

## “A Case Study on comparison of health care development before and after implementation of mission ‘Swachh Bharat Abhiyan’ by Municipal Corporation, intended for Wardha city.”

S. N. Gandhare<sup>1\*</sup>, S. K. Narad<sup>2</sup>, N. N. Hiware<sup>3</sup>, Manoj Patil<sup>4</sup>, Punit Fulzele<sup>5</sup>

<sup>1</sup> Dept. of Mechanical Engineering, Datta Meghe Institute of Engineering Technology and Research, Sawangi(M), Wardha, India.

<sup>2</sup> Dept. of Computer Science Engineering, Datta Meghe Institute of Engineering Technology and Research, Sawangi(M), Wardha, India.

<sup>3</sup> PhD Scholar, Dept. of Chemistry, Bapurao Deshmukh College of Engineering, Sewagram, Wardha, India.

<sup>4</sup> Research Consultant, Jawaharlal Nehru Medical College, Datta Meghe Institute of Medical Sciences, Wardha

<sup>5</sup> Asso. Professor, Sharad Pawar Dental College, Datta Meghe Institute of Medical Sciences, Wardha

\*E-Mail: [gandhare.shirish@gmail.com](mailto:gandhare.shirish@gmail.com), TP: +91-9673992174

**Abstract:** In the mission of sanitation implemented by the government of India, a lot of developments & work regarding ‘Swachh Bharat Abhiyan’ are going on. Swachh Bharat Mission (SBM) is a nationwide campaign in India for the period 2014 to 2019<sup>1</sup>. Now, People are much health conscious and more aware of sanitation. The database is collected from AVBRH, Sawangi for no. of patients treated under-identified disease (for 2013-2018) & Wardha Municipal Corporation for Daily solid waste management. Chemical assessment of solid waste & its influence as a pollutant on human health is reviewed. Based on chemical parameters segregated from solid waste & its effect on human health, the comparison is carried out for no. of patients identified before & after implementation of Mission SBM. It is found that improvement in sanitation through solid waste management of Wardha city enhances human health. The study concludes that SBM is an approach that can improve sanitation & enhance human health.

**Keywords:** Chemical Parameter Assessment; Cause of disease; Human Health; Municipal Solid Waste Management; Swachh Bharat Mission; Solid waste Management.

### 1. Introduction

In the mission of sanitation by the government of India, the lot of developments & work regarding ‘Swachh Bharat Abhiyan’ is going on. Swachh Bharat Abhiyan (SBA) or Swachh Bharat Mission (SBM) is a nationwide campaign in India for the period 2014 to 2019 that aims to clean up the streets, roads, and infrastructure of India's cities, towns, and rural areas. <sup>1</sup> People are much aware of sanitation as well as health-conscious. Municipal Corporation is taking great efforts for the garbage collection & its disposal over the town & localities. With the help of the database maintained by the corporation, the daily garbage collection & disposal of plastic, biodegradable waste can be identified from the population in Wardha city. The municipality also disposes of that garbage after separation of it & through incineration plant. So, from those databases, we can also calculate & compare the percentage of daily use of plastic & biomaterial (degradable) waste. Reviewing those data, comparison of the health care enhancement before the implementation of mission ‘Swachh

Bharat Abhiyan’ & after accomplishment, it can be recognized. The study is an effort to conclude the solution towards the society through the statistical calculation of waste & implementation of the effective garbage disposal system.

‘Swachh Bharat Abhiyan’ is launched on 2<sup>nd</sup> October 2014. The solid waste management & its disposal through incineration plant or landfill are carried out daily. With the help of the database maintained by the corporation, the daily solid waste collection & disposal of plastic, biodegradable waste can be identified from the population for Wardha city.

Wardha Municipal Corporation identified Physical parameters (types of solid waste) & chemical assessment of those solid wastes per kilogram while preparing an annual report for ‘Swachh Sarvekshan 2019’. Bad sanitation (soil pollution) is one of the reasons for infection & bacterial disease affects (society) human health. The extraction of chemicals from solid waste is one of the causes of disease as an environmental pollutant.

The data for year-wise number of the patient due to particular disease treated by Acharya Vinoba Bhave Rural Hospital, Sawangi (Meghe) is collected. The comparison of the number of patients affected due to the defined chemical parameter is reviewed before & after the implementation of mission SBM. As the corporation trying to achieve good sanitation & disposal of solid waste, it indirectly accomplishes the health of society. This is an approach to enhance human health.

