

Effectiveness of Child-To-Child Concept on Knowledge and Attitude Regarding Hazards of Plastic Use and Safe Disposal among School Children Studying in Selected Schools at Bagalkote

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Abstract

Original Research Article

Background: Plastics are widely used due to their durability, affordability, and versatility; however, their indiscriminate use and unsafe disposal pose serious environmental and health hazards. Being non-biodegradable, plastics persist in the environment for centuries, polluting soil, water, and air. Burning plastic releases toxic gases, while chemical leaching contaminates food chains and groundwater. Children are frequent users of plastic bottles, toys, food wrappers, and stationery, yet they often lack adequate knowledge about the harmful effects and safe disposal of plastic. This unawareness increases their vulnerability and contributes to unsafe disposal practices. The Child-to-Child approach is a participatory educational method that empowers children to learn and share health and environmental information with their peers. It enhances learning, retention, and behavioural change, making it effective in promoting environmental awareness. Hence, the present study was undertaken to assess the effectiveness of the Child-to-Child concept on knowledge and attitude regarding hazards of plastic use and its safe disposal among school children in Bagalkote.

Objectives: (1) To assess knowledge regarding hazards of plastic use and its safe disposal among children. (2) To assess attitude regarding hazards of plastic use and its safe disposal among children. (3) To evaluate the effectiveness of child-to-child concept on knowledge and attitude regarding hazards of plastic use and its safe disposal among children. (4) To find out the association between pretest level of knowledge and attitude scores regarding hazards of plastic use and its safe disposal among children with their selected socio demographic variables. **Methods:** The research design selected for this study was quantitative quasi-experimental research design. The sample size comprises of 60 children aged 10–14 years from T.M. Bhagavati Educational Higher Primary English Medium School, Shirur, Bagalkot, selected through simple random sampling. In the present study data was collected by using Structured knowledge questionnaires and a 5-point Likert attitude scale. The data analysis done by using descriptive and inferential statistics. **Results:** Findings of the study revealed that in the pre-test, the majority of children (58.33%) had average knowledge and 41.01% had poor knowledge, while none had good knowledge regarding hazards of plastic use and its safe disposal. In contrast, post-test results showed that 85% had good knowledge and 15% had average knowledge. Similarly, pre-test assessment of attitude scores indicated that 53.33% had moderate attitude and 46.66% had poor attitude, while post-test results revealed that 70% had good attitude and 30% had moderate attitude. A paired *t*-test showed a statistically significant improvement in both knowledge ($t = 35.9, p < 0.05$) and attitude ($t = 18.27, p < 0.05$) scores after the intervention. Chi-square analysis revealed a significant association of knowledge scores with father's education and source of information. Association of Attitude scores with location of residence. **Conclusion:** The study concludes that the Child-to-Child approach is highly effective in enhancing school children's knowledge and promoting positive attitudes regarding hazards of plastic use and its safe disposal. This strategy may be recommended as a sustainable and participatory method for environmental health education among children.

Keywords: Plastic hazards, Safe disposal, Child-to-Child concept, Knowledge, Attitude, School children.

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INTRODUCTION

Health is a positive concept that emphasizes not only physical well-being but also social and personal

resources. It serves as a resource that enables individuals to lead productive lives and perform their roles effectively in society, rather than being an end in itself.

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A healthy lifestyle allows individuals to live a meaningful and purposeful life, encompassing physical, mental, and spiritual well-being. Maintaining good health through preventive measures reduces the risk of diseases and supports smooth functioning in daily activities [1].

In recent decades, plastic pollution has emerged as a major global environmental and public health challenge. The widespread use of plastics in everyday life ranging from packaging and household products to construction and medical applications has significantly increased due to its affordability, durability, and versatility [2]. However, improper disposal and mismanagement of plastic waste have led to severe environmental consequences. Plastics release toxic substances that contaminate ecosystems, harm wildlife, and pose serious health risks to humans through multiple exposure routes [3]. Children are particularly vulnerable due to their developing immune and organ systems [4].

