) filters, and personal protective equipment (PPE) like masks and goggles

(Zhao et al., 2021; Kim et al., 2017). Adequate ventilation systems and regular cleaning of sweeping tools and equipment can also contribute to reducing dust levels.

By understanding the range of health effects associated with dust exposure during sweeping activities, including respiratory conditions, allergic reactions, and chronic diseases, researchers and policymakers can emphasize the importance of knowledge dissemination and the implementation of effective control measures. This knowledge can empower women in Bindura rural to take appropriate measures to protect their health and well-being while engaging in sweeping tasks.

2.1.1.2 KNOWLEDGE ON DUST PARTICLES

Dust particles raised during sweeping activities can comprise various components that have potential health effects. One common component is particulate matter (PM), including PM10 and PM2.5. Inhalation of PM can lead to respiratory symptoms such as coughing, wheezing, and shortness of breath. Fine particles (PM2.5) have been specifically associated with an increased risk of cardiovascular and respiratory diseases (Jones et al., 2021; Martinez et al., 2019).

Allergens, such as pollen, fungal spores, pet dander, and dust mite feces, can also be present in dust particles. These allergens have the potential to trigger allergic reactions, resulting in symptoms like nasal congestion, sneezing, itching, watery eyes, and skin rashes (Wong et al., 2018).

Microorganisms, including bacteria, viruses, and fungi, are another component found in dust particles. Inhaling these microorganisms can lead to respiratory infections, particularly in individuals with weakened immune systems. Certain fungi may also produce toxins that can cause respiratory and allergic reactions (Thomas et al., 2020).

Dust particles can also contain chemical pollutants such as heavy metals, pesticides, volatile organic compounds (VOCs), and combustion by-products. Exposure to these pollutants can result in respiratory irritation, allergic reactions, skin irritation, and systemic health effects. Long-term exposure to specific chemicals, such as lead or asbestos, can have severe health consequences, including neurological and respiratory disorders, as well as cancer (Wong et al., 2018).

The composition and health effects of dust particles can vary depending on the environment and sources of dust. Factors such as occupational settings, proximity to industrial activities, and indoor air quality conditions can influence the types and concentrations of particles present in the dust

To minimize the potential health risks associated with dust exposure, it is crucial to implement effective dust control measures. Proper ventilation, wet mopping techniques, and the use of personal protective equipment can help reduce the generation and dispersal of dust particles, thereby minimizing the likelihood of inhalation or contact with harmful components (Zhao et al., 2021; Kim et al., 2017). These measures play a vital role in safeguarding individuals' health and well-being during sweeping activities.

In a study by Noko (2019) on knowledge about coal dust among workers at a power station in Zimbabwe it was discovered that most workers had adequate knowledge concerning the sources and the exposure routes for coal dust. A fair (59%) proportion of workers had knowledge about the frequency of exposure that can lead to the contraction of respiratory diseases. On the other hand, less than half (48%) of the workers did not have knowledge on the duration of exposure that can lead to the development of respiratory symptoms. The majority of workers had high knowledge on the health problems associated with coal dust exposure and preventive measures. The perceptions of the workers did not depend on the length of the period of employment.

In a study in South Africa in a community near a gold mine, Wright, et.al., (2014) found that most people knew that dust causes health problems. Furthermore, they had knowledge about long and short term strategies of protection against dust though they were considered not enough. Some of the methods for protection that were mentioned include, watering, pavements as well as the establishment and maintenance of trees. Lack of assistance from the government and other stakeholders was cited as the major hurdle in fighting the problem of dust.

Contrary to popular expectation of an association between exposure andknowledge a study on Knowledge, attitudes and Practices on workers exposed to dust by Sifanu, *et. al.,* (2023), it was found that knowledge and was not associated with exposure

2.2 ATTITUDE OF PEOPLE AND UNDERSTANDING OF THE EFFECTS AND CONTROL OF DUST RAISED DURING SWEEPING

In a study about the perceptions of farmers about dust, Tahera., *et. al.,(*2020), categorised farmers into three factors depending on their perceptions of dust and its effects. The first

category known as factor 1 known as adherents of health who believe that health is more significant that production. In their perceptions, government must provide them will free masks since some of them may not afford such PPE. The second category of famers was called the government blamers who sought support. These believe that dust causes harm to their farms as dust transmits pests and pathogens from one plant to another. They feel that government must help them for protection and compensation for damage caused as a result of dust. The last category, the planning adherents emphasise that dust has negative health effects and also causes loss of visibility and so placed emphasis on the need to be protected from the health problems caused by dust. The same category believed that dust reduced crop production but has a negligible effect on animal production.

