

A Study to Evaluate the Effectiveness of Structured Teaching Programme on Knowledge and Attitude regarding Mismanagement of Plastic Waste and its Environmental Hazards among High School Students in selected School, Hubballi

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Abstract: *Background:* Plastic changes the world weight less and strong. The use of plastics made life easy in day to day life. We can't live without touching a plastic object in a single day. The development of science contributes lot of advantages as well as disadvantages. But the harmful effect of plastic is unimagined. Its waste will destroy the whole world very soon if we are not taking any control measure. Most of the time unawareness is the cause of throwing plastic in open places. People don't know the seriousness; people are not getting adequate education regarding such pollutant. Providing some information to the public regarding the harmful effect of plastic waste will help the environment by means of reduces, reuse, recycle method. A healthy environment is fundamental to life, and attention to the effects of the environment on human health is essential if we have to achieve the goal of health for all. *Objective:* Total four objectives were formed and discussed in detail below. *Material and Methods:* An evaluate study was conducted among 45 high school students of selected school Hubballi. Probability; Simple Random Sampling Technique was used to select the samples. The research design used for the study was Pre-experimental: One group pre-test post-test design. Data was collected by structured knowledge questionnaire and attitude scale [Modified 5-Point Likert Scale]. Data analysis was done using descriptive and inferential statistics. *Results:* Overall results of the study revealed out of 45 subjects majority of them in pre-test 22(48.88%) had average knowledge, 15(33.33%) had poor knowledge, 08(17.79%) had good knowledge whereas in post-test 45(100%) had good knowledge regarding mismanagement of plastic waste and its environmental hazards. Regarding attitude, majority of them in pre-test 21(46.66%) had negative attitude, 16(35.55%) had neutral attitude and 08(17.79%) had positive attitude whereas in post-test 45(100%) had positive attitude regarding mismanagement of plastic waste and its environmental hazards. The calculated paired 't' value ($t_{cal} = 45.92$) was greater than the tabulated paired 't' value ($t_{tab} = 2.02$). This indicates that the gain in knowledge score was statistically significant at 0.05 level of significance. In case of attitude the calculated paired 't' value ($t_{cal} = 36.75$) was greater than the tabulated paired 't' value ($t_{tab} = 2.02$). This indicates that the change in attitude score was statistically significant at 0.05 level of significance. There exists a negative correlation ($r_{xy} = -0.88$) between pre-test knowledge and attitude scores of high school students. There was statistical association between pre-test knowledge scores and one of the socio-demographic variable i.e., gender. Regarding attitude, there was an association between pre-test attitude scores and socio-demographic variables like family income per month, education of father, education of mother, method of waste disposal. *Conclusion:* The study concluded that, the Structured Teaching Programme was effective in enhancing knowledge and changing the attitude regarding mismanagement of plastic waste and its environmental hazards.

Keywords: Plastic waste, High school students, Knowledge, Attitude, Structured Teaching Programme, Hazards, Mismanagement

1. Introduction

"Progress is impossible without change, and those who cannot change their minds cannot change anything"

-George Bernard Shaw

The environment and the economy are two sides of the same coin, environment is the ecosystem in which all living organisms survive together and are dependent on each other. It comprises of living and non-living things, When one creature is disturbed, the whole cycle gets eroded and if we cannot sustain the environment, we cannot sustain ourselves.

Now, in the era of advanced living our environment is getting affected to a greater extent by the means of air pollution, noise pollution, deforestation, water pollution, soil pollution, acid rain, and other dangerous disasters which are created by the human beings through technological advancement which in turn is generating numerous waste having detrimental effect on our environment.

In 2019, the global production of plastics reached 368 million metric tons out of which Europe alone produces 57.9 million metric tons of plastic and China is one of the largest producers of plastics in the world, accounting for more than one quarter of the global production.

Plastics are used widely everywhere in our life, with the industrial revolution, mass production of goods started and plastic seemed to be a cheaper and effective raw material. Today, every vital sector of the economy starting from agriculture to packaging, transportation, telecommunication, food, clothing, serving, automobile, building construction, and healthcare industries have been virtually revolutionized by the applications of communication or InfoTech has plastics. They have been beneficial in many fields and are likely to increase with on-going developments in the plastic industry.

A **Central Pollution Control Board (CPCB)** report (2018-19) puts the total annual plastic waste generation in India at a humungous **3.3 million metric tons per year**.

Plastics are becoming a staple product in the world. The problems caused due to plastic bags have often been overlooked and underestimated, this is because it has various uses in our economy, this sound like boon to us, but there is another side of the coin as well, being light weight plastic gets carried away by the wind, hence landing up with severe environmental consequences.