Globally, plastic production has increased dramatically, from approximately 2 million tonnes in 1950 to over 450 million tonnes today [5]. A significant proportion of plastic waste is not adequately managed, resulting in environmental pollution. Each year, millions of tonnes of plastic enter marine ecosystems, threatening biodiversity and food safety [5]. In India, rapid growth in plastic consumption and waste generation, along with inadequate waste management infrastructure, has intensified the problem [6]. Plastic materials may take up to 1,000 years to decompose, contributing to long-term environmental degradation [7].

Effective plastic waste management is therefore essential. The principles of Reduce, Reuse, and Recycle (3Rs) play a crucial role in minimizing plastic waste [8]. Strategies such as waste segregation, recycling initiatives, and public awareness campaigns are necessary to mitigate environmental and health hazards.

Schools provide an ideal setting for promoting health and environmental awareness, especially among children aged 6 to 12 years. This developmental stage is critical for shaping habits, attitudes, and values [9]. School-age children are highly active, receptive to learning, and capable of influencing their peers, families, and communities [10].

One effective educational strategy is the Child-to-Child (CtC) approach, a participatory and rights-based method that empowers children to learn and share knowledge with their peers [11]. This approach enhances understanding, retention, and application of knowledge while promoting holistic development. Evidence suggests that CtC interventions significantly improve awareness and attitudes toward health and environmental issues among school children [12].

Promoting awareness about reducing plastic use such as avoiding single-use plastics, using reusable alternatives, and supporting eco-friendly practices can help cultivate environmentally responsible behaviors [13]. Educating children through participatory methods like the CtC approach can play a vital role in addressing plastic pollution and fostering sustainable development.

MATERIALS AND METHODS

Quasi-experimental one group pretest and post-test research design was used to assess the level of knowledge and attitude regarding plastic use and its safe disposal among children.

Study design: The research design adopted for the study is “Experimental research design”

Setting of the study: The present study was conducted Children studying at primary schools of Bagalkot, District in the age group of 10-14 years.

Variables:

- Independent variable: Child to child concept.
- Dependent variable 1: Knowledge regarding hazards of plastic use and its safe disposal
- Dependent variable 2: Attitude regarding hazards of plastic use and its safe disposal
- Socio-demographic variables: Socio-Demographic characteristics of children such as age, sex, religion, year of study, father educational status, mother educational status, father’s occupation, mother’s occupation, number of siblings, area of residence, type of family, monthly income, birth order.

Tool Description

- Section I: Questionnaire to assess socio-demographic data of school children.
- Section II: Structured knowledge Questionnaires.
- Section III: Likert 5-point scale to assess attitude.

Methods of Data Collection

- Formal permission obtained from the principal of institute.
- Researcher explained in detail to study participants about the study
- Informed consent was obtained from all the participants.
- The willing participants were assessed by Structured questionnaires
- Assessment was done and collected the data from all the participants of the study.

Statistical Analysis

Data were analysed using descriptive and inferential statistics.

- Descriptive statistics: Frequency, percentage, mean, median and mode used to summarize socio-demographic variables.
- Inferential statistics: Paired t-test used to assess the effectiveness child to child concept regarding the hazards of plastic use and its disposal. Chi-square test used to associate selected socio demographic variables of children with their pretest level of knowledge and attitude score.
- Level of significance: $p < 0.05$ was considered statistically significant.

Ethical Clearance

Ethical approval was obtained from the Institutional Ethical Committee of B.V.V.S. Sajjalashree Institute of Nursing Sciences, Bagalkot, and clearance was submitted to RGUHS, Bangalore with the study synopsis. Permission was granted by the Medical Superintendent of S. Nijalingappa Medical College & HSK Hospital & Research Centre, Bagalkot. Written informed consent was obtained from parents, and privacy, confidentiality, and voluntary participation were ensured.