In another study, by Mpanza et. al.,(2018) on the perceptions of external costs from dust fallout the community around a mine felt that they were suffering external costs in the treatment of respiratory diseases originating from dust.

Contrary to popular expectation of an association between exposure and attitudes a study on Knowledge, attitudes and Practices on workers exposed to dust by Sifanu, *et. al.,* (2023), it was found that knowledge and attitudes were not associated with exposure.

In Bangladesh a study among street sweepers found that risk perception of health hazards from dust was low. This perception was associated with age and education (Kabie, et. al., 2015).

2.3 PRACTISES OF PEOPLE AND UNDERSTANDING OF THE EFFECTS AND CONTROL OF DUST RAISED DURING SWEEPING

2.3.1.2 Assessment of Practices

To gather empirical data and inform evidence-based interventions, an assessment of practices related to the effects and control of dust raised during sweeping among women in Bindura rural is necessary. This assessment can involve surveys, interviews, and direct observations to collect data on sweeping practices, the use of preventive measures, and barriers to dust control.

The assessment should cover various aspects, including the frequency and methods of sweeping, the type of equipment used, the adoption of preventive measures, and the level of compliance with recommended dust control practices. Additionally, it is crucial to explore the cultural, social, and environmental factors that influence these practices. Factors such as societal norms, economic constraints, and social support networks can significantly impact the adoption and adherence to dust control practices.

Understanding the current practices and identifying gaps will facilitate the development of targeted interventions and educational programs. These initiatives can focus on raising awareness, providing training on proper sweeping techniques, promoting the use of personal protective equipment, and addressing specific challenges faced by women in Bindura rural.

In Tanzania, Nyanza et. al.,(2024) in a study on perceptions of occupational dust exposure, discovered that the majority of street sweepers workers were exposed to occupational dust. It was recommended to have education and training programs to improve people's practices towards dust suppression and reduction of exposure.

In a study on the effects of dust exposure on respiratory symptoms and pulmonary functions, in by Habybabady et.a., (2018) discovered that most street sweepers did not wear face masks and so their exposure was high. The study also found that respiratory symptoms were higher among street sweepers as compared to office workers. In a different study among women sweepers in India, Johncy *et. al*., (2013) discovered that most women did not wear any protective clothing. Furthermore, they did not sprinkle water on the soil before sweeping. Cocco *et.al.,* (2021) found out that workers were exposed to textile dust and there was association between exposure and the development of Hodgkin's lymphoma. Recommendations were made for awareness to be raised among sweepers about the peils of dust so that they can improve on the use of PPE.

In Addis Ababa, Kumie, et. al., discovered that road sweepers were exposed to dust as they did not use any personal protective clothing during the execution of their sweeping tasks. In this study, the median exposure level was above the permissible threshold value. It was recommended that management provide PPE and conduct training sessions for their employees in order to improve the practices of workers during sweeping. In a different study, Kabir, et. al., (2015) revealed that most sweepers were exposed to dust particles owing to lack of personal protective equipment.

Sweepers can be exposed to heavy metals such as lead, cadmium and arsenic resident in dust particles. In a study by Li, *et. al., (*2021) it was discovered that the hair of sweepers had concentrations of heavy metals higher than those in non-sweepers and the concentrations were higher than those due to dietary sources.

Besides heavy metals, sweepers are often suffer musculoskeletal disorders. In Nigeria, Johnson and John (2015) found that most sweepers suffered from back aches and injuries to fee as none of them used protective shoes nor goggles.

CHAPTER 3: RESEARCH METHDOLOGY

3.0 INTRODUCTION

This chapter delivers an outline of the research methodology engaged to examine the knowledge, attitudes, and practices of women in Bindura ruralconcerning the effects and control of dust and the environmental effects raised up during sweeping. The methodology preferred for this study is critical in guaranteeing the collection of consistent and effective data, as well as enabling the accomplishment of the research objectives.

3.2 Description of study site

The Musana communal area is located in the Bindura district to the northeast of the capital city, Harare (16^0 450–17^0 400 S, 31^0 050–31^0 350 E) in the Mashonaland Central province of Zimbabwe. The study area covers an area of approximately 525 km2. The altitude varies from 940 m to 1440 m above sea level, falling into the middle veldt. The highest temperatures usually occur in the second half of October or early November with an average maximum temperature in the range of 2635 ^{0}C.

