

The Perilous Repercussions of Plastic Bags on Health, as well as the Prevailing Sentiment of the Populace towards Alternative Options

Sheetal Barde^{1,*}, Sheela Upendra¹, Jasneet Kaur¹, Ranjit Kumar²

¹Symbiosis College of Nursing, Symbiosis International (Deemed University), Pune, India

²School of Engineering, Ajeenkya DY Patil University, Pune, India

Received December 4, 2023; Revised January 10, 2024; Accepted February 17, 2024

Cite This Paper in the Following Citation Styles

(a): [1] Sheetal Barde, Sheela Upendra, Jasneet Kaur, Ranjit Kumar, "The Perilous Repercussions of Plastic Bags on Health, as well as the Prevailing Sentiment of the Populace towards Alternative Options," *Universal Journal of Public Health*, Vol. 12, No. 2, pp. 277 - 284, 2024. DOI: 10.13189/ujph.2024.120212.

(b): Sheetal Barde, Sheela Upendra, Jasneet Kaur, Ranjit Kumar (2024). *The Perilous Repercussions of Plastic Bags on Health, as well as the Prevailing Sentiment of the Populace towards Alternative Options*. *Universal Journal of Public Health*, 12(2), 277 - 284. DOI: 10.13189/ujph.2024.120212.

Copyright©2024 by authors, all rights reserved. Authors agree that this article remains permanently open access under the terms of the Creative Commons Attribution License 4.0 International License.

Abstract Background: Plastic bags have become a ubiquitous part of daily life, but their accessibility comes with environmental and potential health hazards. While the health concerns associated with plastic bag use are not as widely studied as their ecological influence, there are some concerns worth considering. Objective: The purpose of this study was to delve into the collective comprehension of the general populace regarding the potential health hazards associated with the utilization of plastic bags within residential premises. Additionally, it sought to explore the prevailing dispositions towards embracing substitute options within specific localities of Pune City. Methodology: The current study used a non-experimental descriptive design. The sample size of 100 adults living in the specified Pune Urban Area was determined using a simple random selection procedure. The tool included an organized knowledge survey and an attitude questionnaire about the health risks of using plastic bags in the home and attitudes regarding the usage of alternatives. Results: 65 percent had insufficient knowledge, 35 percent had enough knowledge, and none had sufficient knowledge. Regarding attitude, 44% had an adverse mindset, 53% had an unbiased viewpoint, and three percent had a good attitude about using alternatives. Conclusion: The community health nurse must continually concentrate her efforts on raising women's understanding of the health dangers associated with domestic use of plastic through health education,

media coverage, education programmes, and other ways.

Keywords Plastics, Bags, Domestic, Health Risk, Pune Urban Area

1. Introduction

One of the businesses in India that is expanding quickly is the plastics industry. Plastics production increased by 8% during the previous five years, or 8.5 million tonnes, in 2013. Over the following five years, the rate of growth is predicted to be 10% [1]. Plastic bags are widely used because they are lightweight, durable, and, most importantly, inexpensive. They are also resistant to bacterial, chemical, and UV deterioration. The plastic industry is one of India's fastest expanding industries. Plastics production reached 8.5 million tons in 2013, an increase of 8% over the preceding five years. Over the following five years, the rate of growth is predicted to be 10% [2].

The Philippines is one of the countries that contributes the most plastic to the ocean, according to a survey conducted in 2010 that found between 280 and 750 thousand metric tons of plastic trash there [3].

Plastic bags are widely used due to its lightweight,

resistant to deterioration (caused by the weather, UV light, and microbes), sturdy, and, most importantly, affordable. Although these conveniences are advantageous to the individual users, society as a whole would be burdened by the issues and costs associated with disposing of plastic goods [2]. After entering the environment, plastic takes anywhere from 15 to a thousand years to decompose [4]. Both the environment and human health are in jeopardy [5]. Littered plastic bags act as a mosquito breeding habitat when rainwater collects in them, in addition to obstructing drains. In an area where malaria is endemic, this can make the problem worse.

