Impact of Inadequate Environmental Sanitation Management on Human Health in the Niger Delta, Nigeria

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Abstract

Environmental sanitation refers to the practice of maintaining hygienic conditions in the environment to promote public health, enhance quality of life, and ensure sustainability. This study investigated the effects of poor environmental sanitation management on human health, the level of participation in environmental sanitation, and strategies for mitigating the impact of inadequate sanitation in the Niger Delta, Nigeria. The sample size consisted of 1,500 participants. Two hypotheses were formulated and tested at a 0.05 significance level. Data were collected using a questionnaire, and analyzed using simple percentage and weighted mean statistics. Chi-square tests were employed to test the hypotheses. The findings indicate that residents who lack knowledge of environmental education are not committed to sanitation programs in the study area. Additionally, poor environmental sanitation management has adverse effects on human health. The study also revealed that while the level of participation in environmental sanitation among residents is high, effective methods for mitigating environmental pollution include proper storage, collection, and disposal of refuse and sewage. Recommendations were made to alleviate the impact of environmental pollution.

Keywords: Environmental sanitation management, human health, Niger Delta, Environmental pollution

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1. Introduction

Cleanliness is about the most basic checks in humanlike existence. Improving pure environment is known for its compelling favorable outcome on well-being both in family and beyond neighborhood. A Healthy environment is the principles and practice of effecting healthful and germ-free situation in the surroundings to improve public well-being and welfare, improve quality of life and ensure a sustainable Environment. According to the Ministry of Local Government and Rural Development (MLGRD, 1999), healthy environment signifies efforts or actions geared at advancing and managing a serene, secure, and congenial solid environment in all human settlements.

Impoverished hygienic context of the surrounding require a good proliferated terrain for sickness inducing microorganisms. This condition causes the spreading of sicknesses particularly in humid regions such as Nigeria. Some of the humid sicknesses that have become complicated to manage because of the foul situation of our surrounding are; fever, cholera, diarrhea, lesser respirational epidemic as well as unexpected wounds. In some grown-up and minors under the age of five, one third of all epidemic is caused by the surrounding elements such as air adulteration and unsafe water, (WHO, 2022, Alaqarbeh *et al.,* 2022). In Nigeria, serene environment is usually a misunderstood theme. It is normally known as an exercise rather than a practice (Nwaerema *et al.* 2023). Surrounding situations in most regions jeopardize the gains made in community wellbeing over the last different decades. To enhance the overall surrounding cleanliness of the main cities in Nigeria has always comprised a huge menace to both governmental as well as individuals with the outcome that the towns cities are being choked by things induced by the people. The product of this situation is surrounding adulteration in all implication. The menace of adulteration has circulated into the political region and every community in every state has been confronted with complications of his surroundings (Haji *et al.* 2023).

In 2022, 57% of the global population (4.6 billion people) used a safely managed sanitation service.

Over 1.5 billion people still do not have basic sanitation services, such as private toilets or latrines.

Of these, 419 million still defecate in the open, for example in street gutters, behind bushes or into open bodies of water. In 2020, 44% of the household wastewater generated globally was discharged without safe treatment (UN Habitat and WHO, 2021). At least 10% of the world's population is thought to consume food irrigated by wastewater. Poor sanitation reduces human well-being, social and economic development due to impacts such as anxiety, risk of sexual assault, and lost opportunities for education and work (Ifyalem & Jakada, (2023). Poor sanitation is linked to transmission of diarrhoeal diseases such as cholera and dysentery, as well as typhoid, intestinal worm infections and polio. It exacerbates stunting and contributes to the spread of antimicrobial resistance (UNICEF and WHO, 2023).

Nigeria is a developing African nation, with a population of over 198 million people (Ezeudu *et al.,*

2019). It has many urban and urbanizing cities where the developments in hygienic practices, sanitation, public utilities and health at large need to be monitored and/or continuously evaluated (Aliyu *et al.,* 2017; Atangana & Oberholster, 2023; Ojo & Sohail, 2024). This has become necessary as access to urban sanitation and its accompanying challenges is now a major daunting task in most cities in the Global South locations. Hence, the need to proffer solutions to Nigeria's urban sanitation problems which are yet to receive adequate attention by stakeholders.

This attempt was aimed at revealing the country with the origin of the world health organization which then proclaimed June 1984 as the "World Environmental Sanitation Day"- with war against dirty surrounding as the subject matter. As a result of the militant characteristic of the execution of the current environmental cleanliness agenda inhabitants reacted correspondingly, but not without close supervision. Consciously or unconsciously, most of our town and cities were given some face-lift for some time.