## 2. Characterization of Wastes

Solid waste are characterized based on following parameters [1]

- Their sources
- By the types of wastes produced
- By generation rates and composition.

Accurate information in these areas is necessary to monitor and control existing waste management systems and to make regulatory, financial and institutional decisions.

## 3. Type of Solid Waste

Depending on their source the solid waste may of different type such as [2, 3] Residential waste

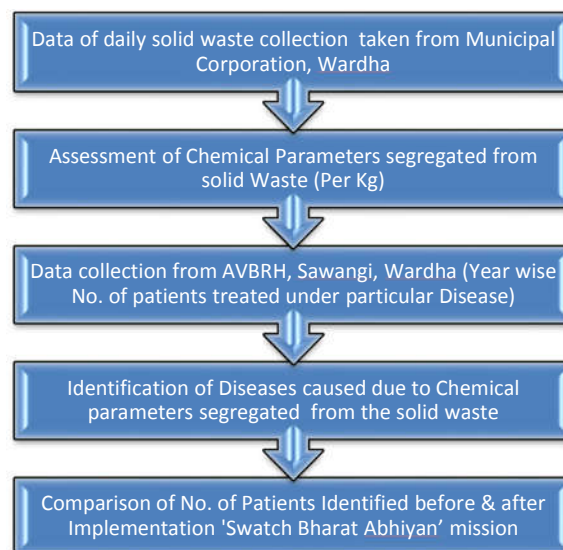
- Industrial
- Institutional
- Construction and demolition
- Municipal services

## 4. Solid Waste Treatment

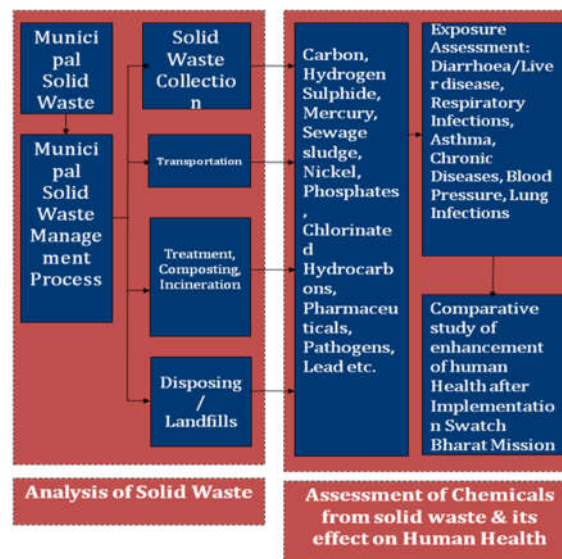
Current treatment strategies are directed towards reducing the amount of solid waste that needs to be Land filled, as well as recovering and utilizing the materials present in the discarded wastes as a resource to the largest possible extent. Different methods are used for the treatment of solid waste and the choice of proper method depends upon refuse characteristics, the land area available and disposal cost they are as follows [3].

- Incineration
- Compaction
- Pyrolysis
- Gasification
- Composting

## 5. Methodology of Work



## 6. Study Framework



## 7. Discussion

The putrefaction of waste into constituent chemicals is a common source of local environmental pollution. In this case study comparison of the effect on human health before and after the implementation of Mission 'SBM' has been carried out. So, the database from the Municipal Corporation of the wardha city has been collected. Table 1 shows the average waste per Kilogram of solid waste collected from various areas. The difficulty is especially in the separation of solid waste and categorization in the form of a chemical parameters to assess solid waste which can evaluate the main chemical element segregation

which is the main reason behind the soil pollution [Table 2].

The solutions as landfills, incarnation as per the policy of SBM in the small town and cities have been not accomplished due to delay in implementation of the mission by the Corporation. The problem is again compounded by the issues associated with the collection of solid waste & its disposal. A major environmental concern is gas release by decaying garbage from market areas, social places where people throw the garbage. In this sense, a study has been carried out to characterize chemical parameter which is the impactful parameter to influence human health. All the types of Solid waste have the number of elements that are the main constituent as a pollutant which influences human health. Just take an example, Methane is a by-product of the anaerobic respiration of bacteria, and these bacteria thrive in landfills with high amounts of moisture. Methane concentrations can reach up to 50% of the composition of landfill gas at maximum anaerobic decomposition [3]. Another problem extraction of gasses is the contribution to the enhanced greenhouse gas effect and climate change which may result in viral infections & health issues related to the respiratory system.