People utilize plastic bags to transport products they have purchased from businesses, such as clothing and food. Plastic bags are used often despite the fact we are aware of the harm they cause to the environment. When it regards municipal solid waste, plastic bags have assumed a major position in the trash system. As a result, there have been many detrimental environmental effects, including animal exhaustion, contamination, channel, river, and stream blockage, and terrain modification. Concern over these consequences has been expressed by the general public, activists, and legislators to the extent that certain national governments have banned the use of shopping bags made of plastic.

Plastic bag packaging for hot edible products allows hazardous chemicals to migrate into meals. These include styrene, which is toxic, phthalates, and bisphenol, which causes diabetes and heart and liver damage [6]. As a result, it is past time to transition to alternative packing and transportation materials. "The Plastics Manufacture, Sale, and Usage Rules 1999, as updated in 2003 by the Indian Environment (Protection) Act of 1986, prohibits the production, use, storing, dispersion, or selling of carry-on bags made of virgin or recycled plastic, as well as the littering of plastic items" [7].

Environmental Impact

The reality that bags made of plastic take so long to break down has a serious adverse effect on the environment. In addition, when plastic bags burn, a toxic material is released into the air, adding to ambient air pollution, and when plastic bags degrade in sunlight, harmful compounds are released into the soil. According to, using plastic bags could facilitate the unregulated build-up of carcinogenic compounds, which could lead to the propagation of malignant illnesses. Plastic bags are carelessly thrown into landfills around the world, which occupy thousands of hectares of space, emit dangerous methane and carbon dioxide emissions, as well as highly poisonous leachates during the decomposition stage [8].

The environment, including the health of people and animals, is significantly endangered by waste from plastic bag production. If bags of plastic are not disposed of properly, they can have an adverse effect on the environment by generating litter and clogging storm water

drains.

Additionally, plastic bags can trap animals, causing them to drown. The bags are frequently mistaken for food by animals, who then eat them, slowing down their digestive processes. Animals getting entangled in ocean waste, and especially plastic bags, may cause lack of food, choking to death laceration, infection, decreased reproduction accomplishment, and mortality [9]. There were occasions where big vulnerable turtles were discovered to have died because of the accidental ingestion of bags of plastic mixed with seaweed [10].

Action must be taken right once to halt this trend because plastics are now prevalent across the marine ecosystem. Despite plastics being recognised as a problem in marine settings since the 1970s, plastic contamination in aquatic and freshwater ecosystems has only recently been identified as a global issue. Governments, scientists, non-governmental groups, and the general public are increasingly gravely concerned about the pollution of marine life by plastic bags [6].

Many nations have currently banned the use of plastic bags, either completely or in part. Others are coming up with options to effectively handle plastic waste or are using other materials, although plastic and plastic bags are still widely used in many countries, particularly for food goods. Adequate legislation, including tax and levies, penalties for production restrictions, and restrictions on the use of plastic bags, is urgently needed. Many nations have implemented voluntary taxes and tax schemes to reduce the use of plastic bags and the difficulties associated with natural garbage [10].

Given the growing concern over the past year about the dangers that the plastics constitute to the environment, it is very impressive that many brands, major shopping centres, and marketplaces in urban areas as well as major metropolitan areas have begun to transition from disposable plastic to reusable jute as well as cotton bags. This is a really encouraging start in the direction of a healthier ecosystem.

Keeping in mind the aforementioned facts, the researcher decides on a topic to gauge public awareness and attitude regarding the potential hazards associated with using plastic bags at home. As the public becomes more informed, they should be able to prevent these potential hazards by adopting an optimistic attitude regarding the utilization of alternatives. In a chosen urban region in Pune, the study sought to gauge broad public awareness of the health concerns associated with household use of plastic bags as well as views regarding the adoption of alternatives.

