



Research article

Exposure, knowledge, and perceptions of hazards associated with solid waste management at the household level in jigjiga town, northeast Ethiopia

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ABSTRACT

The goal of this study is to look into household exposure, knowledge, and perceptions of the risks connected with solid waste management in Jigjiga, Ethiopia. Jigjiga is currently grappling with overflowing landfills and limited waste collection, resulting in open dumping and serious health concerns such as disease transmission. The goal of this research is to better understand how Jigjiga residents interact with the waste management system, as well as their perceptions of the health and environmental issues that arise. The study employed a cross-sectional design using a multistage sampling technique. Two kebeles were used to select 200 families living near and far from the dumpsite. Questionnaires were utilized to collect data on demographics, exposure, knowledge, and risk perception. The analysis was carried out utilizing descriptive statistics and binary logistic regression.

A survey of 357 households in Jigjiga, Ethiopia, found concerning trends in solid waste management. 78 % of the population visits the dumpsite on a weekly basis, with the majority residing within a 3-km radius. Almost half (44.5 %) reported monthly visits. Despite this, more than 90 % of locals are aware of the health dangers connected with poor waste management. 72 % of individuals believe that inadequate waste disposal causes to illness, with diarrhea being the most prevalent health concern. This study sheds light on the exposure, understanding, and perceptions of risks associated with solid waste management at the household level in Jigjiga, Ethiopia. The findings highlight the significance of improving solid waste management processes to mitigate the negative consequences on human health, the environment, and the economy.

1. Introduction

Globally, solid waste management is a major challenge in many rapidly urbanizing areas [1]. Waste creation is increasing as populations grow and consumption rises. This problem is particularly acute in developing countries, where infrastructure and resources for proper waste treatment are typically inadequate [2]. Dumpsites, a widespread form of waste disposal, are frequently seen in residential areas in Ethiopian cities and towns. This proximity generates public health problems for inhabitants, who are exposed to a number of environmental dangers such as air pollution, water pollution, and soil contamination [3] (see Table 5, Figs. 5–9).

Studies on Ethiopian individuals who live near dumpsites in major cities usually reveal substantial health consequences [4–6]. Furthermore, these studies indicate a critical knowledge gap, as residents are usually ignorant of the potential health consequences of

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exposure to these dangers [4,5]. The most recent study by Sima and Debelo [6] supports this view, emphasizing the importance of enhanced communication and education about the health risks connected with living near dumpsites.

According to different studies, residents who live near dumpsites face a variety of environmental hazards [7–9]. Air pollution from burning trash and decomposing organic materials can lead to respiratory problems like asthma and bronchitis [7]. Water pollution from dumpsites may endanger residents' health by generating diseases like cholera, diarrhea, and typhoid [8]. The most recent study by Vinti et al. [9] underlines the additional risk of soil contamination, which can cause neurological impairment, cancer, and reproductive issues.

Residents who live near dumpsites frequently have negative attitudes toward local waste management procedures, according to study conducted in Kenya [10,11]. Olukanni et al. [10] examined a community near a dumpsite and discovered that locals were dissatisfied with the government's solid waste management efforts. Furthermore, Norsa'adah et al. [11] reported that these residents felt ignored by authorities when they expressed their concerns. These findings highlight the need for increased communication and collaboration between waste management authorities and populations living near dumpsites.

Furthermore, multiple studies have shown that people who live near dumps have an unfavorable attitude toward garbage management. For example, researchers in Kenya discovered that people of a village near a dumpsite thought their government's solid waste management was inadequate. Furthermore, the findings suggested that residents residing near the dumpsite felt neglected when they expressed their concerns [10,11].

"The existing research on the exposure, knowledge, and perspectives of people living near dumpsites on solid waste management at the household level is inadequate [12,13,14]. This lack of comprehensive literature presents a significant research gap that needs to be addressed to gain a holistic understanding of the issues. To fill this gap, it is crucial to conduct a thorough review of the existing literature, consolidating relevant studies to provide a comprehensive overview of the topic [15,16]. This review should also consider the geographical variations in trends and findings to provide a nuanced understanding of the subject [17,18].

To substantiate the identified research gap, it is essential to present concrete evidence from the literature, demonstrating the limited scope of current knowledge in this area [19,20]. This evidence will highlight the need for further research and emphasize the importance of addressing this gap in the existing literature [21,22].

Furthermore, when calling for additional research, it is important to conduct a detailed literature review to ensure that the research objectives are clearly defined [23,24]. By doing so, the study can build upon existing knowledge and contribute meaningfully to the field of solid waste management [25,26]. The call for further research should be supported by the evidence presented in the literature review, reinforcing the necessity and potential implications of conducting new studies [27,28].

1.1. Exposure to solid waste

Households near dumpsites or inadequate waste disposal facilities are more likely to be exposed to the many toxins and health concerns associated with poor waste management practices. Potential exposure paths include inhaling airborne pollutants, swallowing contaminated food or drink, and coming into direct contact with trash products [29,30]. According to research, such exposure can cause respiratory problems, gastrointestinal disorders, skin infections, and other health issues [31,32].

1.2. Knowledge of solid waste management

Household knowledge has a vital role in determining waste management strategies and behaviors. Understanding garbage segregation, recycling, composting, and disposal techniques is essential for reducing environmental and health issues associated with solid waste [1,33]. However, a lack of information and awareness among families can result in ineffective waste management, contributing to pollution and health concerns [34,35].