The Environmental Cleanliness Task Force at the community governance level was comprised of members from various professions. Strict cleanliness standards were enforced on personnel, organizations, and corporate bodies that failed to meet government principles on maintaining a serene environment and healthy practices. For example, Delta State conducts environmental cleanliness drives on the last Saturday of each month. When these initiatives are not continuously monitored, the health outcomes of poor sanitary practices and the objectives of the environmental hygiene program are often misunderstood.

At the municipal government level, the Sanitation Task Force was also composed of members from diverse professions. Severe sanctions were applied to personnel, organizations, and corporate bodies that did not adhere to government directives on sanitation and healthful practices. Delta State's sanitation efforts occur on the last Saturday of each month, addressing issues such as waste disposal in prohibited areas. Without ongoing supervision, the hygienic implications of inadequate practices and the goals of the sanitation program can be misconstrued (Olaitan *et al.* 2022).

The menace of impoverish surrounding sanitization and un-healthful habits amidst the greater number of Nigerians have lingered in spite of the many strict steps adopted by government and other healthful organization to impose a transformation of character amidst the inhabitants. It is imperative to note too that all the while attention has been on the rural populace or residents that give tangibly to the city populace. It therefore signifies that the individuals home orientation would also be unconsciously exhibited in a new surrounding hence the neglect of the sanitization campaign at the ordinary people level has made the sanitization endeavor in most of our cities futile

A survey of the literature showed that limited data are currently available on the management of the

surrounding sanitization on the well-being of humans in the Niger Delta (Gilbert et al. 2017). The objectives of this research were to determine the cause and the impact of impoverish surrounding sanitization administration on human well-being, and to ascertain the level of surrounding cleanliness involvement by the community dwellers in the research area, with a view to providing knowledge on the ways of ameliorating the effect of surrounding pollution (Guérin et al. 2022).

2. Materials and Methods

2.1. Study Location

The study was conducted in four (4) communities in Delta State Nigeria's Warri South municipal authority district, from June to November 2021. There are four communities; Ode Itsekiri,Orugbo,Okere and Ekurede. The communities' locations are depicted on the map below Fig 1 research area is seen on a map of Warri South.
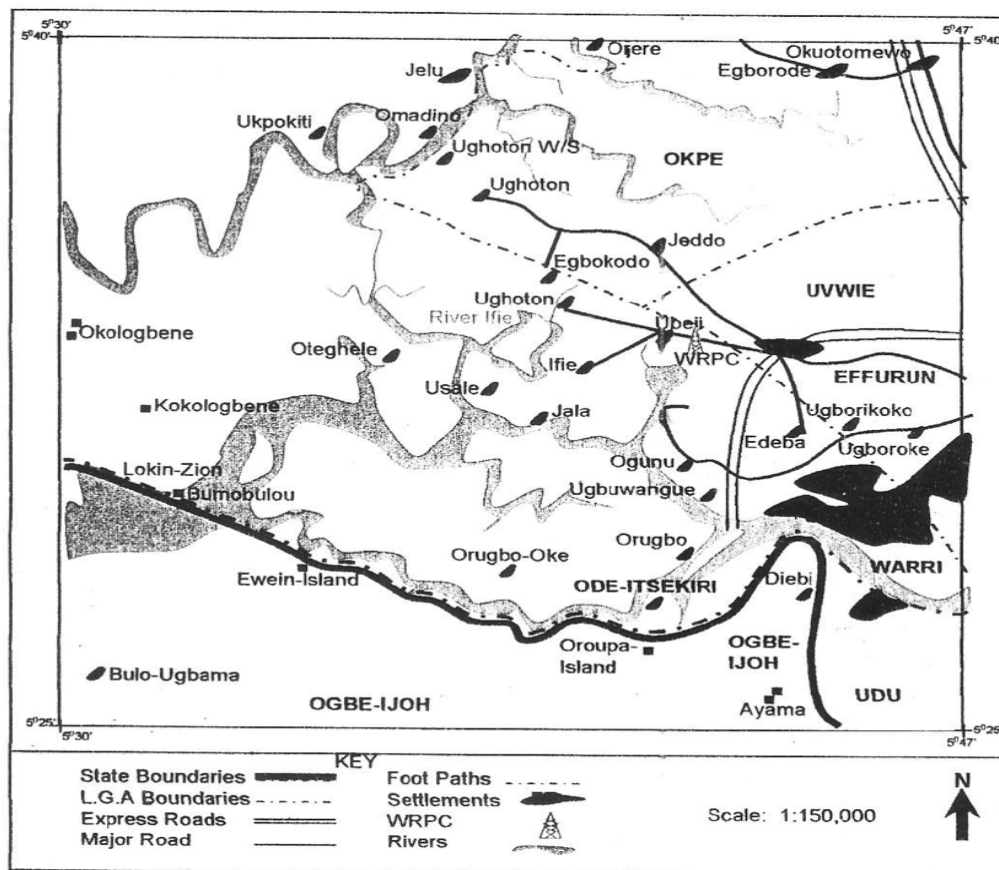
Fig 1: Map of Warri South Showing Study Area (Source: https://www.researchgate.net/figure/)