2. Method

Research Approach

The current study's methodology is a descriptive study approach. Descriptive research addresses a variety of issues,

including the relationships among factors, testing of questions, and the development of generally applicable generalisations, principles, or theories. They look for defining features. As a lot of the behaviour patterns that the investigator had an interest in cannot be set up in a realistic context, the method of descriptive research is particularly appropriate in the behavioural sciences. Because they concentrate on the relationships between unchanged variables, they are not experimental [9].

Design

We did a research study that was cross-sectional, descriptive, and correlative in nature. A cross-sectional research was chosen because its findings may be readily extrapolated to a wide population within a very brief timeframe. The study involved Men and women from specific urban areas of Pune.

Study Sample

The sample size calculation in G Power was conducted to determine the appropriate number of participants needed for a research with a significance level of 0.05 and a statistical power of 0.95. The researcher in the current study estimated a sample size of 100 males and female between the ages of 20 and 60 years, and were selected using a convenient sample technique and who lived in specific urban areas of Pune city.

Selection Criteria

Those who had agreed to take part in the study, and were available during the data collection period. People were barred from participating if they could not read, interpret, or react in Hindi or Marathi and were unwilling to do so.

Tools

A self-made questionnaire and the five-point Likert scale were used as instruments. The following is a description of the tools:

Questionnaire Structure

It was divided into two pieces. Section A contained six items pertaining to socio-demographic data. Another tool contained 20 items, covering over-all info about the use of plastic (8 questions), health risks associated with plastic (8

items), plastic disposal (2 items), and alternatives to plastics (2 items). The total was divided into three categories: satisfactory awareness (>75%), somewhat satisfactory awareness (51-75%), and insufficient awareness (50%).

The Likert Scale

The attitude measure consists of 14 positive questions, each with a possible response on a 5-point rating scale. For the six unfavorable questions, a rating of five was awarded for a strong agreement, 4 for agreeing with 3 for neutral, two for disapproving, and 1 for strongly disagreeing; thus, an overall of 100 marks were provided for interpreting the score, which was classified into a negative mindset (50%), neutral mindset (51-75%), and a favorable mindset (>75%).

Reliability

The reliability of the tool was assessed using the split-half method. The reliability value was $r = 0.88$ for knowledge and $r = 0.71$ for attitude.

3. Results

Section I: Socio-demographic Distribution of General Population

According to table 1, majority of participants (56%) were within those in the age range of 21 and 30; 18 (18%) were within the age of 31 and 40; and 26 (26%) were within the age of 41 and 50. In terms of educational attainment, the majority of subjects (57 (57%) had primary schooling, 15 (15%) had informal schooling, 23 (23%) had secondary schooling, and only 5 (5%) graduated from college. Gender wise distribution shows majority of the subjects 68 (68%) were female and 32 (32%) were male. When it came to occupation, among the majority of the subjects, 51 (51%) were unemployed, 34 (34%) were private-sector workers, 5 (5%) were government employees, and 10 (10%) were running their own businesses. In terms of family structure, the majority of respondents (70%) belong to a nuclear family, while only 30 (30%) belong to a joint family.

When it came to the utilization of plastic, 100 (100%) of the participants used it. In terms of use, most of the subjects (82%) used it for multipurpose storage, while 18 (18%) used it for grocery storage.

Table 1. Frequency and percentage distribution of socio-demographic variables of General Population according to their age, educational status, occupation, and type of family

Socio-demographic variables	Frequency	Percentage
Age in years		
21–30	56	56
31–40	18	18
41–50	26	26
51–60	-	-
Educational status		
Non-formal education	57	57
Primary education	15	15
Secondary education	23	23
Graduation	5	5
Others	-	-
Occupation		
Housewife	51	51
Private employee	34	34
Government employee	5	5
Business	10	10
Others	-	-
Family Type		
Nuclear	70	70
Joint	30	30
Family income (Rs/month)		
<2500	25	25
2500–3000	20	20
3000–3500	12	12
3500–4000	13	13
>4000	30	30
Use of plastic		
Yes	100	100
No	-	-
Type of use		
Storage of food items	32	32
Multipurpose	68	68

