

SOLID WASTE AND ITS NEGATIVE IMPACT - A COMPARATIVE STUDY OF THIRUVALLA AND PATHANAMTHITTA MUNICIPALITIES IN KERALA.

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Abstract:

In a developing country like India systematic solid waste management is growing at snail's pace. It is accountable for a series of problems such as low sanitation level, air pollution, water pollution, environmental degradation and lot of health issues to humans and animals. As a densely populated state, those issues are intensive in Kerala. Highly populated municipalities of Kerala are suffocating for a properly managed solid waste system. The study compares the two major municipalities in Pathanamthitta district of the state, Pathanamthitta and Thiruvalla in respect of negative impact of improper solid waste management. It tries to bring out the which municipality performs better and which one weaker with reference to environmental pollution, air pollution, water pollution, noise pollution and health issues. The study reveals that with respect to air pollution and eye disease Thiruvalla is comparatively more affected and in all other cases Pathanamthitta Municipality is more affected.

1. Introduction

Any form of material in solid form which is rejected by the first user is solid waste. Hence, they are essentially not wastes in liquid form. Solid wastes are also called refuse or trash. Many European countries are managing solid waste in a very systematic manner hence is the case with other developed countries. In India waste management is getting its momentum in a very slow pace. Even though the central government is taking urgent steps to control the generation and the safe processing and disposal of waste through programmes like Swach Bharat Mission they couldn't hit the target as expected. The prospects of waste management in the state of Kerala are also bleak. The population density of Kerala is comparatively three times the national average. Hence the state experiences extreme scarcity of free space for proper treatment and disposal of waste. In spite of highly educated population the environmental sanitation level in the state is pathetically low. It is highly contradictory that the people are in the clutches of NIMBY Syndrome and their household sanitation level is very high. Municipalities of Kerala are stinking from one to the other because of uncontrolled littering of waste, unplanned transportation, treatment and disposal. It is creating a variety of problems to the inhabitants in the form of health issues, air pollution, water pollution and noise pollution. Therefore municipal solid waste management is a critical area to be addressed in the present context in the state of Kerala.

2. Statement of the Problem

The environmental sanitation level of municipalities of Kerala is surprisingly low. People do not realize the fact that waste generators are responsible for waste management. They blindly cast upon the responsibility on the shoulders of the municipal authorities and blaming them irresponsible. The inhabitants throw away waste in certain spots earmarked and escape from their responsibility of waste treatment and disposal. Municipalities do not possess the facilities to treat such a huge quantity of daily waste. This unplanned waste management system paves way for a lot of environmental and health problems to the residents in the surroundings. Health problems due to solid waste range from minor lungs diseases to severe cancer. Pollution includes mainly air, water and noise pollution leading to contamination of essential ingredients meant for human and animal consumption. Being declared as the cleanest district in India in terms of air quality index, Pathanamthitta is deliberately selected to conduct the present study. The two major municipalities Thiruvalla and Pathanamthitta are compared in terms of negative impact of solid waste and the problem is stated as **“SOLID WASTE AND ITS NEGATIVE IMPACT - A COMPARATIVE STUDY OF THIRUVALLA AND PATHANAMTHITTA MUNICIPALITIES IN KERALA”**.

3. Objectives of the Paper

The overall objective of the study is to make a comparative study of the two municipalities Thiruvalla and Pathanamthitta in terms of negative impact of solid waste.

1. To compare the environmental impact of the two municipalities Thiruvalla and Pathanamthitta.
2. To compare the levels of air, water and noise pollution of the two municipalities.
3. To compare the health issues affecting the residents of the region due to mismanagement of solid waste.

4. Methodology and Sampling Design

The Paper uses both primary and secondary data. Secondary data is collected from different published sources of various Government Departments, other Agencies and Municipal Authorities. For the purpose primary data collection, two major municipalities in Pathanamthitta District, Thiruvalla and Pathanamthitta are selected. Primary data is collected from residents who are living in the municipal limits by simple random sampling method in proportion to the total population of the two municipalities. A structured questionnaire is used in the study to assess the negative impact of solid waste.

5. Tools Used for Data Analysis

The tools used for analysis of primary data consist of Arithmetic Mean, Standard Deviation, and Independent Sample t-test.

6. Negative Impact of Solid Waste Management

The Negative Impact of solid waste on the two municipalities are examined by using four parameters namely, Environmental Impact, Air Pollution, Water Pollution and Noise Pollution. For the purpose, information is gathered through a Questionnaire from eighty residents from Thiruvalla and sixty nine from Pathanamthitta. The respondents are selected by Simple Random Sampling. The selection of the ratio 80:69 is fixed based on the proportion of total number of residents on these two municipalities. The Negative Impact is analyzed by using t-test.

