Nep J Environ Sci (2025), 13(2), 47-58
https://doi.org/10.3126/njes.v13i2.84110

ISSN 2350-8647 (Print) 2542-2901 (Online)

Research Article

Knowledge and attitudes towards plastic waste management in selected educational institutions of Nepal

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(Received: 25 September 2025; Revised: 06 December 2025; Accepted: 09 December 2025)

Abstract

Plastic waste is an unavoidable consequence of the high consumption and production of plastic, which pose serious threats to the environment and public health. The present survey was carried out to evaluate awareness, attitudes, and practices among the respondents with respect to plastic waste. The responses were collected from 77 participants representing different educational institutes in Nepal using a closed-ended questionnaire. The present survey indicates that dumping and storage are the most commonly practiced methods of plastic waste management in Nepal, presenting limited availability of other management practices. The present survey report revealed that the frequency of the use of plastic items is very high among the respondents, since 80.5% of participants used plastic items every week. Most respondents (80%) were aware of the environmental impacts of plastic waste and emphasized the recycling and upcycling of plastic waste for its management. Statistical analysis, such as the Chi-Square test and Kendall's rank correlation, was carried out to understand the knowledge and behavior towards plastic waste in different educational institutes. The result of the Chi-Square test revealed that there were no significant differences in knowledge and behavior towards plastic waste in different educational institutes. Similarly, the correlation analysis revealed a significant negative correlation between the knowledge and awareness of plastic waste and the use of plastic. The present result emphasizes on environmental education and improving management systems for positive behavioral transformation towards sustainable plastic waste management.

Keywords: Dumping and storage, educational institutes, Nepal, plastic waste, recycling, survey

Introduction

Plastic is a durable and flexible high molecular weight material composed of a long carbon chain, which may be synthetic or semi-synthetic. It is derived from the word 'pliable', which means easily shaped and correctly fits its property (Evode et al., 2021). The unique characteristics of plastics, such as versatility, resistance to contamination and erosion, cost-effectiveness, and ease of synthesis, have increased their attraction over other materials in the modern era (Bhandari et al., 2021; Lomwongspoon & Varrone, 2022; Pan et al., 2020). Among different classes of plastic, polyvinyl chloride (PVC), polyethylene (PE), polyethylene terephthalate (PET), polypropylene (PP), polyurethane (PUR), and polystyrene are highly popular in the synthesis of different commodities in our daily life (Rodrigues et al., 2019). In the present context, plastic is used for multipurposes for the manufacture of different items like furniture, packing materials, bags, utensils, pipes, etc., for domestic use, along with medical and electrical appliances (Gunjan et al., 2021; Sharma & Mallubhotta, 2019).

The high production and consumption of plastic in the world have resulted in the issue of plastic waste. In the global context, the plastic waste produced per annum increased significantly from 242 million tons in 2016, 360 million tons in 2018 to 460 million tons in 2019 and is expected to increase by over 0.50 billion tons by the year 2025 if it tends to increase in the current ratio (Bai et al., 2019; Facts, 2019; Kaza et al., 2018; OECD, 2022). According to a recent report from the International Trade Center, Asia is very forward in plastic waste production, and itself contributes to half of the plastic waste generated in the world (Plastic Europe, 2019). In Nepal, 242,000 tons of plastic waste is produced annually, of which a large fraction (85%) is not managed properly, whereas only 4 % undergoes the recycling process (SWITCH–Asia Policy Support Component, 2023).

Since plastic is very common and vital in our daily lives, its proper management is a great challenge. Plastic waste not only affects human life and the environment but also disturbs biodiversity and the ecosystem, along with different hazards such as air pollution, water pollution, and land pollution (Crinnion, 2010; Elliott et al., 1996; Khanal et al., 2023; Laist, 1987; Li et al., 1995; Wang & Shi, 2022). A huge fraction of the total plastic waste (about 80%) is dumped in landfills and open spaces, whereas only 9% is recycled, accounting for mismanagement of 32% of plastic in the global context (Cabernard et al., 2022; Gourmelon, 2015). In Nepal, plastic waste is mostly managed by the old practice of dumping in open landfills or burning, and 20.7 kilo tons are leaked into the environment, resulting in the release

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of greenhouse gases and environmental degradation (Aryal & Adhikari, 2024; Maharjan, 2024).