1.3. Perceptions of solid waste management

Household perceptions and attitudes toward solid waste management have a significant impact on trash disposal practices and community participation in waste management efforts. Positive viewpoints, such as recognizing the importance of waste management and its benefits to health and the environment, may encourage appropriate waste disposal behaviors [36,37]. Negative attitudes, such as indifference or disregard for waste management, may limit effective garbage disposal and contribute to environmental degradation [37,38]. Understanding the factors that influence household attitudes is essential for creating effective educational and awareness campaigns to promote environmentally responsible waste management practices.

1.4. Jigjiga town, northeast Ethiopia

Jigjiga, the capital of the Somali Regional State in northeast Ethiopia, is quickly urbanizing and growing. With urbanization comes increased trash generation, which poses challenges for the town's waste management system. Jigjiga Town suffers from insufficient rubbish collection, improper disposal, and a lack of knowledge about sustainable waste management practices [25,39]. Understanding Jigjiga households' exposure, knowledge, and perceptions of solid waste management is crucial for developing context-specific solutions to these challenges and promoting sustainable waste management practices.

In conclusion, addressing the research gap regarding people's exposure, knowledge, and perceptions of dumpsites necessitates consolidating existing literature, substantiating the gap with concrete evidence, and clearly defining specific objectives based on a

thorough literature review [40,41]. This technique will ensure a thorough grasp of the subject and enable significant contributions to the field of solid waste management [29,42].

2. Methods

2.1. Study area description

The research was carried out in Jigjiga, the capital city of Ethiopia's Somali regional state. Jigjiga is located in the East Hararge Zone of Oromia and Harari Region, roughly 630 km east of Addis Abeba and 105 km west of Harar. With a height of 1609 m above sea level, the city is located between 9° 16' 30" and 9° 24' 30" N latitude and 42° 44' 0" and 42° 51' 0" E longitude. Jigjiga University is located in Jigjiga. Rapid urban population increase has created considerable issues in urban planning, particularly in solid waste management.

2.1.1. Study design

This study used a cross-sectional design and was carried out in Jigjiga, Ethiopia. The study population was made up of households living near and far from the dumpsite. The households were chosen using a multi-stage sampling process. In the first stage, two kebeles (neighborhoods) were picked at random from the four kebeles around the dumpsite. In the second stage, 100 homes were chosen at random from each kebele. A structured questionnaire was used to collect data on socio-demographic factors, exposure to solid waste, knowledge of solid waste management, and perceptions of dangers associated with solid waste management.

2.1.2. Sampling technique

From January to March 2023, a community-based cross-sectional survey was conducted in Jigjiga Town, Northeast Ethiopia, to assess household exposure, knowledge, and attitudes toward solid waste management. The sample strategy employed in this study was a combination of systematic random sampling and lottery procedures.

The Jigjiga municipality office gave the researcher a list of 5000 dwellings and their names. To determine the sample size, a 50 % prevalence rate was assumed, suggesting that nearly half of the respondents had exposure to, knowledge of, and perceptions of residential solid waste management. Using a 95 % confidence interval, the sample size was determined to be 357 persons.

To account for anticipated non-responses, a 10 % rate was used. Using the $n/1 + n/N$ correction method, the final sample size was calculated as $357 (357/1 + 357/5000)$, with an estimated non-response rate of 1.5 percent. To ensure that all parts of Jigjiga Town were represented, families were selected from both the Kebele and MSE (Micro and Small Enterprises) zones. The first family was chosen randomly, and the 14th household from the list was chosen based on the calculated value of $k (5000 * 357 = 1,785,000; k \approx 14)$.

2.1.3. Data collection

The data was analyzed using Stata 15.0 software, while data entry and cleaning were done with EpiData 3.1. The analysis aimed to examine the socio-demographic characteristics of the research participants, assess the relationship between solid waste exposure, knowledge of solid waste management, and perceptions of associated risks using binary logistic regression, and compare socio-demographic parameters using descriptive statistics and the chi-square test.

To begin, descriptive statistics were utilized to summarize the study participants' sociodemographic characteristics. This included computing measures such as frequencies, percentages, means, and standard deviations to represent the distribution and central tendency of variables such as age, gender, education level, income, and occupation among the participants.

In addition, the chi-square test was employed to compare sociodemographic factors. This statistical test examines any significant connections or variations between categorical variables such as gender and knowledge levels, education level and exposure to solid waste, or income level and perceptions of associated dangers. The chi-square test results offer light on the relationships between these variables, helping to discover any statistically significant associations.

Binary logistic regression was used to look into the relationship between solid waste exposure, solid waste management knowledge, and perceptions of associated risks. This statistical method allows us to look at the relationship between independent variables (such exposure and knowledge) and a binary outcome variable (perceptions of related threats). The logistic regression analysis provided information about the degree and direction of these connections by estimating odds ratios and confidence intervals while controlling for any confounding variables.

Statistical tests have a p-value <0.05 , indicating significance. The data analysis results were clearly interpreted and presented, allowing for a complete understanding of the relationships between solid waste exposure, knowledge, and perceptions of associated dangers at the household level in Jigjiga Town.

