WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

IMPACT OF AWARENESS PROGRAM ON REDUCING SINGLE-USE PLASTIC BOTTLE CONSUMPTION: A COMMUNITY-BASED STUDY

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ABSTRACT:

Global initiatives to decrease the use of single-use plastics have been spurred by the growing concern over environmental deterioration caused by plastic waste. The impact of an awareness campaign aimed at lowering the usage of single-use plastic bottles by Rajpura, Punjab, residents is assessed in this study. The study, which used a quasi-experimental approach, evaluated 180 participants' knowledge and behaviors. According to results, experimental group awareness significantly increased, their usage of plastic bottles decreased, highlighting the importance of community-based educational initiatives in encouraging sustainable behavior.

Keywords: Effectiveness, Awareness Program, Single-Use Plastic Bottles, Community People

INTRODUCTION:

According to statistics from the United Nations, one million plastic water bottles are sold every minute across the globe but only less than 50% are recycled.[1] The indiscriminate distribution of plastic, especially for disposable water bottles, has not been without high doses of social, environmental and economic costs. Thousands of specialists have warned for many years about the harmful consequences plastic has at every time in its life cycle, from mining natural resources equivalent to coal oil and gas, manufacturing it, utilizing it as we speak and disposing of it. Plastic is poisoning us and the organisms, ecosystems and communities that support us — causing diseases, giving rise to disabilities, and leading to early deaths.[2]

One of the most common types of plastic is probably single-use water bottles. The simplicity of use, affordability, durability, and convenience of plastic bottles make them a popular option, especially when compared to glass bottles that need to be handled with greater care. But this extensive use has detrimental effects on the ecosystem and human health. Concerns regarding exposure to dangerous chemicals like Bisphenol A (BPA), a common industrial chemical present in many plastics, are raised by the widespread usage of plastic, particularly in bottled water. Hormonal abnormalities, damage to the reproductive system, and other severe illnesses have all been connected to BPA. Heat and other extreme conditions can cause BPA and other harmful compounds to leak into the water from plastic bottles, which could have long-term negative health effects.[3]

The industry for bottled water (BW) has expanded quickly in recent years, and analysts predict that this expansion will continue even though plastic bottles are known to pose health and environmental hazards. Over 2 billion people worldwide lack access to safe drinking water, but in rich nations, convenience, taste preferences, and suspicion of the safety of tap water account for a large portion of the demand for bottled water. The bulk of plastic trash, especially from bottled water, ends up in landfills and the oceans due to inadequate waste management systems, especially in low- and middle-income nations. More than 80 percent of the plastic debris that ends up in the oceans is thought to originate in Asia alone.[4]

The most popular plastic for water bottles is polyethylene terephthalate (PET), a semi-crystalline polymer that has supplanted glass and other materials because of its affordability and usefulness. PET bottles do, however, also present serious concerns. PET can leak chemicals like phthalates, acetaldehyde, and antimony, particularly when heated at high temperatures. Since these substances have the potential to be hazardous to human health, laws and regulations must be in place to reduce their effects. Reducing the negative impacts of plastic pollution, which is becoming a bigger danger to the environment and public health, requires efficient waste management systems.[5,6]

This study aims to evaluate the effectiveness of an awareness program designed to educate the community about the harmful effects of single-use plastic bottles and promote the use of sustainable alternatives. By raising awareness of the environmental and health risks associated with plastic bottles, the program seeks to encourage individuals to adopt more eco-friendly practices and reduce their dependence on single-use plastics.

RESEARCH METHODOLOGY:

This study was conducted in the Rajpura District of Punjab and used a quantitative research, quasi-experimental design. The accessible population was people who were present during the data collection period, and participants were chosen using a non-probability convenience sampling technique, yielding a total sample size of 180. Participants divided into two groups: 100 in the experimental and 80 in the control group.

A self-structured questionnaire was used in the study, and it was split into two sections: Section A collected sociodemographic information, and Section B evaluated knowledge and behaviors about single-use plastic bottles. The experimental group was given a 15-day awareness program that included health discussions, street plays, and the distribution of informational leaflets. The program lasted 15 to 20 minutes. There was no intervention for the control group. To evaluate the program's effect, a pre-test was given to both groups, the experimental group received intervention, and a post-test was taken from both groups. At the end of study leaflets were distributed among the control group participants.