Nigeria's Niger Delta includes local authority region of Warri South. Near Warri is where its heart is. It is the commercialized nerve-wracking center of the Delta South Senatorial zone and is a crucial ocean port for the country. The area is primarily a canal with extensive tracts of mangrove forests and it is home to various industrialized organizations notably Nigeria's oil industry (Udoh et al. 2016).

2.2. Sampling Technique

For accuracy and validity of the results, this study focuses on several groups of residents from four neighborhoods in Warri South L.G.A. These groups include men, women, the elderly, adults, children, and taskforce members responsible for sanitation in Delta State. To effectively gather information for this inquiry, a total of 1,500 participants were involved. The number of residents in each community influenced the selection of the demographic sample. Specifically, at least 300 respondents from four villages in Warri South L.G.A. and 300 members of the Delta State sanitation taskforce were selected to participate in the survey.

Table 1: Distribution of Target Population

Communities	No. Sampled
Ode Itsekiri	300
Orugbo	300
Okere	300
Ekurede	300
Delta State environmental sanitation taskforce	300
Total	**1500**

2.3. Research Instrument

The study utilized a survey instrument for this assessment. The survey comprised two sections: A and B.

Section A gathered information on demographic factors and residents' personal details.

Section B aimed to elicit opinions from the population regarding the effects of inadequate environmental sanitation in the Warri South local government area. The survey was designed to collect responses in the manner described below.

SA – Strongly Agreed   =5

A – Agreed   =4

D – Disagreed   =3

SD–Strongly Disagreed   =2

U – Undecided   =1

The cut-off point was calculated as follows $\frac{5+4+3+2+1}{5} = \frac{15}{5} = 3.0$

The response whose mean score is below 3.0 is not accepted as agreed and the responses whose mean score is 3.0 and above are accepted as agreed.

2.4. The Instruments Legitimacy

Maiden model of the inspection outline was created and handed to the study examiner for review commentary and opinion the items in the poll were changed in reaction to his comments.

2.5. Validity of the Instrument

Maiden model of the inspection outline was created and handed to the study supervisor, for review, criticism, and suggestions. The items in the poll were changed in reaction to his statements.

2.6 Reliability of the Instrument

To ensure that the device developed will be dependable, a smaller sample of the same respondents was selected using the test retest method. The questionnaires were administered on the respondents and after 3 weeks, the same was re administered and the outcome of the two administration were calculated using simple percentage.

2.7 Data Analysis Techniques

Data gathered from the questionnaires were tabulated and grouped into specific problems areas based on the statement of problems. The responses were qualified and converted to percentages from which their distributions on each set of items were judged. The data in the Tables were interpreted using Chi-square formula to test the assumption for acceptability or refusal of the assumption, if the computed chi-square amount is lesser than the table value, we accept the hypothesis at 0.05 degree of significance. If the computed amount is greater than the probability value we refuse the assumption (Berends et al. 2012).

The formula

Chi-Square $\quad X^2 = \frac{\sum (F_0 - F_e)^2}{F_e}$ (Cochran, 1952)

Where: Fo is frequency observed

Fe is frequency expected

Simple Percentage $\quad \% = \frac{F}{N} \times \frac{100}{1}$

Where:

F = Frequency

N = Numbers of respondents

% = Percentage

Weighted Mean

X Ex/Ef

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Where:

Ex = Total Scores

Ef = Total Frequencies

X = Mean Scores

3. Results and discussion

3.1. Causes of Poor Environmental Sanitation Management in The Study Area.

1. **Table 2**: Responses on the Causes of Poor Environmental Sanitation Management