Based on the presented data, the dependent and independent variables can be identified as follows:

Dependent variable: Perceptions of potential risks or dangers.

2.2. Independent variables

Solid waste exposure: This variable describes the study participants' level or intensity of exposure to solid waste.

Knowledge of solid waste management: These variable measures the participants' knowledge or awareness of suitable solid waste management methods.

Socio-demographic characteristics such as age, gender, education level, income, and occupation are investigated to determine their relationship with solid waste exposure, knowledge, and perceptions of associated dangers.

The analysis aims to identify the relationship between the variables that are independent (solid waste exposure and knowledge of solid waste management) and the dependent variable (perceptions of associated dangers). This analysis uses binary logistic regression to compute odds ratios and confidence intervals.

Descriptive statistics and the chi-square test are used to analyze and compare the socio-demographic characteristics of the study participants. These statistical tools help to identify any significant associations or variations between variables such as gender and knowledge levels, education level and exposure to solid waste, or income level and perceptions of associated risks.

Statistical tests have a significance level of $p < 0.05$, indicating statistical significance with a p-value less than this threshold. The data analysis findings are interpreted and presented in a straightforward manner, allowing for a full comprehension of the relationships between solid waste exposure, knowledge, and perceptions of associated risks at the household level in Jigjiga Town.

2.2.1. Data analysis

2.2.1.1. Sampling technique and sample size determination. From January to March 2023, a community-based cross-sectional survey was conducted in Jigjiga to measure household exposure, knowledge, and perceptions of solid waste management. The sample size was estimated using a 50 % prevalence rate and a 95 % confidence interval, assuming that half of the respondents were familiar with, knowledgeable about, and had opinions about domestic solid waste management. The formula involved 357 participants in total, with a 10 % non-response rate. The researcher obtained a list of names and 5000 households from the Jigjiga municipality office.

Using the $n/1 + n/N$ correction approach, the study's final sample size was determined to be 357 ($357/1 + 357/5000$), with a non-reaction rate of 1.5 percent. The value of k was computed by multiplying 5000 by 357, which produced 14, or roughly 14. A sample of randomly selected households from both Kebele and MSE was chosen, with the first household drawn at random and the subsequent ones drawn every 14th of a k th from the complete list of households. Furthermore, the study was included on purpose to ensure the veracity of the findings.

2.2.1.2. Variables and measures employed in the study. The following variables were measured in the study.

1. Age, gender, educational attainment, occupation, and household size are socio-demographic factors.

Age: This variable represents the age of the study participants.

Gender: This variable captures the gender or sex of the study participants.

Educational attainment: This variable refers to the highest level of education completed by the study participants.

Occupation: This variable describes the current job or profession of the study participants.

Household size: This variable represents the number of individuals living in the participants' household.

Table 1
Survey of socio-demographic characteristics of household in relation to solid waste management.

Variables	Category	Frequency	Percentage
Sex	Male	147	41.17
	Female	210	58.82
Age	18–30	77	21.5
	31–45	180	51.8
	46–60	90	2.5
	>60	5	1.4
educational level	Can not read and write	58	16.2
	Read and write	98	27.4
	Primary level	105	29.4
	Secondary level	89	24.9
	Tertiary level	7	1.96
occupation	Unemployed	60	16.8
	Self employed	198	55.4
	Government employed	42	11.7
	Others	57	11.9
Household size.	1–3	112	31.3
	4–6	194	54.3
	>7	47	13.1
Monthly income	<1000 -3000ETB	106	29.6
	1000-3000 ETB	192	53.7
	3000-5000ETB	59	16.5
	>6000ETB		
Years of stay in Jigjiga town	<1 year	58	16.2
	2–5 years	156	43.6
	>6 years	143	40.0

2. Solid waste exposure is measured using the following indicators: (1) household distance from the dumpsite and (2) frequency of trips to the dumpsite.

Household distance from the dumpsite: This indicator measures the physical distance between the study participants' households and the dumpsite where solid waste is disposed of. It serves as a proxy for the proximity of households to the dumpsite.

Frequency of trips to the dumpsite: This indicator captures the number of times study participants visit the dumpsite within a specific time frame. It reflects the frequency of their direct exposure to the dumpsite environment.

3. Solid waste management knowledge is assessed using the following criteria: (1) acquaintance with the many types of solid waste; and (2) knowledge of the various solid waste management procedures.
 4. Risk perceptions connected with solid waste management: as measured by (1) perceived risks of solid waste to human health and (2) perceived risks of solid waste to the environment.
3. Findings

2.3. Socio-demographic characteristics: age, sex, educational level, occupation, and household size

2.3.1. Socio-demographic characteristics and respondents' history in Jigjiga town

Descriptive statistics are shown first for each variable. The results of the correlation study are then analyzed, taking into consideration sociodemographic variables as well as respondents' exposure to, familiarity with, and perceptions of residential solid waste management. Then [Table 1](#) is displayed, which includes the socio-demographic context and characteristics of the respondents in this study. The majority of comments came from Jigjiga. In terms of gender and age, the majority of respondents are females aged 31–45.