Map showing Musana and Masembura communal area

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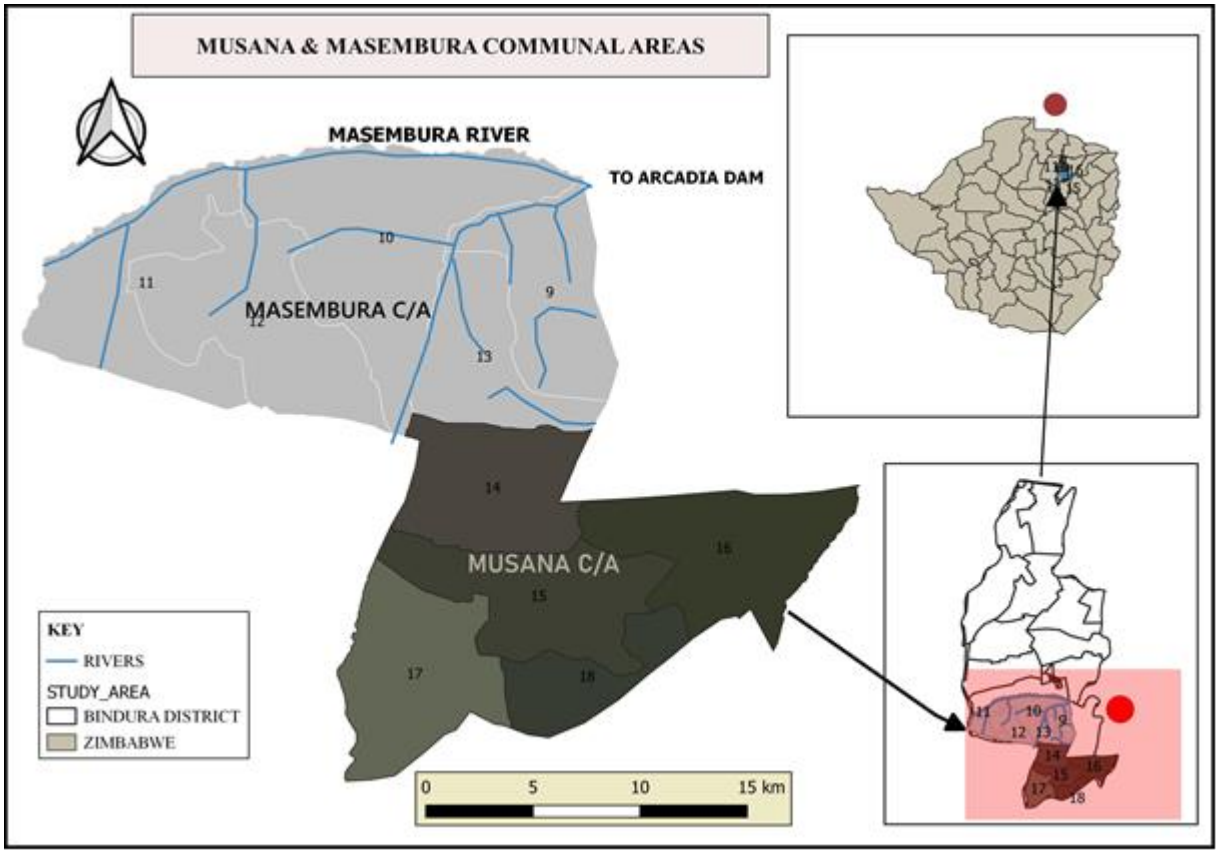

3.2 STUDY DESIGN

A descriptive cross-sectional research design was adopted for this study in Bindura rural. This design enabled the collection of data at a specific point in time, offering a snapshot of the knowledge, attitudes, and practices of women residing in Bindura rural regarding dust pollution caused by sweeping. By employing a cross-sectional design, data could be gathered from a diverse group of participants, allowing for a comprehensive understanding of the research topic.

The cross-sectional design was predominantly appropriate for this study as it provided an effective and applied approach to collect data from a wide range of participants within a distinct timeframe. It allowed researchers to capture a broad depiction of women in Bindura rural and examine their knowledge, attitudes, and practices related to the effects and control of dust and environmental effects caused by sweeping (Levin, 2006).

With the cross-sectional design, data collection transpired at a lone point in time, which was advantageous for studying a specific phenomenon such as dust pollution. It allowed researchers to assess the current status of women's knowledge, attitudes, and practices concerning dust pollution without the need for longitudinal follow-up, which can be time-consuming and resource-intensive.

By employing a cross-sectional design, researchers could efficiently collect data from a large number of participants within the confines of the study's time and resource limitations. This enabled researchers to analyse and interpret the data promptly, generating valuable insights into the current state of knowledge, prevailing attitudes, and common practices related to dust pollution among women in Bindura rural.

3.3 DATA SOURCES

The researcher utilized both primary and secondary sources for data collection. Primary data refers to information obtained directly from primary sources such as questionnaires, surveys, or interviews. In this study, the primary sources of primary data were the female household members who participated in the research through questionnaires, surveys, and interviews. This allowed the researcher to gather first hand insights and perspectives from the target population.