From the discussion and study of chemical parameter characterization, a responsible parameter can be identified. From the below bar graph it can be studied that issues related to health may or may not be categorized but solid waste management influences the human/public health and if solid waste management can control the use of particular material may decrease the disease which is very important to social health. Also, the study can convey the message, if more effort taken that very effective while implementing of the mission like 'SBM' may result in minimization of infection and control the situation.

Table 1: Solid Waste Generation from various sources at Wardha City

Sr. No	Waste Generator	No. of generator	Avg. Waste Per Day in Kg	Total Waste in Kg	Total Waste in Tons
1	Household & slums (secondary collection)	27366	0.85	23261	23.26

2	Hotels & Restaurants	160	20.0	3200	3.20
3	Institutions	217	10.0	2170	2.17
4	Slaughter House	1		200	0.20
5	Market Waste	2	2500.00	5000	5.00
6	Road sweeping		73.00	2170	2.17
7	Construction & Drainage Waste		22.00	1200	1.20
<b>Total</b>					<b>37.2</b>

Table2: Physical Parameters and Methodologies for Assessment of Solid Waste

Sr. No.	Parameter	Unit	Residential Area	Dumping Yard Fresh Waste	Dumping Yard Old Waste	Market
1	Moisture	%	36	36.2	9.3	26
2	Ash Content	%	87.8	81.61	81.26	67.56
3	Total Volatile Content	%	12.2	18.39	18.74	32.44
4	Total Organic Carbon	%	7.14	7.21	7.39	7.23
5	Calorific Value	cal/gm	2738.18	2932.26	3125.69	3345.85
6	C/N Ratio	-	17.55	16.73	18.44	15.6
7	Total Nitrogen	mg/kg	44480	3220	3080	5320
8	Total Phosphates as P <sub>2</sub> O <sub>5</sub>	mg/kg	4230	3341	5927	7301
9	Total Potassium as K <sub>2</sub> O	mg/kg	5121	5569	6176	6778
10	pH (1:2.5 Ratio at 25°C)	%	7.14	7.21	7.39	7.23
11	Arsenic (As)	mg/kg	BDL	BDL	BDL	BDL
12	Nickel (Ni)	mg/kg	11.35	9.15	7.75	6.95
13	Zinc (Zn)	mg/kg	27.15	64.85	20.6	13.95
14	Cadmium (Cd)	mg/kg	BDL	BDL	BDL	BDL
15	Copper (Cu)	mg/kg	16.6	17.15	23.25	15.7
16	Chromium (Cr+6)	mg/kg	20.7	26.25	15.4	19.65
17	Mercury (Hg)	mg/kg	BDL	BDL	BDL	BDL

Table3: Chemical Parameter Characterization of Solid Waste

Sr. No.	Parameter	Unit	Residential Area	Dumping Yard Fresh Waste	Dumping Yard Old Waste	Market
1	Plastic, Plastic Bags, Tetra Packs etc.	%	13.16	15.44	20.3	17.3
2	Paper Waste	%	11.14	12.35	9.68	16.2
3	Glass	%	0.81	0.92	0.88	1
4	Metals	%	2.44	2.45	2.61	4.2
5	Leather, Rubber, Synthetics, Clothes & Rags	%	11.38	13.11	13.06	14.24
6	Food Waste	%	24	19.26	11	15.7
7	Vegetable Waste/ Fish/Mutton Waste	%	19.12	11.33	7.7	13.63
8	Horticulture Waste & Wood	%	2.95	10.14	9.14	9.43
9	Miscellaneous & Inert Waste	%	15	15	25.63	8.3
<b>Total % of Waste</b>			<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

Table4: Disease cause through the Chemical parameter from solid waste

Sr. No.	Diseases	Chemical Parameter in Solid Waste
1	Bronchitis, Lung Infection	Nitrogen
2	Kidney Stone, Infection related to Kidney.	Phosphates (P2O5)
3	Cholera, Liver Infection, Skin Diseases	Potassium K2O
4	Cancer (bladder, Kidneys and lungs)	Arsenic(As)
5	Lung cancer, nose cancer, larynx cancer and prostate cancer	Nickel (Ni)
6	Diarrhoea and abdominal pain, affect Pancreas.	Zinc (Zn) (Relatively less harmful.)
7	Flu, Haemolytic anaemia, diarrhoea Cardiac Disease	Ash content Zinc
8	Respiratory tract Infection, hypersensitivity, Asthma, Affect Immune System.	Copper (Cu)