RESULT

Part I: Description of percentage wise distribution of samples according to socio-demographic variables.

The percentage wise distribution of samples according to their age shows that of children 63.33% belongs to 10 to 12yrs age group, least of children 36.67% belongs to 13 to 15yrs age group. The percentage wise distribution of samples according to their gender shows that majority of children 58.33% were male and 41.67% were females. Depicts the Percentage wise distribution of samples according to their location of residence shows that majority of 55% were in semi urban and 43.33% were related to rural area and least of 1.6% samples were residing in urban area. The percentage wise distribution of samples according to their father's education status shows that majority of fathers 68.33% were completed high school and 18.33% completed their College/university level education and 11.66% were completed primary school, least of samples 1.66% were having no formal education and none of samples had not undergone post graduate and above. The percentage wise

distribution of samples according to their mother's education status shows that majority of 75% were had no formal education and 21.66% were completed primary school and 3.33% were completed their high school level education and none of samples had undergone their college and post graduate and above level of education. The percentage wise distribution of samples according to their father's occupation shows that majority of 51.66% were doing agriculture, 16.66% were private employee and 15% were business men and 10% were government employee and remaining least of samples 6.66% were on daily wages or labor. The percentage wise distribution of samples according to their mother's occupation shows that majority of 45% were house maker and 35% were related to agriculture, 8.33% were daily wages labor and 6.66% were government employee and least of samples 5% were business or private employee. The percentage wise distribution of samples according to their family monthly income shows that majority of 81.66% of the children's family income was Rs 5001-Rs 10000, 11.66% were having below Rs 5000 monthly family income and remaining least of samples 6.66% were having monthly income Rs 10001- Rs 15000. The percentage wise distribution of samples according to their usage of the plastic items shows that majority of samples 75% use more plastic water bottles and 13.33% prefer plastic lunch box and least of samples 11.66% use plastic straws. The percentage wise distribution of samples according to their know health effects of plastic usage shows that majority of 70% don't know health effects of plastic usage and remaining least of samples 30% know health effects of plastic usage. The percentage wise distribution of samples according to their learned about plastic waste management at school shows that majority of 61.66% have learnt about plastic waste management and least of samples 38.33% haven't learnt about plastic waste management. The percentage wise distribution of samples according to their precious source information regarding health affects plastic usage shows that majority of 43.33% of the children's have no source of income and, 33.33% of children's have learnt from teachers and 11.66% of children's have learnt from parents and least of samples 6.66% from social media and remaining 5% have learnt from television or social media.

Section II: Assessment of levels of knowledge regarding plastic usage and it's safe disposal among school children of selected schools of Bagalkot.

Table 1: Assessment of levels of knowledge regarding plastic usage and it's safe disposal among school children
N=60

Level of Knowledge	Pre-Test		Post-Test	
	Frequency	%	Frequency	%
Good	00	00	51	85
Average	35	58.33	09	15
Poor	25	41.01	00	00
Total	60	100	60	100

The assessment of knowledge level regarding plastic usage and its safe disposal among school children, revealed that in pre-test the majority (58.33%) of children had average knowledge, 41.01% of children had poor knowledge regarding plastic usage and its safe disposal. The assessment of level of knowledge regarding plastic usage among school children, revealed

that in post-test the majority (85%) of children had good knowledge, 15% of children had average knowledge regarding plastic usage and its safe disposal.

Section-III: Effectiveness of child to child concept on knowledge regarding use of plastic and safe disposal.

Table 2: Effectiveness of child to child concept on knowledge regarding use of plastic and safe disposal
N=60

Test	Mean	Std error	Mean diff	SD Diff	Paired t- value	Table value
Pre-test	8.13	0.62	8.53	0.62	35.9	2.00
Post-test	16.66					

H₁ -There is a significant difference between the pre test knowledge and post test knowledge scores of children regarding hazards of plastic use and its safe disposal. As calculated t value is (35.9) was much higher than table 't' value (2.00) for Degree of Freedom 59 and at 5% level of significance, Hence the H₁ Hypothesis is accepted. Findings revealing the presence of significant difference

between pre-test and post-test knowledge scores, hence the child to child concept is proved to be effective.