In addition to primary data, the researcher also incorporated secondary sources. Secondary data refers to existing information that has been collected by other researchers or organizations. These sources may include published studies, reports, or statistical data related to the research

topic. By utilizing secondary sources, the researcher was able to complement and validate the primary data, providing a broader context to the study and enhancing its overall reliability.

Combining primary and secondary sources of data allowed the researcher to gather comprehensive and well-rounded information for the study. The primary data provided direct insights from the female household members themselves, offering unique perspectives and experiences. The secondary sources, on the other hand, supplemented the primary data by providing additional background information, supporting evidence, and comparative analysis.

By employing a mixed-methods approach, the researcher ensured a robust and reliable data collection process, capturing both the first hand experiences of the participants and the broader context of the research topic. This approach enhances the validity and credibility of the findings, enabling a more comprehensive understanding of the subject matter.

3.4 SAMPLING METHOD

The researcher employed a combination of convenience sampling and stratified sampling methods to select participants for the assessment on the knowledge, attitudes, and practices regarding the effects and control of dust raised during sweeping among women in Bindura rural.

Convenience sampling was used to select participants based on their availability and accessibility. This method is often employed when the researcher needs to gather data quickly and efficiently, as it allows for the inclusion of individuals who are readily available and willing to participate in the study. In this case, convenience sampling may have been used to select women in the Bindura rural area who were easily accessible for data collection.

On the other hand, stratified sampling was used to ensure that participants were representative of specific subgroups within the population. Stratified sampling involves dividing the population into different strata or categories based on certain characteristics, such as age, education, or marital status. By stratifying the population, the researcher can ensure that each subgroup is adequately represented in the sample, leading to a more accurate and reliable assessment of knowledge, attitudes, and practices.

The justification for using a combination of convenience sampling and stratified sampling in this study is rooted in practicality and representativeness. Convenience sampling allows for efficient data collection, particularly in a rural area where accessibility and availability of

participants may be limited. It helps to ensure that data can be gathered within a reasonable timeframe. On the other hand, stratified sampling ensures that the sample represents the diversity of the population by including participants from different demographic groups. This helps to enhance the generalizability of the findings and allows for a more comprehensive understanding of knowledge, attitudes, and practices among women in Bindura rural.

3.5 SAMPLE SIZE

The sample size of respondents was determined by using the Cochran formula below.

$No = (z2 \times p\ (1-p))/e2$

In directive to estimate the appropriate district level sample magnitude for female respondents, the study based on the entire population of families in the three districts and using the following formula for calculating the sample size below:

$n = DEFF * (\ z2 * (p)\ (1-p\ ))\ /d2$

DEFF = Design effect (1.2)

Z value = 1.645 for p = 0.1 or 90% confidence intervals

P = Estimated is not known, so we assume that 50%

q = 1 − p

= 1 − 0 .5

= 0 .5

Therefore, the sample size required was calculated as follow:

$n = DEFF * (\ z2 * (p\ )(\ 1-p\ ))\ /\ d2$

$n = 0.9*(((\ 1.6452\ )*(0.5)*(0.5))/(0.022))$

n=119.5

n=110

Therefore the number of respondents was to be 110

3.6 RESEARCH TOOLS

The researcher utilized questionnaires as a research tool, incorporating both closed and open-ended questions. Questionnaires are a standardized set of questions designed to gather relevant

information on a specific topic (Ropak et al., 2012). The researcher manually distributed the questionnaires to the selected participants in the target populations within the chosen faculties. After distributing the questionnaires, the researcher patiently awaited the completion of the surveys by the participants.

The questionnaire was organized into four sections, focusing on different aspects related to the effects and control of dust raised during sweeping:

1. Demographics: This section aimed to gather information about the participants' background, including factors such as age, gender, education, and marital status.

2. Knowledge: This section assessed the participants' understanding of the effects and control measures associated with dust raised during sweeping.

3. Attitudes: This section explored the participants' attitudes and perspectives towards the effects and control of dust raised during sweeping.

4. Practices: This section aimed to gather information about the participants' actual behaviors and practices concerning the effects and control of dust raised during sweeping.

5. Environmental effects: This section focused on understanding the environmental consequences associated with dust raised during sweeping.

After collecting the completed questionnaires from the participants, the researcher proceeded to analyze the data contained within them. The analysis of the questionnaires would provide valuable insights into the participants' demographics, knowledge, attitudes, practices, and their perceptions of the environmental effects of dust raised during sweeping.