Section II: Level of Knowledge regarding Health Risks of Plastic Bag

Fig 1 demonstrates that when it comes to general awareness about plastic bags in home use, 40 (40%) of the individuals had insufficient knowledge, 60 (60%) had fairly adequate understanding, and none had adequate knowledge. When it came to the health risks of plastic, 42 (42%) of the individuals had insufficient information, 56 (56%) had somewhat adequate understanding, and 2 (2%) had adequate knowledge. In respect to plastic garbage disposal, 68 (68%) of those surveyed had insufficient knowledge, 30 (30%) had fairly adequate knowledge, and

2 (2%) had sufficient understanding. In terms of the utilization of substitutes to plastic, 65 (65%) of the individuals had insufficient information, 22 (22%) had fairly adequate understanding, and 23 (23%) had adequate knowledge.

Section III: Attitude regarding Usage of Plastic Alternatives

Fig 2 reveals that the majority of those surveyed (75%) had a neutral view, 20 (20%) had a negative attitude, and only 5 (5%) had a positive attitude towards the usage of alternatives.

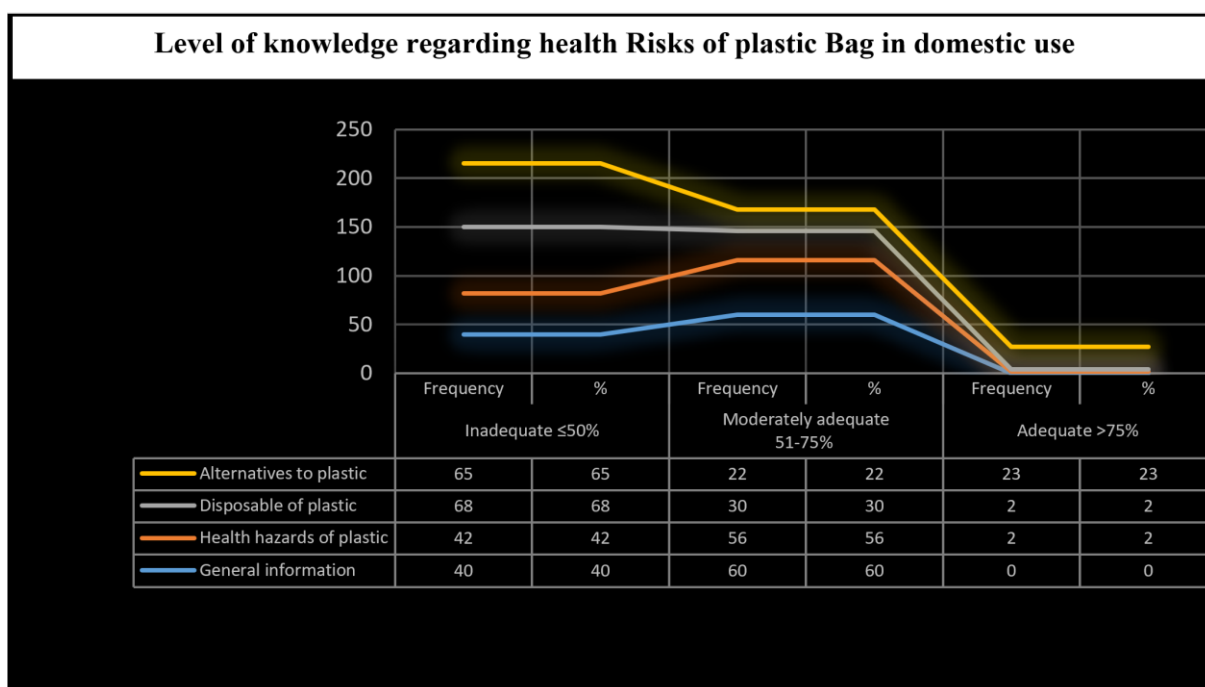


Figure 1. Knowledge of potential health risks

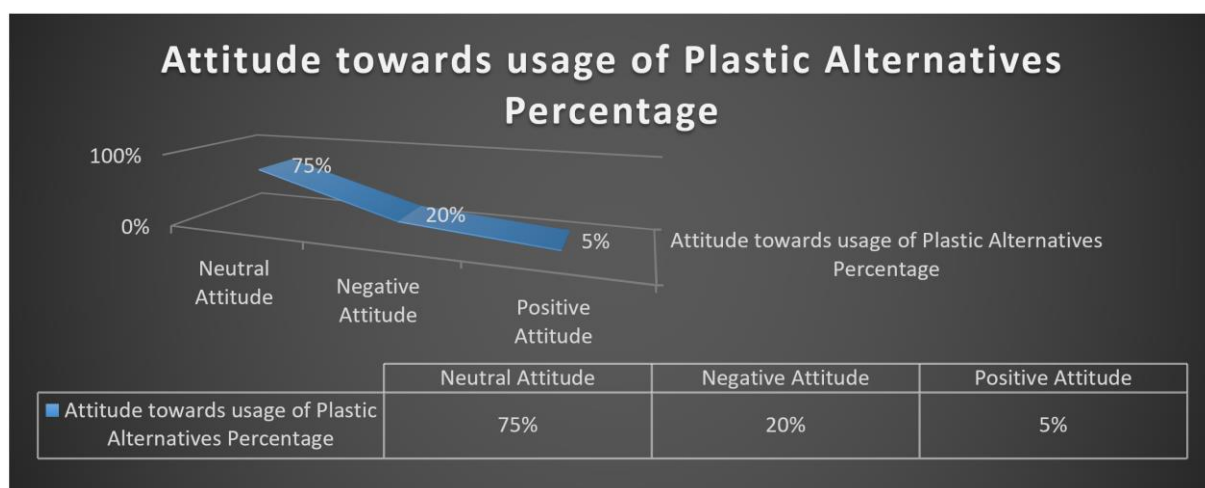


Figure 2. Attitude regarding usage of plastic alternatives

4. Discussion

The majority of research participants had a basic understanding of the health risks associated with plastic consumption. This was greater than the results of studies done across India and other parts of the world, when 50-81.1% of participants knew of the potential health hazards [11]. A Delhi-based study found that, compared to our findings, only 74.3 percent of housewives and 81.5% of professionals were aware of the health dangers associated with the usage of plastics [12]. However, the survey conducted in Delhi found that learners (93%) and those with lower incomes (52%) had higher awareness levels than our observations. Any awareness campaign must focus on student awareness. As a component of their academic curriculum, students are expected to learn about a variety of societal public health concerns, such as the risks associated with the usage of plastic bags.