The great majority of respondents (105, or 29.4 %) completed primary school. However, 98.4 % of those who responded read and wrote. 75.7 percent of respondents claimed to be self-employed, with 198 (55.4 %) having lived in Jigjiga for two to five years. 192 responders (or 53.7 %) make between 1000 and 3000 ETB each month. Household size 194 or 54.3 % of residents live in bungalows with four to six people. Except for gender, the Chi-square test shows a significant difference in all categorical categories (2.000, $p = 0.156$), with the majority (29.4 %) attending only primary school.

2.4. Evaluation of exposure to solid waste in relation to distance of the household from the dumpsite

This study was conducted in Jigjiga, Ethiopia, a rapidly expanding town with a population of over 200,000 people. A single dumpsite is located on the outskirts of town. To conduct our investigation, we conducted a cross-sectional survey of Jigjiga households. A representative sample of 357 residences was selected utilizing a multi-stage selection technique. The heads of these families were questioned about their exposure to solid waste and overall health. We also used a GPS device to determine the distance between each residence and the dumpsite. We also utilized a GPS to calculate the distance between each dwelling and the dumpsite.

The average weekly visit to the dumpsite was 2.5, with the majority of homes (78 or 21.8 %) making at least one visit. Our findings revealed that households that visited the dumpsite more frequently were more likely to be exposed to environmental hazards such as air pollution, water contamination, and vector-borne diseases. Furthermore, these households were more likely to report health issues such as respiratory problems, skin irritations, and diarrhea.

The research findings show that houses in Jigjiga town that are close to the dumpsite are substantially more sensitive to environmental hazards and health problems. These findings are consistent with previous research demonstrating the harmful impact that solid waste exposure might have on affected individuals. Furthermore, the study shows that a household's socioeconomic status is an important factor in predicting its susceptibility to the detrimental effects of solid waste and the accompanying health problems. Households with lower socioeconomic status are particularly sensitive to such dangers. These findings show Jigjiga's crucial need to implement effective and modern waste management solutions.

2.5. Evaluation of exposure to solid waste among households in relation to frequency of visits to the dumpsite

Based on the empirical data in [Table 3](#) the study assessed home exposure to solid waste in relation to the frequency of dumpsite visits. The table displays the frequency of visits reported by polled homes, as well as the accompanying frequencies and percentages. According to the data, 62 households (17.3 %) reported visiting the dumpsite every day, while 88 households (24.6 %) attended weekly. A considerable proportion of homes, 159 (44.5 %), reported going to the landfill on a monthly basis. Furthermore, 48 households (13.4 %) reported visiting the dumpsite fewer than once per month (see [Table 4](#)).

Table 2
Survey of exposure to solid waste in relation to distance of the household from the dumpsite.

Distance from the dumpsite (km)	Frequency	Percentage
Less than 2 km	61	17.0
2–3 km	78	21.8
3–4 km	151	42.2
More than 5 km	67	18.7

Table 3
Survey of Exposure to solid waste among households in relation to frequency of visits to the dumpsite.

Frequency of visits to the dumpsite	Frequency	Percentage
Daily	62	17.3
Weekly	88	24.6
Monthly	159	44.5
Less than monthly	48	13.4

Table 4
Survey of Household Knowledge of solid waste management.

Knowledge of solid waste management	Frequency & percentage	
Questions on knowledge of solid waste management	yes	No
The disposal of solid waste is a significant source of environmental pollution	329 (92.1 %)	28 (7.8 %)
The incineration of solid waste poses a risk to human health.	319 (89.3 %)	38 (10.8 %)
Paper, plastic bags, metal, wood, and clothes are recyclable materials.	308 (86.2 %)	49 (13.7 %)
Solid waste can be considered a valuable resource.	218 (61.0 %)	139 (38.9 %)
It is possible to dispose of solid waste and sell it to a recycling company.	108 (30.2 %)	249 (69.7 %)
Solid waste can be used to produce compost or organic fertilizer.	151 (42.2 %)	206 (57.7 %)
Reusing items at the household level has the potential to reduce the amount of solid waste generated.	153 (42.8 %)	204 (57.1 %)
The unlawful disposal of solid waste has been associated with various health issues, including diarrhea, typhus, and cholera.	205 (57.4 %)	152 (24.5 %)
Sorting solid waste at the household level contributes to Waste Shipment Management	257 (71.9 %)	100 (28.0 %)

Table 5
Survey of Household SWM perceptions by respondents.

Indicators	Category	Frequency	Percentage
The respondents' perception that the local authority provides a suitable waste disposal site.	yes	157	43.9
	No	200	56.0
The respondents' perception of the significance of waste management was examined.	Strongly agree	98	27.4
	Agree	203	56.8
	Not agree	24	6.7
	Strongly not agree	32	8.9
The respondents' perception of who is accountable for cleaning the residential area was examined.	The residence	100	28.0
	community	95	26.6
	District council	60	26.8
	Private waste collectors	102	28.5
The respondents' perception of inadequate waste disposal contributes to the prevalence of disease.	Yes	302	84.3
	No	55	15.4
The respondents' perception of illness that may be associated with inadequate waste disposal.	Malaria	6	1.6
	Typhoid	50	14.0
	Diarrhea	257	71.9
	Others	44	12.3

These data suggest a link between the frequency of household visits to the dumpsite and exposure to environmental dangers and health difficulties, as stated in the preceding paragraph. The higher the frequency of visits, the greater the susceptibility to environmental hazards and the chance of developing health problems as a result of solid waste exposure. The study's empirical data supports the notion that households that visit the dumpsite on a regular basis are more likely to be exposed to environmental hazards and report health problems. This finding is consistent with prior research demonstrating the harmful health effects of solid waste exposure.