3.7 Reliability and Validity of the Study

3.7.1 Reliability

To ensure the reliability of the study, a combination of convenience sampling and stratified sampling methods was employed. This approach aimed to include a diverse range of perspectives and experiences among women in Bindura rural, increasing the representativeness of the sample. The research instrument, such as a structured questionnaire or interview guide, was carefully designed and underwent pre-testing and refinement to ensure clarity and comprehensibility, reducing measurement errors. Moreover, standardized data collection

procedures were followed, including clear instructions to participants, trained data collectors, and quality control measures, which further enhanced the reliability of the study's findings.

3.7.2 Validity

The study took steps to enhance its validity by utilizing a research instrument that was specifically designed to measure the knowledge, attitudes, and practices related to the effects and control of dust raised during sweeping. The instrument was developed based on established theories, existing literature, and expert input, ensuring its content validity. The sampling strategy aimed to improve external validity by selecting women from diverse demographic backgrounds, allowing for broader generalizations of the findings. Standardized data collection procedures were implemented, and appropriate analysis methods were employed to minimize response biases and increase the internal validity of the study. These measures were implemented to ensure that the conclusions drawn from the study were valid and contributed valuable insights to the existing knowledge in this area.

3.8 STATISTICAL ANALYSIS

3.8.1 Data Collection

The collection of primary data involved conducting face-to-face structured interviews using a specifically designed questionnaire for this study. The questionnaire comprised a combination of closed-ended and open-ended questions to gather both quantitative and qualitative data. By utilizing structured interviews, the data collection process maintained standardization, ensuring consistency and facilitating comparability of responses. Trained research assistants carried out the interviews, adhering to a standardized protocol to maintain uniformity and minimize bias.

3.8.2 Data Analysis

For the analysis of the assessment on the knowledge, attitudes, and practices related to the effects and control of dust raised during sweeping among women in Bindura rural, statistical analysis can be performed using SPSS 24 (Statistical Package for the Social Sciences). SPSS is a widely used software program for statistical analysis and data management.

The questionnaire consisted of 10 questions to assess attitudes and 10 questions to evaluate practices concerning the effects and control of dust raised during sweeping. Each correct response received a score of 1, while incorrect and "don't know" responses were assigned a score of 0. The average score for each participant was calculated, and responses were categorized as "Good" if the score exceeded 70%, "Fair" if the score ranged from 51% to 69%, or "Poor" if it fell below 50%. To assess the overall knowledge, attitude, and practice (KAP)

scores, the individual scores were combined. These total KAP scores were then used to rank the participants' levels of knowledge, attitude, and practice regarding the effects and control of dust raised during sweeping. The analysis results were presented in tables to display the data effectively.

3.9 Ethical Considerations

Ethical considerations played a paramount role in the study investigating the knowledge, attitudes, and practices related to the effects and control of dust raised during sweeping among women in Bindura rural. The following ethical principles were upheld:

1. Informed Consent: Prior to participation, informed consent was obtained from all participants. They were fully informed about the study's purpose, procedures, and their rights as participants. Voluntary participation was emphasized, and participants had the freedom to withdraw from the study at any time without facing adverse consequences.

2. Confidentiality and Anonymity: Participant confidentiality was strictly maintained. Personal information collected was treated confidentially and securely stored. Data were anonymized or de-identified when reporting and publishing the results to protect participants' privacy.

3. Respect for Participants: Participants were treated with respect and dignity throughout the study. They were not subjected to harm, discomfort, or discrimination. Necessary permissions and approvals were obtained from relevant authorities or institutions, ensuring compliance with local regulations and cultural sensitivities. Risks of physical or psychological harm were carefully assessed and mitigated, and support or referrals were provided to participants in need.

4. Beneficence: The study aimed to benefit participants and the broader community. It sought to contribute to knowledge, improve practices, or address important issues related to the effects and control of dust raised during sweeping. The potential positive impact of the study outcomes on participants or society as a whole was considered throughout the research.

5. Data Handling and Security: Data handling procedures ensured the security and integrity of the collected data. Data protection and privacy regulations were followed, utilizing encryption and secure storage methods to safeguard against unauthorized access or breaches.

6. Ethical Review and Approval: The study underwent ethical review and received approval from relevant institutional review boards or ethics committees. This ensured that the study design, procedures, and data collection methods complied with ethical guidelines and regulations.

7. Transparency and Reporting: The study results were reported with transparency, providing clear information about the study methodology, findings, and limitations. Misrepresentation or selective reporting of data was avoided to maintain the integrity and credibility of the study. Any conflicts of interest that arose during the study were disclosed.

CHAPTER 4: RESULTS

4.0 INTRODUCTION

This chapter presents the assessment findings that evaluate the knowledge, attitudes, and practices regarding the environmental and health effects associated with dust raised during sweeping activities. The results discussed herein are derived from the analysis of data collected from a diverse sample of participants, including residents, workers, and students.