DATA ANALYSIS:

TABEL 1: Demographic Distribution

N=180

Demographic Variables	**Experimental Group (n= 100)**		**Control Group (n= 80)**	
	F	**%**	**F**	**%**
Age				
<30	05	5.0	7	8.8
31-35	20	20.0	18	22.5
36-40	21	21.0	38	47.5
>40	24	24.0	17	21.3
Gender				
Male	25	25.0	16	20.0
Female	75	75.0	64	80.0
Non-binary/Other	00	00	00	00
Educational Level				
Primary education	05	5.0	02	2.5
Secondary education	43	43.0	34	42.5

Higher education (e.g., college, university)	44	44.0	38	47.5
Post-graduate education	08	8.0	06	7.5
Occupation				
Students	05	5.0	02	2. 5
Teachers/Educators	04	4.0	02	2.5
Professionals (e.g., engineers, doctors)	11	11.0	08	10.0
Laborers/Skilled workers	30	30.0	25	31.3
Homemakers	55	55.0	43	53.8
***Family* Income Level**				
Low income (<20K)	23	23.0	17	21.3
Middle income	67	67.0	58	72.5
High income (>80K)	10	10.0	05	6.3
Residential Area				
Urban	12	12.0	03	3.8
Suburban	62	62.0	47	58.8
Rural	26	26.0	30	37.5
Family Size				
Small family (1-4 members)	19	19.0	21	26.3
Medium family (5-6 members)	54	54.0	37	46.3
Large family (7+ members)	27	27.0	22	27.5
Access to Recycling Facilities				
Have access to local recycling programs	04	4.0	00	00
Do not have access to recycling programs	96	96.0	80	100

(Table 1) A demographic profile of the participants was recorded. The majority of participants in both groups were aged between 31 and 40 years. Gender distribution showed a higher proportion of female participants in both groups. Education levels varied, with the majority having secondary or higher education. Most participants were homemakers or laborers, with a significant proportion from middle-income households.

TABEL 2: Community Practices Regarding Single-Use Plastic Bottles

N=180

ITEMS	**Experimental group (n=100)**		**Comparison group (n=80)**	
	Yes (%)	**No (%)**	**Yes (%)**	**No (%)**
Do you use single-use plastic water bottles on a daily basis?	14	86	8.75	91.25
Do you reuse single-use plastic water bottles?	79	21	72.93	27.07
Do you reuse single-use plastic water bottles because they are cheap and convenient?	76	24	73.08	26.92
Have you ever tried to avoid using plastic bottles?	43	57	55.62	44.38
Have you ever looked for alternatives to plastic bottles?	36	64	41.43	58.57
Do you think reusable water bottles are easily accessible for purchase at local stores or provided by local organizations?	93	7	96.81	3.19
Do you always dispose of plastic waste in a dustbin?	89	11	90.31	9.69
Is plastic bottle usage high during community events or gatherings (e.g., festivals, public celebrations)?	84	16	87.33	12.67
Do you ensure that the plastic bottles you use are biodegradable?	23	77	31.06	68.94
Do you take steps in your daily life to reduce plastic pollution?	49	51	38.90	61.10

Table 2 presents data on participants' practices concerning single-use plastic bottles. A large percentage of both groups reported using single-use plastic bottles daily, though the experimental group showed more awareness of reusable alternatives. Before the intervention, 79% of the experimental group reused plastic bottles due to their convenience, compared to 72.93% in the control group. Both groups showed a similar tendency to use plastic bottles during community events, with the experimental group showing slightly better disposal practices.

Fig.1 : Comparison of Pre and Post-Test Scores.