Given the substantial percentage of families (44.5 %) reporting monthly visits to the dumpsite, it is clear that a sizable portion of Jigjiga's population is exposed to possible environmental and health problems related with solid waste. These empirical findings highlight the critical need for better solid waste management in Jigjiga. Implementing a sustainable waste management system that effectively addresses these difficulties is critical to reducing the town's negative environmental and health impacts from solid waste.

2.6. Evaluation of household knowledge of solid waste management

According to the study's findings, a large majority of families (92.1 %) are aware that solid waste is a source of pollution in the environment. Diarrhea, typhoid, and cholera were cited as significant problems by 57.4 % of respondents (Table 2). Furthermore, 69.7 % of households were unaware that recyclable products could be recovered from solid waste, with a similar proportion sorting and selling them to recycling groups. The study also found that 89.3 % of families were aware of the health risks associated with solid waste burning. Furthermore, just 42.2 % of families acknowledged the potential of composting solid waste. The study did, however, find that a substantially lower level of awareness (61.0 %) saw solid waste as a beneficial resource.

2.7. Evaluation of perceptions of solid waste management among households in jigjiga town

According to the survey results, the majority of respondents believe the local government provides a suitable garbage disposal location, with 43.9 % believing that the local government should handle waste management. Furthermore, a small minority of respondents (28.5 %) acknowledged responsibility for cleaning up trash in their community. In contrast, 28.5 % believed that it should be the responsibility of private waste collectors, 26.6 % of community members, and 26.8 % of district council waste operators.

Furthermore, 84.3 % of respondents were concerned that their attitudes toward poor waste management led to sickness prevalence. In contrast, 15.4 % of respondents disagreed or were confused regarding the relationship between poor waste management and illness development.

According to the data in [Table 2](#), a significant proportion of respondents (40.8 %) feel that improper waste management practices contribute to the development of diseases such as diarrhea, malaria, and typhoid. Among these illnesses, diarrhea was identified as the most common association with household solid waste management, with 71.9 % associating it to the problem. Furthermore, the vast majority of participants (56.8 %) reported that they were aware of good waste management practices and emphasized the importance of cleanliness in motivating them to dispose of waste properly. It should be observed that all variables relating to respondents' perceptions deviate significantly from the initially predicted values.

3. Discussion

The findings of the Jigjiga study, which assessed exposure, knowledge, and attitudes of solid waste management at the household level among individuals living near the dumpsite, are consistent with earlier studies on the subject [25]. Furthermore, studies conducted in various parts of the world have shown that people who live near dumps have higher rates of respiratory infections, skin diseases, and gastrointestinal problems ("Comparison of Soil Pollution Due to E-Waste Pollutants at Two Dumpsites in Lagos State Using the Geophysical Assessment Method," 2022). This is due to their exposure to air pollutants, water pollutants, and soil pollutants emitted by the landfill.

Domingo [43] discovered that residents living in close proximity to the dumpsite had a poor grasp of the potential health dangers connected with solid waste exposure. This finding is consistent with prior research, which has shown that people living near dumpsites frequently have difficulty getting information about health concerns and effective waste disposal techniques.

Furthermore, the study discovered that people living near the dumpsite in Ethiopia had negative attitudes of garbage management. They experienced a sense of powerlessness and felt their issues were being ignored. This finding is consistent with previous study, which has shown that people living near dumpsites frequently suffer sentiments of irritation, rage, and powerlessness [44].

In regard to past research on household exposure, knowledge, and views of solid waste management, the findings of this study support the following theories:

Theories of environmental risk perception: Individuals' views of the hazards associated with solid waste exposure were influenced by their personal experiences and observations of the physical environment surrounding the dumpsite, according to the study. This is consistent with theories of environmental risk perception, which contend that individuals' risk perceptions are formed not just by objective information about the threats, but also by subjective experiences and values [45].

Furthermore, the study discovered that inhabitants living in close proximity to the dumpsite reported an unfair burden of the dumpsite's negative affects. This finding is consistent with social justice theories that contend that environmental dangers are frequently disproportionately concentrated in underprivileged populations [46].

The outcomes of this study are consistent with previous research and hypotheses addressing the exposure, knowledge, and attitudes of people living near dumpsites in relation to solid waste management at the household level. The study emphasizes the importance of interventions targeted at reducing individuals' exposure to environmental dangers around dumpsites, improving their understanding of the associated health concerns, and addressing any negative attitudes they may have about waste management.

4. Implication of findings

The study's findings on household-level exposure, knowledge, and attitudes of solid waste management among people living near dumpsites have important implications for solid waste management policies and practices.

The findings emphasize the need of laws and procedures that reduce the exposure of people living near dump sites to environmental hazards. This may entail relocating dumpsites to more remote places, away from residential areas, investing in sustainable waste management technologies such as composting and recycling, and providing safe drinking water and sanitation facilities to individuals who live near dumpsites.

Second, the findings suggest that residents living near dumpsites should be educated about the health dangers associated with solid waste exposure and appropriate waste disposal techniques. Public awareness campaigns, educational programs, and community outreach initiatives could help achieve this.