In a Guwahati-based investigation, despite using plastic bags on a regular basis, those living in Guwahati city nevertheless have to deal with the fact that they are bad for the environment. The fact that all respondents agreed that their actions harm both people and the environment demonstrate that individuals are aware of this. The report also reveals that some of Guwahati's environmentally concerned residents employ alternatives to plastic bags. Only 38% of people choose this alternative, although 62% find it to be the least bothersome, which is an unsatisfactory percentage to support this statement. In this poll, respondents also brought out another disadvantage of using plastic bags, namely the high cost of biodegradable alternatives to polythene bags [13].

The Economic Times published findings from a market research firm on June 21, 2018, which stated that "while more than 85 percent of those who took part were conscious of the plastics use prohibition and the adverse impacts of plastic on environment." These reports might be used to support this study. Another article published by Times of India with the headline "Prolonged use of plastic bags a health hazard" on June 3, 2017, also states that "Experts argue plastic bags consist of polymers and chemical toxins like lead, cadmium, mercury, and cancer-causing agents and direct contact with these substances over a long period of time can have serious health consequences" [14].

The numerous methods for making information easily accessible should help to enhance awareness-raising efforts. Displaying banners to raise consciousness of the usage of alternate bags, for example, could be an effective low-cost information technique [15]. Plastic bag safety pamphlets should be placed at checkouts or cash registers in supermarkets and retailers. Television and radio can also aid in the spread of knowledge. This will encourage kids as well as adults to use more ecologically pleasant bags, such as fabric or paper bag [12]. The study indicated that the most prevalent reasons for selecting plastic bags were ease of availability, followed by durability [16].