Improper disposal of and a range of chemicals that are used in the manufacture of plastics are known to be toxic becoming carcinogenic to human, birth defects, impaired immunity, endocrine disruption, respiratory, nervous and reproductive systems disorders. Human beings are exposed to plastic and toxic chemicals through the main routes such as ingestion, inhalation, skin absorption, direct injection. Individuals ingest the plastic chemicals when foods and drinks are stored in plastic containers causes leaching out leading to adverse effects on environmental and public health.

Increase in human population has led to increase demands for plastics and plastic products, natural beauty of environment gets deteriorate due to stagnation of water, clogs the drains causing floods and breeding grounds for disease-causing mosquitoes and spread of water-borne diseases, associated with hygiene problems thus hits urban sewage system creates unsanitary environment which results in hazards to health.

Improper disposal of plastic waste has its effect on the marine life where oceans, rivers, streams are used as a dumping ground, contaminating the water, soil, marine life leading to entanglement, death, and transforming the marine areas into a plastic soup.

In 2018, World Environmental Day (5 June) has come up with a theme of "Beat plastic pollution". The world is coming together to combat single use plastics. There is need to create awareness among people regarding adequate disposal and recycling of plastic waste and maintain the originality of our environment to continue the life on the earth.

India, our beloved motherland has immense youth power who are so energetic and dedicated, can do phenomenal work to achieve this mission of making a plastic free country.

Objectives of the study

- 1) To assess the level of knowledge & attitude regarding mismanagement of plastic waste and its environmental hazards among high school students.
- 2) To determine the effectiveness of Structured Teaching Programme regarding the mismanagement of plastic waste and its environmental hazards among high school students.
- 3) To find out a co-relation between pre-test knowledge and attitude scores regarding the mismanagement of plastic waste and its environmental hazards.
- 4) To find out the association between the pre-test knowledge & attitude score and their selected socio-demographic variables.

2. Review of Literature

- 1) Literature reviews related to hazards of plastic use on human health.
- 2) Literature reviews related to hazards of plastic waste on environment.
- 3) Literature reviews related to hazards of plastic use and its safe disposal.
- 4) Literature reviews related to food toxicity due to plastic chemicals.
- 5) Literature reviews related to plastic waste management and use of alternatives for plastic use.

Research Methodology/ Materials and Methods

- 1) **Research approach:** evaluative approach
- 2) **Research design:** Pre-experimental; one group pre-test, post-test design
- 3) **Variables**
 - a) **Independent Variable:** Structured Teaching Programme
 - b) **Dependent Variable :** Knowledge and Attitude regarding mismanagement of plastic waste and its environmental hazards of high school students
- 4) **Research setting:** M.R. Sakhare English medium CBSE School Hubballi
- 5) **Research Population :** High school students
- 6) **Sample:** 8th, 9th and 10th standards of KLES' M.R. Sakhare English Medium CBSE School Vidyanagar, Hubballi.
- 7) **Sample size:** 45 High school students
- 8) **Sampling technique:** Probability: Simple Random Sampling technique.
- 9) **Description of the tool:** The tool selected for the study, was a Structured Knowledge questionnaire and Structured Attitude Scale [Modified 5point Likert Scale] which comprises of three sections. They were:

Section I: Socio-Demographic Data: This section consists of socio demographic data of high school students with 11 variables.

Section II: Items on Structured Knowledge Questionnaire: This section consists of 35 items for obtaining level of knowledge of High School Students regarding mismanagement of plastic waste and its environmental hazards. A score value of one (1) was allotted for each correct response and zero (0) for each incorrect response. Total maximum score limit was 35.

Section III: Attitude Scale [MODIFIED 5 POINT LIKERT SCALE]: This section consists of 15 statements for obtaining the views, opinion and attitude of high school students regarding mismanagement of plastic waste and its environmental hazards. A score value for positive statements ranges from “Strongly Agree = 5” to “Strongly Disagree = 1” and reverse for negative statements.

Reliability of the tool:

The tool was tested for reliability on 10 students during pilot study by using Split Half Method and applying Karl Pearson’s Correlation Coefficient formula. The reliability of Structured knowledge questionnaire was $r = 0.85$ and attitude $r = 0.93$. Hence, the tool was found to be reliable. Item analysis was done to test the internal consistency. This was done by critically evaluating questions based on difficulty index and discriminative index

3. Results

Table 1: Frequency and percentage distribution of Knowledge scores of subjects regarding mismanagement of plastic waste and its environmental hazards, $n=45$

Level of knowledge	Pre-test		Post-test	
	Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)
Good (12.63 & above)	08	17.79	45	100
Average (12.63 – 9.59)	22	48.88	00	00
Poor (9.59 & below)	15	33.33	00	00

Table 01 Reveals that majority of the 100% of high school students had good knowledge regarding mismanagement of plastic waste and its environmental hazards.