	Item	SA	%	A	%	D	%	SD	%	U	%
1	Those who lack knowledge of environmental education adopt poor means of disposing their waste.	501	33.4	570	38.0	120	8.0	131	8.7	18	1.2
2	Duelers who lack knowledge of environmental education do not understand the implication of poor sanitation on health.	504	33.6	520	34.7	201	13.4	156	10.4	19	1.3
3	People who lack knowledge of environmental education care less about their environmental conditions.	459	30.6	536	35.7	191	12.7	192	12.8	22	1.5
4	Resident duelers who lack knowledge of environmental education are not committed to environmental sanitation programs.	593	39.5	494	32.9	114	7.6	190	12.7	9	0.6
5	People who lack knowledge of environmental education dispose their waste in drainages when they have premonition of rainfall.	471	31.4	511	34.1	198	13.2	197	13.1	23	1.5

Table 2 Item 1 showed that 71.4% of respondents agreed or strongly agreed with the statement that people who don't know about environmental education are more likely to dispose of their garbage improperly, while 16.7% disagreed or strongly disagreed. Additionally, 1.2% of those surveyed were undecided. Item 2 indicated that 68.3% of respondents agreed or strongly agreed that individuals who are unaware of environmental education do not understand the negative effects of poor sanitation on health, whereas 23.8% disagreed or strongly disagreed with the statement, and 1.3% were unsure.

Item 3 showed that 66.3% of residents agreed or strongly agreed that people who lack knowledge of environmental education care less about their environmental conditions, while 25.5% disagreed or strongly disagreed, and 1.5% were undecided. Items 4 and 5 revealed that 72.4% of community members agreed or strongly agreed that residents who are not aware of environmental education are not committed

to environmental sanitation programs. In contrast, 0.6% of respondents were unsure, and 20.3% disagreed or strongly disagreed with the statement.

Finally, Item 5 showed that 65.5% of respondents agreed or strongly agreed that people who lack knowledge of environmental education dispose of their waste in drainages when anticipating rainfall, while 26.3% disagreed or strongly disagreed, and 1.5% were undecided.

The research indicates that Item 4 has the highest percentage, 72.4%. Consequently, residents in the study area who are unaware of environmental education are not dedicated to environmental sanitation programs. The analysis of the first set of findings revealed that the lack of environmental education and the ineffective policies of local governments in Warri South are the main causes of the area's poor environmental sanitation. The study's conclusions suggest that inadequate methods of disposing of trash, ignorance of the negative effects of poor sanitation on health, indifference to the state of the environment, and dumping waste into drainages all contribute to the poor sanitation of the surrounding area. This is in line with the findings of (Yoada *et al*. 2014), who verified that there is a growing perception that inadequate waste management practices result from ignorance of the importance of proper sanitation. The respondents thought that drainage dumping, negligent trash disposal, non payment of waste management fees, and disdain for warning signs against negligent waste disposal were the main causes of the impoverished surrounding sanitization.

3.2. The Impact of Poor Environmental Sanitation Management on the Health of Humans in the Study Area

Regarding the sanitization program, 67.3% of respondents agreed and strongly agreed that it controlled the negative health attitudes, particularly with regard to littering and refuse disposal (see Table 3 above, Item 1), whereas 18.2% of respondents disagreed and strongly disagreed with the statement. 1.3% of residents were unsure. As stated in item 2 above, 61.0% of respondents agreed and strongly agreed that poor sanitization aids in the spread of illnesses, compared to 24.5% who disagreed and strongly disagreed and 1.2% who were unclear. Item 3 revealed that, of the respondents, 64.8% agreed and strongly agreed that poor sanitization shortens people's lives and decreases their quality of life, whereas 1.2% were unclear and 21.7% disagreed and severely disagreed. Regarding item 4, 71.2% of participants concurred and strongly concurred that inadequate sanitation practices lead to an unclean environment. In contrast, 14.5% strongly disagreed with the statement and 1% expressed uncertainty. Finally, Item 5 showed that, while 19.4% disagreed and strongly disagreed with the statement, 1.5% were unsure, and 65.8% of respondents agreed and strongly agreed that a lack of cleanliness contributes to the growth or spread of bacteria and diseases.