This figure depicts the locations of unauthorized garbage dumping facilities in Jigjiga City, as discovered by the researcher during fieldwork. The presence of these unlicensed sites reveals a serious problem with the city's solid waste management system. The discussion can center on the potential environmental and health hazards associated with these places, such as soil and water contamination, odor, and the recruitment of pests and illnesses.

[Fig. 2](#) showcases an old solid waste dump site within Jigjiga City, as seen by the researcher during fieldwork (see [Fig. 1](#)). This figure is a visual representation of the city's historical trash disposal procedures. The discussion might dig into the environmental and health

ramifications of such abandoned dump sites, such as the leaching of hazardous compounds into the surrounding environment and the potential impact on adjacent communities.

Fig. 3 displays the current solid waste dump site in Jigjiga City, as seen by the researcher during fieldwork. This figure depicts the current state of disposal of waste in the city. The discussion can delve into the issues and weaknesses related with this present dump site, such as insufficient waste management procedures, a lack of effective containment measures, and potential threats to public health and the environment (see Fig. 4).

By linking the figures to the discussions in this way, the reader can acquire a better grasp of the specific waste management difficulties and their ramifications in Jigjiga City. The visual representation of the unlawful dumping locations, old dump site, and current dump site emphasizes the current situation and the need for better waste management methods and policies.

5. Potential applications

The findings show that a comprehensive plan is required to address the challenges associated with solid waste management in these communities. Such a strategy should include the following elements.

1. Policies and initiatives to reduce exposure to environmental hazards, such as shifting dumping grounds to more remote places, directing resources to sustainable waste management systems, and guaranteeing access to safe drinking water and sanitary facilities.
2. Education campaigns, school-based programs, and community outreach projects focused at raising knowledge about health concerns and safe disposal techniques.

The study's findings can be used to establish and implement solid waste management policies and procedures in communities near dumpsites. For example, the government could enact a policy requiring all dumpsites to be at least 1 km away from residential areas. To limit the amount of waste disposed of in dumpsites, local governments should engage in composting and recycling initiatives. In addition, the government might start a public awareness campaign to educate people about the health dangers connected with solid waste exposure and advocate safe trash disposal procedures. Local governments could also form community groups to solicit feedback on trash management options.

The study's findings have larger ramifications for the subject of solid waste management, in addition to these specific applications. The study emphasizes the significance of evaluating the social and environmental implications of garbage management on communities, particularly marginalized groups. It also underlines the importance of participatory waste management systems that involve communities in the creation and implementation of solutions.

Overall, the findings of this study have the potential to greatly enhance solid waste management procedures in communities surrounding dumpsites and beyond.

6. Limitations of the study

The study was cross-sectional in nature, which means that data was obtained only at one moment in time. This makes forming conclusions regarding causality difficult. For example, the study found that people living near the dumpsite had greater incidence of respiratory diseases than those living in other locations. However, the study cannot conclusively infer that respiratory infections were caused by exposure to solid waste from the dumpsite. Other factors, such as socioeconomic position or access to healthcare, could also have had an impact.

Furthermore, the study was done in a single Ethiopian village, limiting the findings' generalizability to other populations living alongside dumpsites in Ethiopia or other regions of the world.

Finally, because the study relied on self-reported data, some individuals may have over- or under-reported their exposure to solid waste, understanding of the health consequences, or perceptions of waste management.

Despite these limitations, the study provides useful insights into the issues faced by people who live in close proximity to dumpsites. Furthermore, it emphasizes the need for increased study to improve understanding of the causal links between solid waste exposure



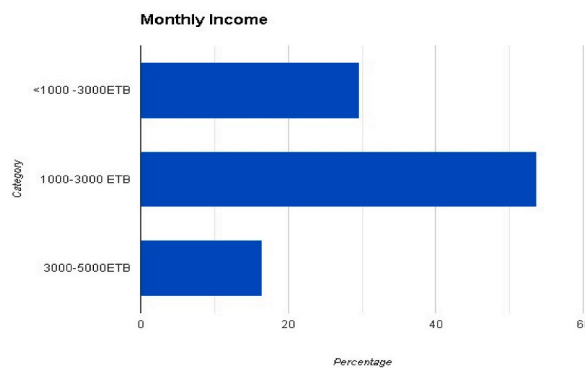
Fig. 1. unauthorized Waste dumping sites in Jigjiga city. Source: Field observation by researcher.



Fig. 2. Old Solid waste dump site in Jigjiga city Source: Field observation by researcher.



Fig. 3. current Solid waste dump site in Jigjiga city (the researcher) Source: Field observation by researcher.

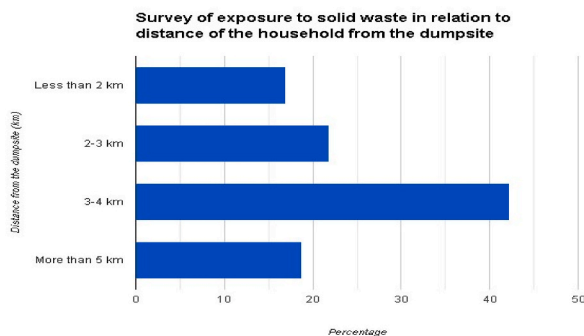


Graph 1. monthly income of respondents.