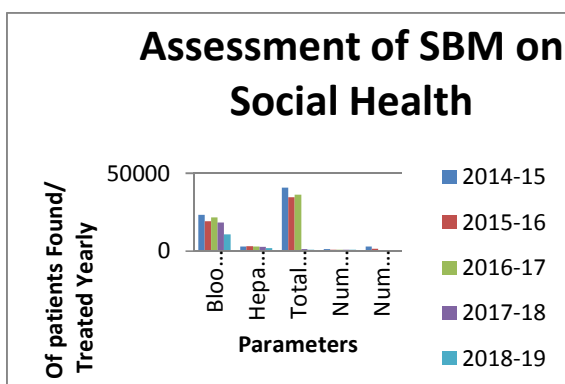
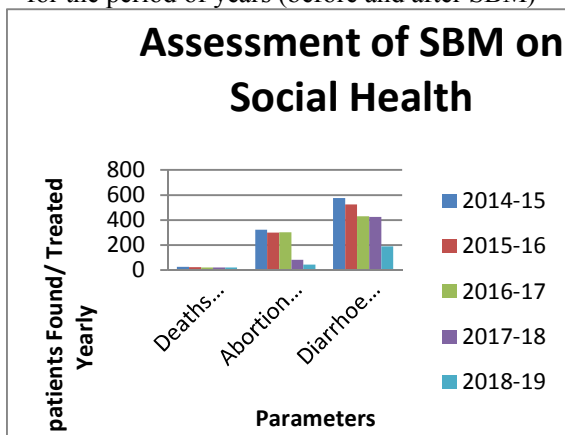
9	Anaemia, Memory loss, loss of appetite,	Chromium (Cr+6)
10	Fatigue, High BP	Lead (Pb)
11	Effect on Foetuses, Gynaecology, Brain defect, Nasal problems.	Mercury (Hg)

## 8. Result

Data has been calculated through the AVBRH Hospital for no of patients found due to the reason year wise. Data also help to compare it statistically that no. of patients treated, but it is difficult to know the cause due to which the patient get affected through the environmental pollution or another cause.

Parameters	No Of patients Found/ Treated Yearly				
	2014-15	2015-16	2016-17	2017-18	2018-19
Deaths due to Malaria	25	22	20	21	20
Abortion (spontaneous / induced)	323	298	300	83	45
Diarrhoea and dehydration	576	525	428	424	189
Blood smears examined	23412	19199	21646	18221	10868
Hepatitis-B0	3056	3200	2965	2781	1844
Total Number of test for Hb	40620	34575	36199	1392	964
Number of Newborns having weight less than 2.5 kg	1313	1023	958	960	938
Number of Patients admitted with Respiratory Infections	3041	1502	588	119	117

Chart 1: No. of patients treated for the disease for the period of years (before and after SBM)



## 9. Conclusion

The focus of the study was on the impact of Solid waste due to non scientific disposal. It can be concluded that human health will be influenced by the segregation of waste at source owing to the decreasing volume of waste and can reduce its exposure as a toxic substance produced by the recyclable waste through its management. Waste that is not properly managed, especially excreta and other liquid and solid waste from households and the community, is a serious health hazard and leads to the spread of infectious diseases. It is found that with an increase in the global population and the rising demand for food and other essentials, there has been a rise in the amount of waste being Generated daily by each household. Statistically, it can be concluded that the successful implementation of SBM can improve the health of society. There is scope for development under the study.

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Mr. Shirish N. Gandhare  
M.Tech ( Industrial Engineering)  
Assistant Professor, DMIETR, Sawangi  
(Meghe), Wardha. Maharashtra (442001)India.



Ms. Supriya Kishor Narad  
M.Tech (Comp. Science & Engineering)  
Assistant Professor, DMIETR, Sawangi  
(Meghe), Wardha. Maharashtra (442001) India.



Ms. Nilam Narayanrao Hiware  
PhD Scholar, Dept. of Chemistry, BDCOE,  
Sewagram, Wardha, Maharashtra (442001)  
India.

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