4.1 SECTION A: DEMOGRAPHY

Table 2: Summary of demographic characteristics

Demographic	**Category**	**n=120**	**%=100**
Sex	Male	10	8.3
	Female	110	92.7
Age	18-25	20	16.7
	26-35	30	25
	36-45	37	30.8
	46-55	20	16.7
	>56	13	10.8
Highest level of education	Primary	32	26.7
	Secondary	79	65.8
	tertiary	9	7.5
Marital status	Single	21	17.5
	Divorced	9	7.5
	Married	80	67
	widowed	10	8.3
Religion	Christian	95	79
	Muslim	25	21
	other	0	0

The demographic results reveal important information about the participants in the study. The majority of participants were female (92.7%), while a smaller proportion were male (8.3%). This gender distribution suggests that the study primarily involved female participants.

In terms of age, the participants were fairly evenly distributed across different age groups. The largest age group was 36-45 (30.8%), followed by 26-35 (25%), and 18-25 (16.7%). The remaining age groups, 46-55 and above 56, represented smaller proportions of the participants. These findings suggest a diverse age range among the participants, allowing for a broader representation of perspectives.

Regarding the highest level of education, the majority of participants had completed secondary education (65.8%), while a significant proportion had a primary level of education (26.7%). The remaining participants had achieved a tertiary level of education (7.5%). These results indicate a varied educational background among the participants, which could influence their perspectives and behaviours related to yard sweeping practices.

In terms of marital status, the majority of participants were married (67%), followed by single individuals (17.5%). A smaller percentage of participants were either widowed (8.3%) or divorced (7.5%). These findings highlight the importance of considering marital status as a potential factor influencing yard sweeping practices, as individuals in different marital statuses may have varying responsibilities and preferences related to household maintenance.

Lastly, the participants' religious affiliations showed that the majority identified as Christians (79%), while a smaller proportion identified as Muslims (21%). No participants reported affiliations with other religions. These religious demographics could potentially influence participants' values, beliefs, and cultural practices, which may have implications for their attitudes and behaviors related to yard sweeping.

In conclusion, the demographic results provide valuable insights into the composition of the participant group, including gender, age, education, marital status, and religion. Understanding these demographic characteristics is essential for interpreting the study findings accurately and tailoring interventions, policies, or communication strategies to address the specific needs and preferences of different subgroups within the population.

4.2 SECTION B: KNOWLEDGE ON DUST AND ITS HEALTH AND ENVIRONMENTAL EFFECTS

The responses to knowledge questions are as shown in table 4.1 below

Table 4.1 Participant response to knowledge questions

Knowledge Variable	**Preferred response**	**n**	**%**	**Score**
Qn1.Do you know what dust is made of?	Yes	40	33	0.33
Qn2. Can dust reach lungs during breathing?	Yes	85	71	0.71
Qn3. Does dust cause lung disease?	Yes	83	69	0.86
Qn4 .Does dust worsen asthma?	Yes	77	64	0.64
Dust is harmful to health	Yes	70	58	0.58
Qn6. Does dust consists of soil particles only?	No	69	58	0.58
Qn7. Can dust be prevented by wearing face musk?	Yes	88	73	0.73
Qn8. Does dust contain chemicals?	Yes	65	54	0.54
Qn9. Sweeping yards causes soil erosion?	Yes	75	62.5	0.63
Total Score				**5.6**

From the table above the mean score can be derives as 5.6/9 = 0.62 or 62% level of overall knowledge on all questions which is moderately high. The results in the table indicate that the least known variable was that dust contains particles other than soil and the most well-known things were that dust can cause lung disease. The survey also explored participants' understanding of whether dust can reach the lungs during breathing. A large majority (71%) correctly answered that dust can indeed reach the lungs. Another aspect investigated was whether dust causes lung disease. The findings showed that the majority of participants (94%)

responded negatively, indicating that they did not believe dust to be a direct cause of lung disease. A small number of respondents (5%) disagreed with this notion, while an even smaller proportion (1%) admitted not knowing. Furthermore, participants were questioned about the impact of dust on asthma.