Table 3: Responses on the Impact of Poor Environmental Sanitation Management on the Health of Humans

	Item	SA	%	A	%	D	%	SD	%	U	%
1	The environmental sanitation programme controlled the poor health attitudes, especially as regards littering and refuse disposal	465	31.0	544	36.3	163	10.9	109	7.3	19	1.3
2	transmission of diseases is linked to Poor sanitation	493	32.9	421	28.1	201	13.4	167	11.1	18	1.2
3	Poor sanitation reduces human well-being and life spans	496	33.1	476	31.7	181	12.1	129	8.6	18	1.2
4	dirty environment is caused by Poor sanitation	572	38.1	496	33.1	100	6.7	117	7.8	15	1
5	Poor sanitation causes breeding or transfer of bacteria and pathogens	499	33.3	488	32.5	146	9.7	145	9.7	22	1.5

The analysis that follows indicates that item 4 has the highest percentage (71.2%). That is to say, the main reason for a dirty atmosphere is insufficient sanitization. The findings are consistent with the research of (Olaitan *et al*. 2022), who examined the cholera pandemic in Nigeria and promoted environmental sanitation practices to promote good health. They found that a number of factors, including inadequate living conditions and a dearth of WASH services, contribute to the prevalence of cholera in Nigeria.

The analysis of study question two indicates that inadequate environmental sanitation management has a negative impact on human health. An individual's environment has a significant impact on their general health. Actually, a lot of diseases that affect humans may be traced back to unhealthy environmental factors such air, water, and soil pollution, poor housing, the presence of animal reservoirs, and insects that can spread diseases that could be hazardous to humans (Adenrele *et al*. 2017; Laita *et al*., 2024). Item 1 in Table 4 above shows that, while 18.1% disagreed and strongly disagreed with the statement, 1.3% were unsure, and 74.0% of respondents agreed and strongly agreed that all community members participate in the environmental cleanliness program. Regarding item 2, sixty-one percent of respondents agreed and strongly agreed, while twenty-four percent disagreed and strongly disagreed and two percent were undecided. Item 3 indicated that 64.8% of respondents agreed and strongly agreed that taking part in the environmental cleanliness program is necessary, whilst 1.2% were doubtful and 21.7% disagreed and strongly disagreed with the answer. In reference to item 4, 67.2% of participants concurred and

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strongly concurred that they collaborate to avert fines or penalties, whereas 17.9% disagreed and strongly disagreed with the statement and 1.6% expressed uncertainty.

3.3. The Level of Environmental Sanitation Participation by The Residents in the Study Area.

Table 4: Responses on the Level of Environmental Sanitation Participation

		SA	%	A	%	D	%	SD	%	U	%
1	All members of the community take part in the environmental sanitation programme	565	37.7	544	36.3	113	7.5	159	10.6	19	1.3
2	The sanitation exercise is regularly carried out in your area	493	32.9	421	28.1	201	13.4	167	11.1	18	1.2
3	It is mandatory to participate in the environmental sanitation programme	496	33.1	476	31.7	181	12.1	129	8.6	18	1.2
4	Do you participate because of fines/punishment?	512	34.1	496	33.1	145	9.7	123	8.2	24	1.6
5	Environmental sanitation has made some significant impact on the health development of the community	399	26.6	488	32.5	196	13.1	195	13.0	22	1.5

Item 5 showed that 59.1% of local residents agreed and strongly agreed that they believe environmental sanitation has had a significant impact on the community's development of health, whereas 26.1% of respondents disagreed and strongly disagreed with the statement. 1.5% of respondents were undecided. With Item 1 having the highest value at 74%, it can be concluded from the data that a sizable majority of people in the research region practice environmental sanitation. 41% of respondents observed monthly sanitation, 24% participated in weekly sanitation, 19% participated in daily sanitation, and 16% did not practice any form of environmental sanitation, according to (Ayuba *et al*. 2018). This agrees with what they discovered.

3.4 Ways of Ameliorating the Effect of Environmental Pollution.

67.3% of respondents agreed and strongly agreed, as indicated by Table 5 above, item 1, that dumping of garbage at a dumpsite is a means to decrease the consequences of pollution on the environment. In contrast, 18.2% disagreed and strongly disagreed, and 1.3% were unsure. One strategy to reduce the consequences of pollution on the environment is to avoid negligent garbage disposal, as stated by 61.0% of respondents to item 2 in the above table.