Section-IV: Comparison of knowledge scores regarding plastic usage and its disposal among school children in selected schools

Table 3: Area wise Mean, S.D and Mean percentage of the knowledge scores in pre test and post test
N=60

Knowledge area	Max. score	Pre-test		Post-test		Effectiveness	
		Mean±SD	Mean%	Mean ± SD	Mean %	Mean ± SD	Mean %
Meaning and concept of plastic usage	4	1.41±0.76	35.25%	3.21± 0.61	80.25%	1.8±0.15	45%
Hazards of plastic usage	08	3.21± 1.18	40.12%	5.76± 0.76	72%	2.55±0.42	31.87%
Prevention of plastic hazards and its safe disposal	10	3.5± 1.24	35%	7.68± 0.91	76.8%	4.18±0.33	41.8%
Total	22	8.12± 3.18	36.90%	16.65±2.28	75.68%	8.53±0.9	38.77%

Table 3 shows area wise comparison of mean and standard deviation of the knowledge scores of the pretest and posttest reveals an increase in the mean knowledge score of the children after administration of Child to Child concept. Comparison of area wise mean and SD of the knowledge scores in the area of "Meaning and concept of plastic" shows that the pretest mean knowledge score was 1.41 with SD ± 0.76 which was 35.25 % of total score of this area, whereas post-test mean of knowledge score in this area was 3.21 with SD ±0.61 which was 80.25% of total score of this area. In the area of knowledge on "Hazards of plastic usage", pre-test mean knowledge score was 3.21 with SD ±1.18 which was 40.12% of total score of this area, where as post-test mean knowledge score was 5.76 with SD ±0.76 which was 72 % of total score of this area. In the area of

knowledge about "Prevention of plastic hazards and its safe disposal" pre-test mean knowledge score was 3.5 with SD ±1.24 which was 35% of total score of this area, where as post-test mean knowledge score was 7.68 SD ±0.91 which was 76.8% of total score of this area. The overall finding reveals that the post-test knowledge score 16.65±2.28 which was 75.68% of total score is more when compared to the pretest knowledge score 8.12±3.18 which was 36.90% of total score. Hence it indicates that Child to Child concept was effective in enhancing the knowledge of children regarding plastic usage and its safe disposal.

Section-V: Assessment of levels of attitude regarding plastic usage and its safe disposal among school children at selected schools of Bagalkot.

Table-5.5: Assessment of levels of attitude regarding plastic usage and its safe disposal among school children
N=60

Level of Attitude	Pre-Test		Post-Test	
	Frequency	%	Frequency	%
Good	00	00	42	70
Moderate	32	53.33	18	30
Poor	28	46.66	00	00
Total	60	100	60	100

The assessment of level of attitude regarding plastic usage and its safe disposal among school children, revealed that in pre-test the majority (53.33%) of children had moderate attitude, 46.66% of children had poor attitude regarding plastic usage and its safe disposal. The assessment of level of attitude regarding plastic usage among school children, revealed that in

post-test the majority (70%) of children had good attitude, 30% of children had moderate attitude regarding plastic usage and its safe disposal.

Section-VI: Effectiveness of child to child concept on attitude regarding plastic use and safe disposal.

Table-5.6: Effectiveness of child to child concept on attitude regarding plastic use and safe disposal

N=60

Test	Mean	Std error	Mean diff	SD Diff	Paired t-value	Table value
Pre-test	10.6	0.58	11.16	1.56	19.12	2.00
Posttest	21.76					

H₂ -There is a significant difference between the pre-test attitude scores and post-test attitude scores of children regarding hazards of plastic use and its safe disposal. As the calculated t value (18.27) was much higher than table 't' value (1.96) for Degree of Freedom 49 and at 5% level of significance, Hence the H₁ Hypothesis is accepted. Findings revealing the presence of significant difference between pre-test and post-test attitude scores, hence the Child to Child concept is proved to be effective.