A large proportion of respondents (58.26%) in a study by Adane and Muleta valued the vital roles that television and radio stations played in spreading knowledge about the harmful impacts of plastic bag trash, next to school (27.82%) and written content (19.13%) [17]. Students who participated in this study said that 83.15% of the knowledge they gained regarding the origins of plastic debris was acquired in educational settings, followed by 80% from broadcast media and 17.89% from written sources. Just 9.47% of the people surveyed in the current study were aware that plastic objects are reusable, compared to 94.2% in Kanagabala et al. study and 71.6% in study [18]. In contrast to Kanagabala et al. who claimed 95.6% of those surveyed understood that fabric bags are a substitute for plastic bags, this investigation shows that 80% of students understand that cloth carriers are used as a substitute to a plastic one, followed by bags made from paper (75.78%) and carriers made of jute (64.21%). According to researcher over three quarters of the research's respondents stated that cloth bags are a preferable alternative to plastic bags. Additionally, it was noted that separating waste (12.1%), reducing plastic use (63.1%), and safely removing waste (49%) are some methods for reducing the risks associated with plastics. But according to this study, reducing usage (75.78%) and separating and disposing of waste properly (12%) are the best strategies to do this [19].

For a number of reasons, the environmental problems brought on by plastic bags are increasingly worse in developing countries [20]. The reason that they are so commonly used may be due to merchants or supermarket owners giving them free single-use plastic shopping bags [21].

Another study's findings showed that all respondents believed plastic bags to be affordable, practical, and easily accessible. Accordingly, more than 60% of study participants said they use five or more plastic bags or more each week for shopping. Similar results were found in a study report from Ethiopia, where 76.5% of the respondents said they used plastic bags more often when they went shopping [22]. Comparable to how it is used in other developing nations. For instance, an adult consumes more than 500 plastic bags annually on average in Jordan [23]. The development of plastic manufacturing sectors as primary business strategies, the absence of sustainable alternatives, and a lack of policy that addresses the challenges are what are driving the rising use of plastic bags. The environmental issues caused by bags made of plastic are getting worse in emerging nations for a variety of reasons. They may be used so frequently because retailers or supermarket managers provide them with complimentary disposable plastic shopping bags [24].

5. Conclusions

Plastic waste management requires strict regulations that are upheld by regulatory agencies. Society should be

conscious of correct usage, especially in low-income and uneducated communities, and should properly dispose of their plastic garbage in bins or containers that have been set up just for that purpose. This is a really encouraging start in the direction of a healthier ecosystem. This survey indicated that 74% of respondents had insufficient information of the health risks related with plastic bags in household use, 36% had fairly sufficient understanding, and none had adequate knowledge. In terms of attitude quality, 75% were negative, 20% were neutral, and 5% were positive about the usage of alternatives.

6. Limitations

1. Samples were restricted to a certain region.
2. The study cannot be generalized due to the small sample sizes.
3. The study's generalizability was restricted by the non-probability method of participant selection.

7. Recommendations

It is advised that future scholars do large-scale research in order to generalize this finding. Additionally, it is advised that future researchers perform pre-experimental and quasi-experimental studies to ensure that different strategies can be carried out to raise awareness of the dangers of using plastic bags. Implementation of policies that ban or restrict the use of plastic bags in educational institutions, promoting the adoption of reusable alternatives. Another innovative way can be proposing incentive programs for schools that actively reduce their plastic footprint, recognizing and rewarding efforts to implement sustainable practices. Supporting research initiatives that investigate the specific challenges and opportunities related to plastic bag use in educational settings, providing data to inform evidence-based policymaking.

Acknowledgements

The authors would like to thank the Symbiosis College of Nursing and the Symbiosis International (Deemed University) for supporting this research activity.

Conflict of Interest

“The authors have no conflicts of interest associated with the material presented in this paper”.

Funding

The study was self-funded. No other source of funding.