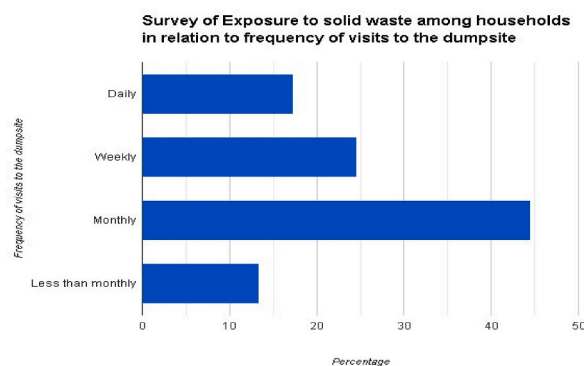
and health difficulties, as well as to develop effective treatments targeted at lowering exposure and improving health outcomes.

The following recommendations are made for future research on exposure, knowledge, and attitudes of household-level solid waste management among people who live near dumpsites.

1. Conduct longitudinal studies to track changes in exposure, knowledge, perceptions, and health outcomes over time.
2. Conduct studies in numerous populations across several countries to examine the applicability of the findings.
3. Use objective solid waste exposure measurements such as air quality monitoring and biomonitoring.



Graph 2. exposure to solid waste in relation to distance of household from the dumpsite.



Graph 3. Exposure to solid waste in relation to frequency of visits to the dumpsite.

4. Conduct qualitative investigations to learn about the lived experiences of people who live near landfills and their viewpoints on trash management.

By overcoming these constraints and widening the scope of the research, a more thorough understanding of the issues experienced by those living near dumpsites can be achieved. As a result, more effective interventions to improve their health and overall well-being can be designed.

7. Conclusion

The study, done in Jigjiga, Ethiopia, looked at the exposure, knowledge, and views of people living near a dumpsite on solid waste management at the household level. The findings demonstrated that these individuals were exposed to a variety of environmental dangers, were unaware of the health risks connected with solid waste exposure, and had negative views toward waste management.

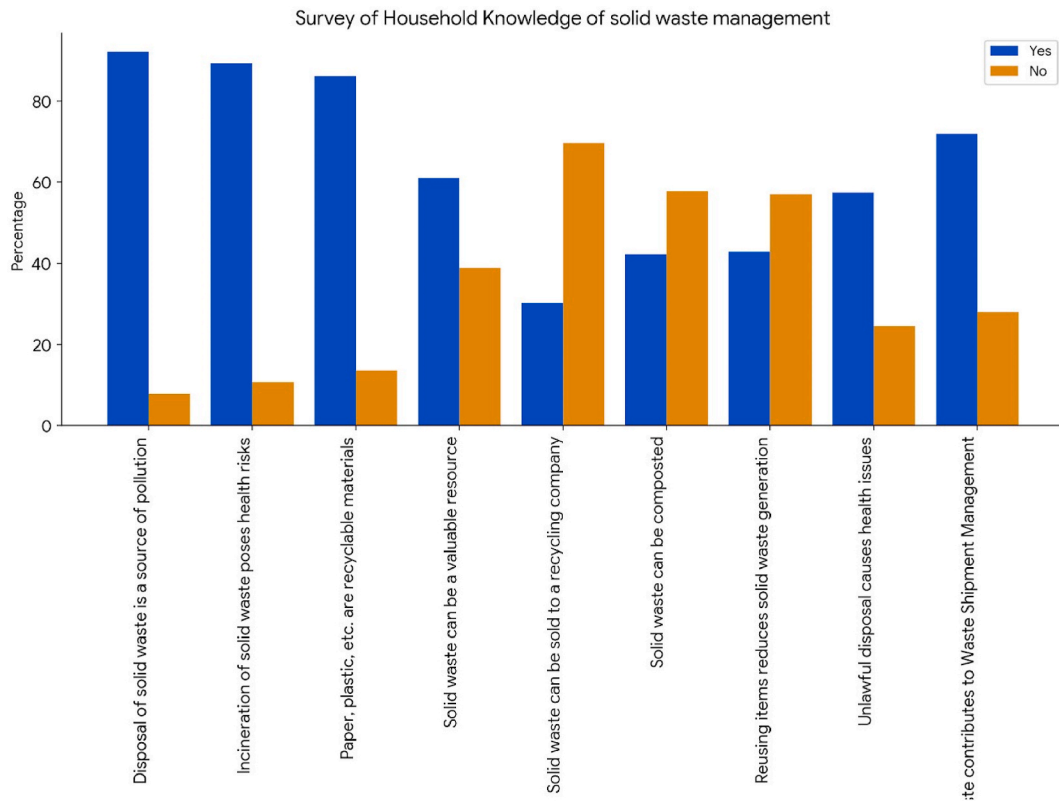
Based on the study’s findings, it is clear that a comprehensive approach is required to solve the issues that communities living near dumpsites confront in handling solid waste. This strategy should include the implementation of policies and practices targeted at lowering environmental dangers, as well as educational activities that raise knowledge of health problems and correct waste disposal processes. Furthermore, it is critical to actively involve these communities in the formulation and execution of waste management strategies.