4.3SECTION C: ATTITUDES ON DUST AND ITS HEALTH AND ENVIRONMENTAL EFFECTS

The responses of participants towards attitudes questions are shown in table 4.2 below

Table 4.2 Responses to attitude questions

Variable Attitude	**Preferred answer**	**n**	**%**	**Score**
Qn1. Dust is not harmful to health	No	45	37.5	0.38
Qn2. People must sweep their yards everyday	No	15	12.5	0.13
Qn3. I always sweep my yard even if its not dirty	No	25	21	0.21
Qn4. People have to sprinkle water before sweeping	Yes	75	63	0.63
Qn5. I think people should wear face masks when sweeping	Yes	70	58	0.58
Qn6. Are you willing to plant lawn if it costs 10 dollars	Yes	20	17	0.17
Qn7. Planting lawn is a waste of money	No	20	17	0.17
Qn.8 The benefits of sweeping are greater than the damage caused to the environment.	No	15	12.5	0.13
Qn9. Do u think most men do not encourage sweeping the yard	Yes	35	29	0.29

Total Score				**2.69**

From table 4.2 the total attitude score was 2.69. The mean score is thus 2.69/9 = 0.3 or 30%. This means positive attitude was only 30% which is very low. The results show that only 38% knew that dust was harmful to health. Also only 13 % perceived that the benefits of sweeping outweigh the harm to health and the environment. Only 17% were willing to plant lawns and did not consider it a waste of time.

4.4 SECTION C: PRACTICES ON DUST AND ITS HEALTH AND ENVIRONMENTAL EFFECTS

The responses to practice questions are shown in table 4.3 below

Table 4.3 Respondents' answers to practice questions

Practice variable	Participant response	n	%	Score
Qn1. Do you sweep your yard every day?	No	15	12.5	0.13
Qn2. Do you sprinkle water before sweeping?	Yes	30	25	0.25
Qn.3 Do you wear face masks when sweeping?	Yes	2	0.02	0.0002
Qn4. Have you planted Lawn in your yard?	Yes	5	4.2	0.042
Qn5. My husband does not want me to sweep the yard everyday	Yes	33	27.5	0.28
Total Score				**0.70**

From table 4.3 above the total practice score was 0.70 and the mean score was 0.7/5=0.14 or 14% which is very low. The information above shows that the respondents do not wear masks, do not sprinkle water and do not plant lawns. Only 28% of the respondents indicated that their husbands do not want them to sweep the yard every day. Furthermore, only 13% of the respondents do not sweep their yards every day.

CHAPTER 5

5.1 DISCUSSION

The results of this study show that in general, people had moderately high (62%) knowledge about issues to do with dust and its effects on human health and the surrounding ecosystems. This is in line with findings by Noko (2019) where participants were generally knowledgeable about sweeping dust and its consequences to health and the environment. In spite of the overall moderately high percentage of knowledge about dust and its effects to people's health and the environment, only 33% knew that dust is made of many other substances besides soil. This lack of knowledge about the constituents of dust such as deleterious heavy metals from exhaust fumes and microorganisms has a bearing on the behavior of people towards protective and preventive measures. The majority of respondents knew that dust can cause lung diseases. Furthermore, the majority of the participants knew that dust can exacerbate asthma. These findings are in tandem with the findings by Wright, *et. al.,(*2014) where the majority of people in the study were aware that dust can cause pulmonary diseases. It is interesting to note that although the majority of respondents knew that wearing a face mask can protect against exposure to dust and had positive attitudes, in reality they reported not wearing masks during sweeping episodes. This can infer that there are other factors besides knowledge and attitudes that are responsible for people's observed behaviours. Such factors can include the cost of preventive or protective measures. According to Wright, *et. al.,(*2014) lack of government support in terms of resources is partly responsible for the persistence of the problem of continuous exposure to dust.

The findings of this study that practice may be poor even though knowledge is high agree with those of Sifanu, *et. al.,* (2023), whose findings indicated that knowledge was not associated with exposure. From the results it can be clear that the majority of people in the study think they should sweep their yards daily. This attitude is not good and entails that even if the yard is not dirty people must sweep and expose themselves to the harmful effects

of dust on the environment and human health. Quite a moderately high percentage of people think that people ought to wear masks during sweeping sessions. They also believe that sweeping should be preceded by sprinkling of water in order to suppress dust. However their practice concerning wearing a mask during sweeping were very poor as only a very tiny percentage indicated to have been using masks as well as sprinkling water in the pre-sweeping period.

There were very few people who thought the benefits of sweeping outweigh the costs to health and the environment. Thus the majority of people think the health and environmental costs of sweeping are larger than costs. Yet people continue to sweep their yards often without using alternatives. This may be due to the fact that who do not sweep their yards are traditionally viewed as lazy and not worthy of marrying. The study shows that most people are not willing to plant lawns as an alternative to keeping bare ground. The reason may be because lawns are difficult to maintain and entail some costs as they required periodic watering and trimming.

The study also revealed that only 38% of people thought that dust was harmful to health. This agrees with what was found by Kabie, et. al.,(2015) in Bangladesh where the majority had a low risk perception about the negative impacts of dust on health.