DISCUSSION

Section-I: Description of percentage wise distribution of samples according to their socio-demographic characteristics.

Present study shows that percentage wise distribution of samples according to their age shows that of children 63.33% belongs to 10 to 12yrs age group, least of children 36.67% belongs to 13 to 15yrs age group. Similar study was conducted by D. Grace Prasad (2020) it depicts that the percentage wise distribution of samples according to their age shows that of children 36% belongs to 10yrs age group, least of children 64% belongs to 11 to 12yrs age group.⁵⁸ The percentage wise distribution of samples according to their mother's education status shows that majority of 75% were had no formal education and 21.66% samples were completed their primary school and 3.33% samples were completed their high school and there were no samples who have undergone college and post graduate and above. Similar study was conducted by Alam MM (2021) it depicts that higher levels of education including maternal education were significantly associated with greater environmental awareness and responsible behavior among urban residents in Sylhet, Bangladesh, underscoring the broader relevance of maternal educational status in children's environmental understanding.

Section-II: Assessment of levels of knowledge regarding plastic usage and its safe disposal among school children of selected schools of Bagalkot.

The assessment of level of knowledge regarding plastic usage and its safe disposal among school children, revealed that in pre-test the majority (58.33%) of children had average knowledge, 41.01% of children

had poor knowledge regarding plastic usage and its safe disposal. The assessment of level of knowledge regarding plastic usage among school children, revealed that in post-test the majority (85%) of children had good knowledge, 15% of children had average knowledge regarding plastic usage and its safe disposal. Similar study was conducted by Geetha Chockalingam (2019) it depicts that the percentage wise distribution of samples according to their knowledge among plastic consumption where 50% of students have moderate, lack of knowledge regarding plastic consumption after structured teaching programme students have acquired 100% of knowledge regarding plastic consumption.

Section-III: Comparison of knowledge scores regarding plastic usage and its disposal among school children in selected schools.

As calculated t value is (35.9) was much higher than table 't' value (2.00) for Degree of Freedom 59 and at 5% level of significance. Findings revealing the presence of significant difference between pre-test and post-test knowledge scores, hence the child to child concept is proved to be effective Similar study was conducted by Kaur Parminder (2019), it depicts that interventions i.e. child to child approach were helpful in improving hand washing knowledge and practices among primary school children, post-test mean score of knowledge was 15.2 respectively which was significant at p value <0.05, similarly post-test mean of hand washing practices was 10.41, which was significant at p <0.05 level.

Section-IV: Effectiveness of child to child concept on knowledge regarding use of plastic and safe disposal

This study shows area wise comparison of mean and standard deviation of the knowledge scores of the pretest and posttest reveals an increase in the mean knowledge score of the children after administration of Child to Child concept. Comparison of area wise mean and SD of the knowledge scores in the area of "Meaning and concept of plastic" shows that the pretest mean knowledge score was 1.41 with SD \pm 0.76 which was 35.25 % of total score of this area, whereas post-test mean of knowledge score in this area was 3.21 with SD \pm 0.61 which was 80.25% of total score of this area. In the area of knowledge on "Hazards of plastic usage", pre-