Table 1: Group Statistics – Negative Impact of Solid Waste

Negative Impact	Name of the Municipality	N	Mean	Std. Deviation	Std. Error Mean
Environmental Impact	Thiruvalla	80	44.8500	5.99388	.67014
	Pathanamthitta	69	47.2754	7.49683	.90251
Air Pollution	Thiruvalla	80	22.3125	2.15591	.24104
	Pathanamthitta	69	22.3043	4.70076	.56591
Water Pollution	Thiruvalla	80	23.2375	5.33497	.59647
	Pathanamthitta	69	24.9275	6.84561	.82411
Noise Pollution	Thiruvalla	80	3.3750	2.35127	.26288
	Pathanamthitta	69	5.1449	4.29526	.51709

Source: Primary Data

From Table 1 it is seen that with respect to Environmental Impact the Mean Score of Thiruvalla is **44.85** while that of Pathanamthitta is **47.28**. Hence the environmental issues due to solid waste is comparatively higher in Pathanamthitta. Similarly, Water Pollution and Noise Pollution are higher in Pathanamthitta with Mean Scores **24.93** and **5.14** respectively while in Thiruvalla they are only **23.24** and **3.38** respectively. Comparatively Air Pollution is lesser in Pathanamthitta with a Mean Score of **22.30** while in Thiruvalla it is **22.31**.

Now it is required to test whether there is significant variation in negative impact of solid waste management between Thiruvalla and Pathanamthitta Municipalities. T-test is used for it by framing the following hypothesis

H0: There is no difference in the mean scores of Environmental Impact, Air Pollution, Water Pollution and Noise Pollution between Thiruvalla and Pathanamthitta Municipalities.

H1: There is difference in the mean scores of Environmental Impact, Air Pollution, Water Pollution and Noise Pollution between Thiruvalla and Pathanamthitta Municipalities.

Table 2: Significance of t Values

	Municipality	t	df	Sig. (2-tailed)
Environmental Impact	Thiruvalla	66.927	79	.000*
	Pathanamthitta	52.382	68	.000*
Air Pollution	Thiruvalla	92.568	79	.000*
	Pathanamthitta	39.414	68	.000*
Water Pollution	Thiruvalla	38.959	79	.000*
	Pathanamthitta	30.248	68	.000*
Noise Pollution	Thiruvalla	12.839	79	.000*
	Pathanamthitta	9.950	68	.000*

Source: Primary data

*Significant at 5% Level of Significance

In the above Table the significance level is tested by using t-test. All values referred above that is, Environmental Impact, Air Pollution, Water Pollution and Noise Pollution are significant at 5% level of significance as $p < 0.05$ (vide last column of Table 2). Hence the null hypothesis is rejected and the mean values vary significantly between two municipalities.

Table 3 - One-Sample Statistics-Comparative Health Problems

Health Issues		N	Mean	Std. Deviation	Std. Error Mean
Respiratory problems	Thiruvalla	80	1.2500	.84942	.09497
	Pathanamthitta	69	1.3188	.75718	.09115
Water Borne Diseases, Cholera	Thiruvalla	80	1.0875	.42676	.04771
	Pathanamthitta	69	1.2609	1.07993	.13001
Water Borne Diseases, Dysentry	Thiruvalla	80	1.0875	.67868	.07588
	Pathanamthitta	69	1.4638	1.38882	.16719
Water Borne Diseases, Typhoid	Thiruvalla	80	1.0875	.48244	.05394
	Pathanamthitta	69	1.3333	1.13328	.13643
Water Borne Diseases, Hepatitis	Thiruvalla	80	1.0750	.56870	.06358
	Pathanamthitta	69	1.3043	1.27538	.15354
Water Borne Diseases, Diarrhea	Thiruvalla	80	1.0125	.11180	.01250
	Pathanamthitta	69	1.4058	1.38605	.16686
Eye Diseases	Thiruvalla	80	1.1625	.78666	.08795
	Pathanamthitta	69	1.0870	.28384	.03417
Skin Diseases	Thiruvalla	80	1.1625	.71942	.08043
	Pathanamthitta	69	1.1739	.38181	.04596
Congenital Abnormalities	Thiruvalla	80	1.0750	.49746	.05562
	Pathanamthitta	69	1.1159	.67598	.08138
Dengue Fever	Thiruvalla	80	1.1125	.71146	.07954
	Pathanamthitta	69	1.6087	1.72539	.20771
Chikungunya	Thiruvalla	80	1.0750	.41415	.04630

	Pathanamthitta	69	2.3043	2.19159	.26384
Malaria	Thiruvalla	80	1.0750	.47133	.05270
	Pathanamthitta	69	1.3478	1.41240	.17003

Source: Primary Data

It is visible from Table 3 that according to the opinion of respondents selected for the study health problems such as Respiratory Problems, Cholera, Dysentery, Typhoid, Hepatitis, Diarrhea, Skin Disease, Congenital Abnormalities, Dengue Fever, Chikungunya and Malaria are higher in Pathanamthitta Municipal limits (*Mean Scores 1.32, 1.26, 1.46, 1.33, 1.30, 1.41, 1.17, 1.12, 1.61, 2.30 and 1.35 respectively*) compared to Thiruvalla. Eye disease as a health problem is found higher in Thiruvalla with *Mean Score 1.16* as compared to Pathanamthitta Municipality (*Mean Score 1.09*).