Table 5: Responses on the Ways of Improving the Effect of Environmental Pollution

	ITEM	SA	%	A	%	D	%	SD	%	U	%
1	Dumping of refuse at recommended dumpsite	465	31.0	544	36.3	163	10.9	109	7.3	19	1.3
2	Avoiding indiscriminate waste disposal	493	32.9	421	28.1	201	13.4	167	11.1	18	1.2
3	Payment of waste management fees	496	33.1	476	31.7	181	12.1	129	8.6	18	1.2
4	Abiding by the sign "do not dump refuse here"	572	38.1	496	33.1	100	6.7	117	7.8	15	1
5	Proper and efficient method of refuse and sewage storage, collection and disposal.	499	33.3	488	32.5	146	9.7	145	9.7	22	1.5

By comparison, 1.2% of respondents were unsure, and 24.5% disagreed and disagreed strongly with the assertion. However, item 3 in the above mentioned table shows that, of the respondents, 64.8% agreed and strongly agreed that paying waste management fees is a strategy to reduce the impact of pollution on the environment, whereas 1.2% were unsure and 21.7% opposed and strongly disagreed with the statement. Item 4 in the above table shows that, of the residents, 71.2% strongly agreed or agreed that they adhere to the "do not dump refuse here" sign in order to lessen the impact of pollution on the environment, while 14.5% disagreed and 1% were unclear.

Lastly, item 5 in the above table showed that 65.8% of respondents agreed and strongly agreed that appropriate and efficient methods of storing, collecting, and disposing of waste and sewage are a way to lessen the effect of environmental pollution, while 19.4% of respondents disagreed and strongly disagreed with the statement. 1.5% of respondents were undecided.

The analysis that follows leads to the conclusion that employing suitable and efficient techniques for the collection, storage, and disposal of waste and sewage can help lessen the effects of environmental contamination.

This is congruent with the work of (Nwaerema *et al.* 2022), who recommended that communal facilities be provided by the government and Community Based Organizations (CBOs), that environmental education be offered, that environmental regulations be upheld in the city, and that other recommendations of a similar nature be made. According to (Yoade 2019), adopting rehabilitation techniques that involve community engagement is dependent on acknowledging that one of the most significant and critical approaches to address the current condition of sanitation challenges is through community participation in sanitation practices.

3.5. Testing of Hypothesis

$H0_1$: Poor environmental sanitation management does not have a significant effects on the environment

$H1_1$: Poor environmental sanitation management have a significant effects on the environment

Table 6 : Using item 3 of **Table 3**

	fo	fe	fo-fe	$(fo-fe)^2$	$(fo-fe)^2/fe$
SA	496	300	196	38416	128.05
A	476	300	176	30976	103.25
D	181	300	-119	14,161	47.20
SD	129	300	-171	29,241	97.47
U	18	300	-282	79524	265.08
TOTAL	1500				641.05

$X^2 = \frac{(fo-fe)^2}{fe}$ = calculated *value X^2 = 641.05*

Expected is calculated by dividing total observed frequency by the number (n).

n = 5

$$Fe = \frac{1500}{5} = 300$$

Degree of Freedom df = n – 1

Df = 5 – 1 = 4

The table value X^2 at 0.05 level of significance for four degree of freedom is 9.488

Since the calculated value X^2 is greater than table value the researcher reject the null hypothesis and accept alternate hypothesis. Therefore, Poor environmental sanitation management have a significant effects on the environment.

Hypothesis 2

$H0_2$: Poor environmental sanitation management does not have a significant effects on health of Humans.

$H1_2$: Poor Environmental sanitation management have a significant effects on health of Humans

Table 7: Using **Table 3** item 5

	fo	fe	fo-fe	$(fo-fe)^2$	$(fo-fe)^2/fe$
SA	499	300	199	39,601	132.00
A	488	300	188	35,344	117.81
SD	145	300	-155	22,025	80.08
D	146	300	-154	23,716	79.05
U	22	300	-278	77,284	257.61
TOTAL	**1500**				**666.55**

$X^2 = \frac{(fo-fe)^2}{fe}$ = calculated *value X^2 = 666.55*

Expected is calculated by dividing total observed frequency by the number (n).

n = 5

$$Fe = \frac{1500}{5} = 300$$

Degree of Freedom df = n – 1

Df = 5 – 1 = 4

For four degrees of freedom, the table value X^2 at the 0.05 level of significance is 9.488. The researcher accepts the alternative hypothesis and rejects the null hypothesis since the computed value of X^2 is bigger than the value in the table. Thus, improper environmental sanitation management has a big impact on people's health.

Conclusion

The study found that inadequate management of environmental sanitation leads to a high rate of infectious disease transmission and environmental contamination, significantly impacting both the environment and human health. Residents in the study area practice environmental sanitation to a high degree. Effective methods for mitigating the negative effects of pollution include storing, gathering, and properly disposing of trash and sewage.

Conflict of Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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