Furthermore, the study’s consequences go beyond the scope of solid waste management. It emphasizes the importance of understanding the social and environmental consequences of waste management for communities, particularly marginalized people. Furthermore, the study emphasizes the need of using participatory waste management methods, which actively involve communities in the development and implementation of solutions.

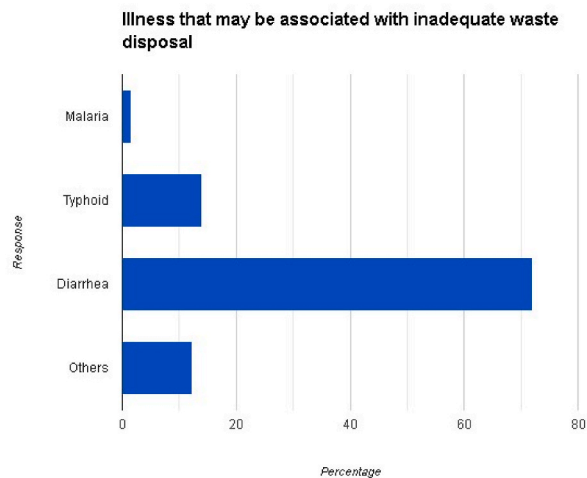
In conclusion, the findings of this study have the potential to greatly improve solid waste management procedures in communities near dumpsites and elsewhere.

Based on the study’s findings, the following recommendations are made.

1. Government officials should develop and implement policies and practices to reduce the environmental risks that people who live near dump sites experience. This could include relocating dumpsites to more isolated places, investing in sustainable waste management systems, and ensuring access to safe drinking water and sanitation services.

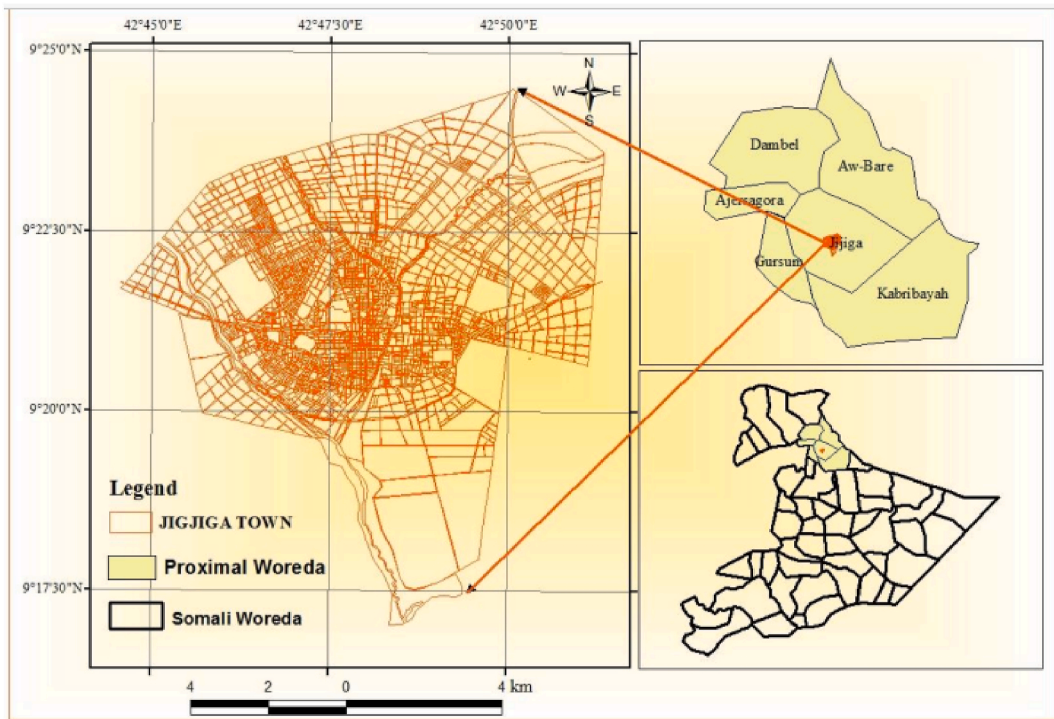


Graph 4. Household Knowledge of solid waste management.



Graph 5. illness that may be associated with inadequate waste disposal.

2. The government should create and implement a thorough public awareness campaign to inform the public about the health dangers connected with solid waste exposure and to promote proper waste disposal procedures.
3. Local governments should set up community committees to actively involve residents in the creation and implementation of waste management strategies. These committees will provide vital comments and insights into meeting the local community’s special demands and concerns.
4. More research is needed to better understand the causal relationships between solid waste exposure and health concerns. Furthermore, this study should focus on finding effective techniques for reducing exposure and improving overall health outcomes.



Map 1. Map of the study area.

These guidelines are intended to help policymakers and stakeholders develop policies that prioritize the well-being of people living near dump sites and promote sustainable waste management techniques.

To summarize, the study's findings highlight the need for comprehensive approaches, community engagement, and policy initiatives to solve the issues of solid waste management. Implementing the proposed solutions, governments can strive towards promoting healthier and more sustainable environments for communities affected by poor waste disposal practices.

Ethical considerations

The Jigjiga University Institutional Review Board approved the study. All subjects provided informed consent prior to data collection.

CRedit authorship contribution statement

Getaneh Haile Shoddo: Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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