Table 2: Frequency and percentage distribution of Attitude scores of subjects regarding mismanagement of plastic waste and its environmental hazards, $n=45$

Level of Attitude	Pre-test		Post-test	
	Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)
Positive (36.76 and above)	08	17.79	45	100
Neutral (36.76 – 33.68)	16	35.55	00	00
Negative (33.68 and below)	21	46.66	00	00

Table 02 Reveals that majority of the 100% of high school students had positive attitude regarding mismanagement of plastic waste and its environmental hazards.

Table 3: Mean difference (\bar{d}), Standard Error of difference ($SE \bar{d}$) and paired ‘t’ values of knowledge scores of subjects, $n=45$

Mean Difference (\bar{d})	Standard error of difference ($SE \bar{d}$)	Paired ‘t’ values	
		Calculated	Tabulated
17.91	0.39	45.92*	2.02

Table No 03: Reveals that the calculated paired ‘t’ value ($t_{cal}=45.92$) was greater than the tabulated paired ‘t’ value ($t_{tab}=2.02$). Hence, H_1 was accepted. This indicates that the gain in knowledge score was statistically significant at 0.05 level of significance. Therefore, the structured teaching programme was effective in improving the knowledge regarding mismanagement of plastic waste and its environmental hazards among high school students.

Table 4: Mean difference (\bar{d}), Standard Error of difference ($SE \bar{d}$) and paired ‘t’ values of Attitude scores of subjects, $n=45$

Mean Difference (d)	Standard error of difference ($SE \bar{d}$)	Paired ‘t’ values	
		Calculated	Tabulated
30.51	0.83	36.75*	2.02

Table No.04: Reveals that the calculated paired ‘t’ value ($t_{cal}=36.75$) was greater than the tabulated paired ‘t’ value ($t_{tab}=2.02$). Hence, H_2 was accepted. This indicates that the change in attitude score was statistically significant at 0.05 level of significance. Therefore, the structured teaching program was effective in changing the attitude regarding mismanagement of plastic waste and its environmental hazards among high school students.

Table 5: Analysis and interpretation of data to find out correlation between pretest knowledge and attitude scores, $n=45$

X	Y	Karl Pearson Coefficient of Correlation (r_{xy})
500	1585	-0.88
Negative correlation		

Table No.07: Reveals that $r_{xy} = -0.88$, there exists a negative correlation between pretest knowledge and attitude scores of high school students. Hence, H_3 was not accepted.

4. Discussion

The overall pretest and posttest level of knowledge regarding mismanagement of plastic waste and its environmental hazards. Majority of them in the pre-test 22(48.88%) had average knowledge, 15(33.33%) had poor knowledge and 08(17.79%) had good knowledge whereas in posttest all the subjects had good knowledge regarding mismanagement of plastic waste and its environmental hazards. The findings were supported through a study conducted by Aneeta A, Ashly G, Jeemol J which revealed that majority of the subjects in the pretest 76.66% had average knowledge, 13.34% had poor knowledge and 10% had good knowledge whereas in posttest 96.66% had good knowledge, 3.34% had average knowledge regarding mismanagement of plastic waste and its environmental hazards.

The overall pretest and posttest level of attitude regarding mismanagement of plastic waste and its environmental hazards. Majority of them in the pre-test 21(46.66%) had negative attitude, 16(35.55%) had neutral attitude and 08(17.79%) had positive attitude whereas in post-test all the subjects had positive attitude regarding mismanagement of plastic waste and its environmental hazards. The findings were supported through a study conducted by Praveena B G which revealed that majority of subjects 71% had negative

attitude, 26% had neutral attitude only 3% had positive attitude whereas in posttest all the subjects had positive attitude regarding mismanagement of plastic waste and its environmental hazards.

5. Recommendations

Keeping in the view the findings of the present study, the following recommendations were made:

- 1) A similar study can be done on a large samples and wider sample size for a longer period of time would be more pertinent in making broad generalizations.
- 2) A Quasi- experimental study can be conducted so that various interventions can be conducted to increase awareness regarding hazards of plastic use.
- 3) A similar study can be replicated in different settings and on different samples.
- 4) A study can be done on Utilization of Plastic Waste in Construction of Roads and various other ways.

6. Conclusion

Based on the findings of the study, the following conclusions were drawn.

- 1) The overall pre-test knowledge and attitude scores of high school students was average.
- 2) The post-test knowledge & attitude scores of high school students after administration of Structured Teaching Programme was significantly higher than the pre-test knowledge & attitude scores.
- 3) The post-test knowledge and attitude scores of Structured Teaching Programme showed significant improvement in the level of knowledge and attitude of high school students.
- 4) The results revealed that there was an association between pre-test knowledge scores and socio-demographic variable i.e., gender.
- 5) The results revealed that there was an association between pre-test attitude scores and socio-demographic variables like family income per month, education of father, education of mother, method of waste disposal.

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