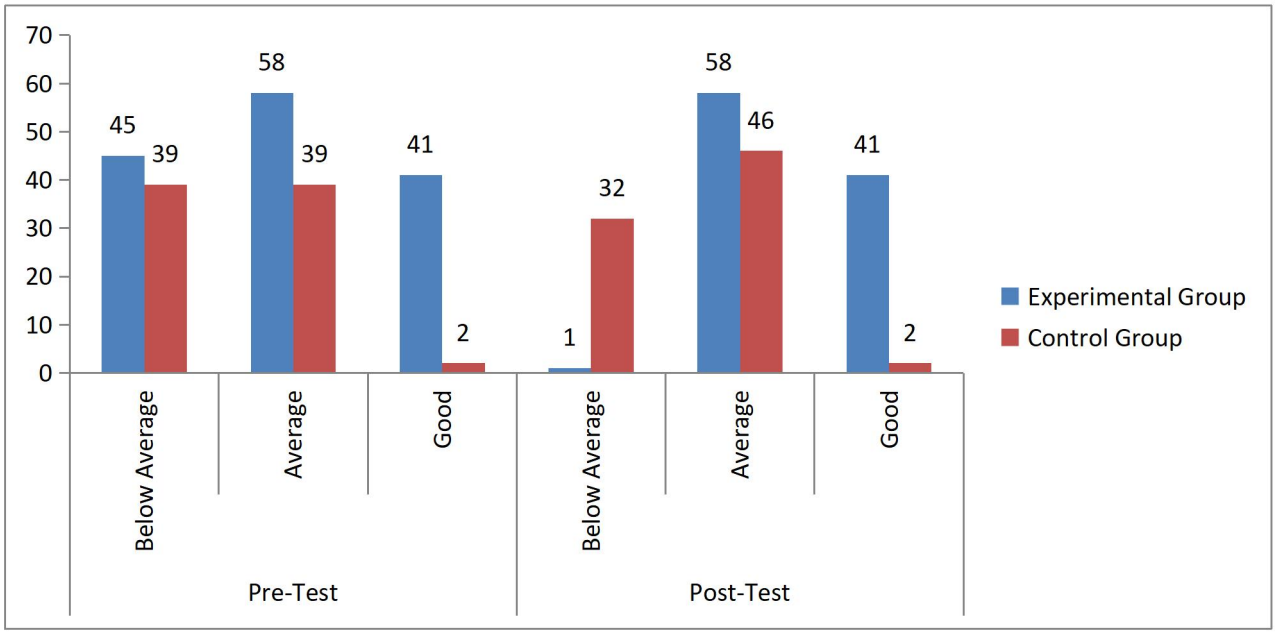

Fig. 1, Both groups exhibited low to average knowledge regarding the environmental and health impacts of single-use plastics. After the awareness program, the experimental group showed significant improvement in knowledge and practices, with 41% achieving a "Good" score, compared to only 2.5% in the control group. In contrast, the control group showed minimal improvement.

TABEL 3: Comparison of mean scores and standard deviation in treatment and comparison Group and within groups

N=180

	pre-test		Post-test		
	Mean	**S.D.**	**Mean**	**S.D.**	**Paired t**
Treatment (n=100)	1.580	0.553	2.400	0.512	-11.026, df=99, Sig.0.000
Comparsion (n=80)	1.537	0.549	1.625	0.536	-2.752, df=79, Sig. 0.007
Unpaired t	0.513, df=178, Sig. 0.608		9.873, df=178, Sig. 0.000		

Table 4 presents the comparison of mean scores and standard deviations between treatment and comparison groups' pre-test and post-test results. The experimental group showed a significant increase in mean scores, with a paired t-value of -11.026, which was statistically significant ($p < 0.000$). The comparison group showed less change, with a paired t-value of -2.752, also significant but less pronounced ($p = 0.007$).

Association with Demographic Variables: Shows that the association between post-test results and experimental group demographics. Post-test results did not significantly correlate with age, gender, wealth, educational attainment, or home location, suggesting that the awareness program had a wide-ranging effect on a variety of demographic groups.

DISCUSSION:

The study's findings highlight how successful community-based awareness campaigns are at lowering the usage of single-use plastic bottles. The significant improvement in knowledge and practices among the experimental group indicates that educational interventions can foster positive behavioral change. The reduction in the use of plastic bottles and the increased awareness about environmental issues align with previous studies that have demonstrated the success of educational campaigns in promoting sustainable behavior.[8,2]

Similar studies have highlighted the global scope of the plastic bottle issue, where plastic waste is especially prevalent, accounts for over 80% of the global plastic waste emitted into the oceans. The health and environmental impacts of plastics, particularly single-use bottles, have led to calls for stronger regulation and more sustainable alternatives.[9] For instance, a study revealed that despite public awareness of the environmental harm caused by plastic bottles, consumer behavior is often driven by convenience and perceptions of bottled water as a safer, more accessible option than tap water. This preference persists even in countries with well-established water safety standards.[10,11]

CONCLUSION

This study shows how well community-based education programs work to cut down on the consumption of single-use plastic bottles. Regarding effects of plastic bottles on environment and human health, participants in the experimental group demonstrated notable gains in both knowledge and behavior. The findings demonstrate how educational initiatives can encourage sustainable practices and lower plastic consumption. Fighting plastic waste and creating a more sustainable future require sustained efforts to increase awareness and promote environmentally appropriate alternatives.

RECOMANDATIONS:

- A Exploratory study can be done to exploring the Long-Term Health Effects of BPA Exposure
- A study can be done to evaluating Alternatives to Plastic Bottles
- A longitudinal study can be done for Tracking the Impact of Plastic Waste on Marine Ecosystems

Ethical Approval:

- Acquisition of Informed consent was done for the study participants.
- Helinski ethical principles were followed during conduction of study.
- Significant Anonymity was maintained during research.

Acknowledgement: We express our sincere gratitude to the scholars whose works are featured and referenced in this book. The authors, editors, and publishers of the books, journals, and articles that formed the foundation of this research are also acknowledged..

Conflict of interest: No conflicts of interest in the conduct or publication of this study.

Funding: Study was independently funded, with no external financial support.

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