5.2 Conclusion

The study concludes that knowledge about sweeping dust and its effects on health and the environment was fairly high, attitudes very negative and practice very poor. It can also be concluded that having knowledge alone does not ensure good practice.

5.3 Recommendations

Health authorities and policy makers must introduce awareness campaigns about the adverse effects of dust as well as the appropriate control measures. There is also need to make water accessible to communities so that they may be able to sprinkle water before sweeping as well as planting lawns

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How farmers perceive the impact of dust phenomenon on agricultural production activities: A Q-methodology study

Author links open overlay panelFatemeh Taheri [a], Masoumeh Forouzani [b], Masoud Yazdanpanah [b], Abdolazim Ajili [b]

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Occupational hazards and health problems among street sweepers in Uyo, Nigeria

May 2020Ibom Medical Journal 13(2)

Appendix

RESEARCH QUESTIONNAIRE

My name is Chibhanguza, a Bindura University of Science Education fourth year student undertaking a Bachelor of Science Honours Degree in Safety, Health and Environmental Management. I am doing **AN ASSESSMENT OF KNOWLEDGE ATTITUDES AND PRACTICES TOWARDS THE ENVIRONMENTAL AND HEALTH EFFECTS OF DUST RAISED DURING SWEEPING** as part of my research project. Your responses will be used to inform the research and contribute to a better understanding of issues to do with food safety and hygiene. Your participation is entirely voluntary and you can withdraw anytime without penalty. Please answer all questions honestly. Thank you for your time and participation.

INSTRUCTIONS TO RESPONDENTS

- *Tick all the appropriate boxes*
- *Do not write your name on any part of the paper.*

SECTION A: SOCIO-DEMOGRAPHIC CHARACTERISTICS

1. **Gender: Male** ☐ **Female** ☐
2. **Age (years): 18-25** ☐ **26-34** ☐ **35-40** ☐ **41-49** ☐ **50+** ☐
3. **Highest Education Level: Primary** ☐ **Secondary** ☐ **Tertiary** ☐
4. **Occupation: _____**
5. **Marital status: Divorced** ☐ **Married** ☐ **Single** ☐ **Widowed** ☐
6. **Religion: Christianity** ☐ **Muslim** ☐ **Other……**
7. **How often do you sweep your yard per day…….**
8. **How often do you sweep your yard per week……..**

	SECTION B: KNOWLEDGE ON DUST AND ITS HEALTH AND ENVIRONMENTAL EFFECTS	
Number	**Knowledge**	**Answers**
K1.	What is dust made of?	Soil ☐ Tyre particles ☐ Plant particles ☐

K2.	Can dust reach the lungs during breathing	Yes ☐ No ☐ Don't know ☐
K3.	Does dust cause lung disease	Yes ☐ No ☐ Don't know ☐
K4	Does dust worsen asthma	Yes ☐ No ☐ Don't know ☐
K5.	Which of the following make up dust?	Soil ☐ pl ☐ Don't know ☐
K6.	Does dust consist of soil particles only	Yes ☐ No ☐ Don't know ☐
K7.	Can dust be prevented by wearing face masks?	Yes ☐ No ☐ Don't know ☐
K8.	Does dust contain chemicals	Yes ☐ No ☐ Don't know ☐
K9.	Sweeping yards causes soil erosion?	Yes ☐ No ☐ Don't know ☐
K10.	Besides sweeping yards how else can they be kept clean?	1. 2. 3.
	Section C: ATTITUDES	
A1	Dust is not harmful to health	Yes ☐ No ☐ Don't know ☐
A2	People must sweep their yards everyday	Yes ☐ No ☐ Don't know ☐
A3	I always sweep my yard even if it's not dirty	Yes ☐ No ☐ Don't know ☐
A4	People have to sprinkle water before sweeping	Yes ☐ No ☐ Don't know ☐
A5	I think people should wear face masks during sweeping Yes ☐ No ☐ Don't know ☐	

A6	Are you willing to plant lawn in your yard if it costs $10	Yes ☐ No ☐ Don't know ☐
A7	Planting lawns is a waste of time because there is no constant supply of water.	Yes ☐ No ☐ Don't know ☐
A8	The benefits of sweeping are greater than the damage caused to the environment.	Yes ☐ No ☐ Don't know ☐
A9	Do you think most men do not encourage sweeping the yard.	Yes ☐ No ☐
	PRACTICE	
P1	Do you sweep your yard every day?	Yes ☐ No ☐
P2	Do you sprinkle water before sweeping?	Yes ☐ No ☐
P3	Do you wear a face mask when sweeping?	Yes ☐ No ☐
P4	Have you planted lawn in your yard	Yes ☐ No ☐
P5	My husband does not want me to sweep the yard	