Now whether there is significant difference in health problems between Thiruvalla and Pathanamthitta municipalities has to be tested by using t-test. The following hypothesis is formulated;

H0: There is no variation in the mean scores of health problems between Thiruvalla and Pathanamthitta Municipalities.

H1: There is variation in the mean scores of health problems between Thiruvalla and Pathanamthitta Municipalities.

Table 4: One-Sample t Test Thiruvalla Municipality

Health Issues	t	df	Sig. (2-tailed)
Respiratory problems	13.162	79	.000*
Water Borne Diseases, Cholera	22.793	79	.000*
Water Borne Diseases, Dysentery	14.332	79	.000*
Water Borne Diseases, Typhoid	20.162	79	.000*
Water Borne Diseases, Hepatitis	16.907	79	.000*
Water Borne Diseases, Diarrhea	81.000	79	.000*
Eye Diseases	13.218	79	.000*
Skin Diseases	14.453	79	.000*
Congenital Abnormalities	19.328	79	.000*
Dengue Fever	13.986	79	.000*
Chikungunya	23.217	79	.000*
Malaria	20.400	79	.000*

Source: Primary data

*Significant at 5% Level of Significance

Table 5: One-Sample t Test – Pathanamthitta Municipality

Health Issues	t	df	Sig. (2-tailed)
Respiratory problems	14.468	68	.000*

Water Borne Diseases, Cholera	9.698	68	.000*
Water Borne Diseases, Dysentery	8.755	68	.000*
Water Borne Diseases, Typhoid	9.773	68	.000*
Water Borne Diseases, Hepatitis	8.495	68	.000*
Water Borne Diseases, Diarrhea	8.425	68	.000*
Eye Diseases	31.810	68	.000*
Skin Diseases	25.539	68	.000*
Congenital Abnormalities	13.713	68	.000*
Dengue Fever	7.745	68	.000*
Chikungunya	8.734	68	.000*
Malaria	7.927	68	.000*

Source: Primary data

*Significant at 5% Level of Significance

While using t-test for testing significance at 5% level, it is seen that the variations are significant as $p < 0.05$ in all cases. It is shown in the above Tables (*vide last column of table 4 and 5*). Hence, the null hypothesis is rejected and it is proven that there is variation in the health problems between the two municipalities.

9. Findings of the Study

1. Environmental issues due to solid waste is higher in Pathanamthitta as compared to Thiruvalla.
2. With respect to Water Pollution Pathanamthitta records higher pollution levels as compared to Thiruvalla.
3. Noise Pollution also is higher in Pathanamthitta Municipality.
4. But in the case of Air Pollution Thiruvalla records a higher Mean Score hence, Air Pollution is comparatively higher in Thiruvalla.
5. While considering health problems such as Respiratory Problems, Cholera, Disentry, Typhoid, Hepatitis, Diarrhea, Skin Disease, Congenital Abnormalities, Dengue Fever, Chikungunya and Malaria are higher in Pathanamthitta Municipal limits.
6. But Eye Disease as a health problem is found higher in Thiruvalla.

10. Suggestions

From the study findings the following solutions are suggested;

1. Safe treatment and disposal of solid waste should be the immediate priority of municipalities which is not given primary importance currently.
2. Inhabitants of municipal limits believe that solid waste disposal and treatment is the responsibility of the municipal authorities which is a false notion and must be corrected by wide campaigning.
3. Integrated Solid Waste Management (ISWM) system should be implemented without delay so that all planning and operational activities of solid waste management will go hand in hand to a sustainable solution.

11. Conclusion

Kerala, the sunny, green state lying in the southern peninsular India is world famous for its scenic beauty. It really stands as the Mount Everest among other states of India in terms of human development indices such as literacy rate, child mortality rate, birth rate, gender ratio which are at par with advanced countries. In those terms it is rightly known as 'God's Own Country' but its solid waste management efforts are surprisingly pathetic. Kerala is stinking from city to city, town to town and village to village as of mismanaged solid wastes and the life of wild life and humans are equally under severe threat. Thrown away waste, scavenging animals and birds and untidy surroundings are reflections of a typical town of the state. Sustainable solid waste management, technically known as Integrated Solid Waste Management will find answers to the multiple problems prevailing in Kerala and authorities must strive for it in a war footing.

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