REFERENCES

- [1] Ali Chamas, Hyunjin Moon, Jiajia Zheng, Yang Qiu, Tarnuma Tabassum, Jun Hee Jang, Mahdi Abu-Omar, Susannah L. Scott, and Sangwon Suh, "Degradation Rates of Plastics in the Environment," *ACS Sustainable Chemistry & Engineering*, vol. 8, no. 9, pp. 3494-3522, 2020. DOI: 10.1021/acssuschemeng.9b06635
- [2] Jonathan Schachter and Rachel Karasik, "Plastic Pollution Policy Country Profile: Philippines," *Nicholas Institute for Environmental Policy Solutions*, 2022, pp. 2-9.
- [3] Deocaris CC, Fernandez MC, Lee AR, Miao SLA, Padolina JBP. "Identification and Characterization of Microplastics on the Surface Water in Laguna de Bay, Philippines," *Nature Environment and Pollution Technology*, vol. 22, pp 1073–80. 2023. Available from: DOI: 10.46488/NEPT.2023.v22i02.055
- [4] Mehnaz Shams, Iftaykhairul Alam, Md Shahriar Mahbub, "Plastic pollution during COVID-19: Plastic waste directives and its long-term impact on the environment," *Environmental Advances*, vol. 5, pp. 1-11, 2021. DOI: 10.1016/j.envadv.2021.100119
- [5] Akhter N and Panhwar SK, "Baseline Study of Microplastics in the Gastrointestinal Tract of Commercial Species Inhabiting in the Coastal Waters of Karachi, Sindh, Pakistan", *Frontiers in Marine Science*, vol. 9, pp. 1-8, 2022. DOI: 10.3389/fmars.2022.855386
- [6] Eriksen M, Maximenko N, Thiel M, Cummins A, Lattin G, Wilson S, Hafner J, Zellers A, Rifman S., "Plastic pollution in the South Pacific subtropical gyre", *Marine Pollution Bulletin*, vol. 68, no. 1-2, pp. 71-76, 2013. DOI: 10.1016/j.marpolbul.2012.12.021.
- [7] Joseph N, Kumar A, Majgi SM, Kumar GS, Prahalad RBY, "Usage of Plastic Bags and Health Hazards: A Study to Assess Awareness Level and Perception about Legislation Among a Small Population of Mangalore City", *Journal of Clinical Diagnostic Research*, vol. 10, no. 4, pp. LM01, 2016. Available from: /pmc/articles/PMC4866139/
- [8] Plant JA, Voulvoulis N, Ragnarsdottir KV, "Introduction," *Pollutants, Human Health and the Environment: A Risk Based Approach*, 2012, pp. 1–14. Available from: <https://onlinelibrary.wiley.com/doi/book/10.1002/9781119950127>
- [9] Carpenter EJ, Smith KL, "Plastics on the Sargasso sea surface", *Science*, vol. 175, no. 4027, pp. 1240-1241, 1972. Available from: <https://pubmed.ncbi.nlm.nih.gov/5061243/>
- [10] Wang B, Li Y. "Plastic bag usage and the policies: A case study of China", *Waste Management*, vol. 126, pp. 163–169, 2021. Available from: <https://pubmed.ncbi.nlm.nih.gov/33770615/>
- [11] Das S, Prasad N, "An initiative towards curbing the usage of plastic bags in supermarkets: A case study in Chennai, India", *Handbook of waste management*, 2014, pp. 238–55. Available from: https://www.researchgate.net/publication/262002388_An_Initiative_Towards_Curbing_the_Usage_of_Plastic_Bags_in_Supermarkets_A_Case_Study_in_Chennai_India