test mean knowledge score was 3.21 with SD ± 1.18 which was 40.12% of total score of this area, where as post-test mean knowledge score was 5.76 with SD ± 0.76 which was 72 % of total score of this area. In the area of knowledge about "Prevention of plastic hazards and its safe disposal" pre-test mean knowledge score was 3.5 with SD ± 1.24 which was 35% of total score of this area, where as post-test mean knowledge score was 7.68 SD ± 0.91 which was 76.8% of total score of this area. The overall finding reveals that the post-test knowledge score 16.65 ± 2.28 which was 75.68% of total score is more when compared to the pretest knowledge score 8.12 ± 3.18 which was 36.90% of total score. Hence it indicates that Child to Child concept was effective in enhancing the knowledge of children regarding plastic usage and it's safe disposal. Similar study was conducted by Jayavarshini.S (2022) it depicts that where top-performing students acted as peer educators for other adolescents (ages ~14–17). The pre-test knowledge mean was 12.33 (SD ± 5.77), which increased to 28.98 (SD ± 1.79) in the post-test a remarkable mean gain of 16.65 points. The paired t-test yielded $t = -21.67$ ($p < 0.001$), indicating a highly statistically significant improvement. These findings mirror our own results overall mean pre-test score of $8.12 (\pm 3.18)$ rising to $16.65 (\pm 2.28)$ and substantiate the effectiveness of peer-led educational methods (like the Child-to-Child concept) in markedly enhancing children's knowledge regarding plastic usage and safe disposal.

Section–V: Assessment of levels of attitude regarding plastic usage and it's safe disposal among school children at selected schools of Bagalkot

The assessment of level of attitude regarding plastic usage and it's safe disposal among school children, revealed that in pre-test the majority (53.33%) of children had moderate attitude, 46.66% of children had poor attitude regarding plastic usage and it's safe disposal.

The assessment of level of knowledge regarding plastic usage among school children, revealed that in post-test the majority (70%) of children had good attitude, 30% of children had moderate attitude regarding plastic usage and it's safe disposal.

Similar study was conducted by Sulistyawati Sulistyawati (2020) it depicts that over 70 % of participants scored satisfactorily across knowledge, attitude, and practice domains, reflecting a notable shift in positive attitudes toward waste (including plastic) disposal.

Section–VI: Comparison of attitude scores regarding plastic usage and it's disposal among school children in selected schools

As the calculated t value (18.27) was much higher than table 't' value (1.96) for Degree of Freedom 49 and at 5% level of significance. Findings revealing the presence of significant difference between pre-test and

post-test attitude scores, hence the Child to Child concept is proved to be effective. Similar study was conducted by Chaudhary V (2022) it depicts that a significant positive shift in attitude toward plastic use and disposal, reinforcing that structured educational interventions like the Child-to-Child concept can effectively enhance students' environmental attitudes.

Section–VII: Association of the pre-test knowledge and attitude scores of children with selected demographic variables of children

The present study shows the association of the demographic variables of children with their knowledge scores shows that, the variables like father's education and information on plastic usage have shown significant association with children knowledge regarding plastic usage and its safe disposal, and the variables like age, gender, location of residence, mother's education, father occupation, mother occupation, family income, use of plastic items, health effects of plastic usage, plastic waste management at school are not having significant association with children pre-test level of scores knowledge regarding plastic usage and its safe disposal. Similar study was conducted by Grätz M (2023) it depicts that paternal education had a strong and consistent positive influence on children's health outcomes while other parental or demographic variables did not show such effects. In the association of the demographic variables of children with their attitude scores shows that, the variables like location of residence have shown significant association with children attitude regarding plastic usage and its safe disposal, and the variables like age, gender, father's education, mother's education, father occupation, mother occupation, family income, use of plastic items, health effects of plastic usage, plastic waste management at school, information on plastic usage are not having significant association with children pre-test level of attitude scores regarding plastic usage and its safe disposal. Similar study was conducted by Partono B (2020) it depicts that where residence location and none of the other demographic factors was the only variable significantly associated with children's attitudes toward plastic usage and safe disposal.

CONCLUSION

The study concludes that the Child-to-Child approach is highly effective in enhancing school children's knowledge and promoting positive attitudes regarding hazards of plastic use and its safe disposal. This strategy may be recommended as a sustainable and participatory method for environmental health education among children.

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