- [12] Thiruketheeswaranathan, Suthajini, "Usage of Plastic Bags and Environment, Health Hazards: A Study to Assess Awareness Level Among a Small Population of Trincomalee Town," *Middle East Journal of Applied Science & Technology*, vol. 2, no. 3, pp. 42-44, 2019. Available at SSRN: <https://ssrn.com/abstract=3446353>
- [13] Sung, Gooi Bee. "Ban On Plastic Bags Usage: Is it a Right Move? An Empirical Study on Consumer Perception and Practice," *Environmental Science, Business*, 2010.
- [14] Kakoti R, Ranjeeta Kakoti C. "Uses of plastic bags and environmental hazard- A study in Guwahati city", *International Journal of Applied Research*, vol. 3, no. 7, pp. 1088-1094, 2017. Available from: <https://www.allresearchjournal.com/archives/?year=2017&vol=3&issue=7&part=P&ArticleId=4182>
- [15] Bahattare V N, Salunke S S, Nagaonkar A S, "A study of knowledge and practices about single use plastics among residents in UHTC area," *MedPulse International Journal of Community Medicine*, vol. 14, no. 1, pp. 07-12, 2020. DOI: 10.26611/10111412
- [16] Khanam, Najnin et al. "Knowledge, attitude and practice on uses of plastic products, their disposal and environmental pollution: A study among school-going adolescents." *Journal of Datta Meghe Institute of Medical Sciences University*, vol. 14, pp. 57-60, 2019. DOI: 10.4103/jdmimsu.jdmimsu_27_19
- [17] Adane L, Muleta D, "Survey on the usage of plastic bags, their disposal and adverse impacts on environment: A case study in Jimma City, Southwestern Ethiopia", *Journal of Toxicology and Environmental Health Sciences*, vol. 3, no. 8, pp. 234-248, 2011. Available online at <http://www.academicjournals.org/JTEHS>
- [18] Joseph N, Kumar A, Majgi SM, Kumar GS, Prahalad RBY. "Usage of Plastic Bags and Health Hazards: A Study to Assess Awareness Level and Perception about Legislation Among a Small Population of Mangalore City", *Journal of Clinical and Diagnostic Research*, vol. 10, no. 4, pp. LM01-LM04, 2016. Available from: <https://pubmed.ncbi.nlm.nih.gov/27190841/>
- [19] "Survey On Plastic Bags: People want paper bags, not plastic bags, 80 percent people gave their opinion in the survey," *Hindustan News Hub* [Internet], 2023. Available from: <https://hindustannewshub.com/india-news/survey-on-plastic-bags-people-want-paper-bags-not-plastic-bags-80-percent-people-gave-their-opinion-in-the-survey/>
- [20] Ari E, Yilmaz V. "Consumer attitudes on the use of plastic and cloth bags", *Environment, Development and Sustainability*, vol. 19, no. 4, pp. 1219-1234, 2017. Available from: https://ideas.repec.org/a/spr/endesu/v19y2017i4d10.1007_s10668-016-9791-x.html
- [21] Starovoytova Madara D, Sitati Namango Charles Wetaka S. "Consumer-Perception on Polyethylene-Shopping-Bags," *Journal of Environment and Earth Science*, vol. 6, no. 11, 2016. Available from: www.iiste.org
- [22] Saidan MN, Ansour LM, Saidan H. "Management of Plastic Bags Waste: An Assessment of Scenarios in Jordan", *Journal of Chemical Technology and Metallurgy*, vol. 52, no. 1, pp. 148-54, 2017.
- [23] David M. Evans, Rorie Parsons, Peter Jackson, Sarah Greenwood, Anthony Ryan, *Understanding plastic packaging: The co-evolution of materials and society, Global Environmental Change*, Vol. 65, pp. 1-8, 2020. <https://doi.org/10.1016/j.gloenvcha.2020.102166>
- [24] Hay SI, Abajobir AA, Abate KH, Abbafati C, Abbas KM, Abd-Allah F, "Global, regional, and national disability-adjusted life-years (DALYs) for 333 diseases and injuries and healthy life expectancy (HALE) for 195 countries and territories, 1990-2016: a systematic analysis for the Global Burden of Disease Study 2016", *Lancet*, vol. 390, no. 10100, pp. 1260-344, 2017. Available from: <https://pubmed.ncbi.nlm.nih.gov/28919118/>