In the context of our country, the government of Nepal has enacted several acts, like the Solid Waste Management Act, 2011 AD, and the Solid Waste Management Rules, 2013 AD, with the sole aim of controlling, managing, and minimizing plastic waste and creating a healthy environment (Maharjan et al., 2024). But, due to the lack of proper public awareness and strict implementation of these laws and legislation, plastic waste management has been ineffective in Nepal. There are various methods for the management of plastic waste, such as recycling (chemical recycling and biological recycling), gasification, pyrolysis, adding value to plastic by its use in nanotechnology, energy recovery, etc. (Achilias et al., 2007; Kujawa et al., 2007; Ragaert et al., 2017). Out of the total plastics produced in the world, 94% are thermoplastics, which can be easily recycled (Aryan et al., 2019). Recycling is an important and scientific method of managing plastic waste in which a recycled product is generated by adding additives and using high energy (Ejlertsson, 2003; Xin et al., 2020). Though it is an effective and eco-friendly approach, there is limited recycling of plastic waste. Unfortunately, the dumping of plastic waste is used as the only method for plastic management, as other alternative methods have not been significantly practiced to date.

The usage of plastic commodities is high, but their management aspect is very poor, as the majority of plastic waste gets deposited in landfills, rivers, and open places, resulting in various forms of environmental pollution. Most of the previous studies were concerned with the usage of plastic bags and the production of plastic waste, plastic upcycling potential in Nepal (Bharadwaj et al., 2021; Khanal, 2022; Park et al., 2024). The present study addresses the knowledge gap by studying the influence of different factors, such as knowledge, attitudes, and practices, on plastic waste management. The purpose of the present study is to identify knowledge, attitudes, and behaviour on plastic waste among respondents in different educational institutes and to assess the relationship between the knowledge and their behaviour towards plastic waste.

Materials and Methods

Population and sample

In the present survey, 77 respondents belonged to the age group (below 18 to 50) years from rural, suburban, and urban areas of Nepal. The three educational institutes: Central Department of Chemistry, Kirtipur Kathmandu, Nepal (CDC), Shree Model Secondary School Dharapani Bhimban, Dhanusha Dham, Dhanusha Nepal (SMSS), Shree Janta Secondary School, Yadukuha, Dhanusha, Nepal (SJSS) were selected for the study. Out of 77 respondents, 19.5% (15 out of 77) were from CDC, 46.75% (36 out of 77) from SJSS, and 32.46% (25 out of 77) were from SMSS, implying the majority of respondents were from SJSS in the present study.

Methodology for data collection

For data collection, a closed-ended questionnaire including the basic information about the respondents, such as their gender, age, residential information, the tendency to use plastic items, awareness and concern about the impact of plastic items on the environment, as well as their knowledge of plastic waste management, was prepared. The questionnaire was prepared via Google Forms and distributed among the participants through Facebook. The collected survey data were analysed using SPSS 19 and illustrated using pie charts as well as bar graphs using Microsoft Excel.

Statistical Analysis

In the present study, responses from different educational institutes were collected with regard to their knowledge and behavior on plastic waste. The data generated during the study consist of both categorical variables (e.g., awareness levels, responses to yes/no questions, frequency categories) as well as ordinal variables (e.g., Likert-scale responses such as "strongly agree" to "strongly disagree" or frequency scales). For interpreting the associations and relationships between the variables, two non-parametric statistical tests, i.e., *Chi*-Square test of independence and Kendall's rank correlation coefficient, were performed. The tests were used to analyze the relationship between knowledge, attitudes, and behavioral practices regarding plastic waste management. The utility of these tests aligned with the research objectives and nature of the data in the present study.

The *Chi*-Square test was used to examine the association between two categorical variables. It was determined at 5% significance level for each questionnaire by calculating the frequency of each answer in different educational institutes to estimate the significant differences in knowledge and practice of plastic waste management in different educational institutes in the present study. Similarly, Kendall's rank correlation was evaluated to understand the strength and direction of association between ordinal variables, such as the relationship between knowledge and behavior towards plastic waste. The answer options of each question were ranked to obtain ordinal data.

The answer to each question relating to knowledge on plastic waste was coded such that higher scores reflected greater awareness and more positive knowledge of plastic waste issues, i.e., higher coding refers to more positive/knowledgeable about plastic waste and its impact.

The questions relating to knowledge of plastic waste are as follows:

Q 1. How aware are you of the environmental impact of plastic waste? (very aware = 3, neutral = 2, very unaware = 1)

Q2. Do you believe that plastic waste is a significant environmental issue? (Strongly agree = 3, neutral = 2, strongly disagree = 1)

Q 3. Have you heard about microplastics and nanoplastics? (Yes =1, No = 0)

Similarly, for the responses for the different questions relating to behaviour on plastic waste, all items were coded such that higher scores reflected more environmentally responsible or positive behaviors in order to ensure consistency in interpretation. The questions referring to behaviour on plastic waste is given below:

Q 1. How often do you use single-use plastic items (e.g., plastic bags, bottles, straws)? (Weekly =1, monthly =2, never =3)
Q 2. Do you separately store and dump plastic waste? (Always = 3, Sometimes = 2, Never =1)
Q 3. Do you believe NGOs are doing enough to reduce plastic waste? (Yes =3, No = 2, Unsure = 1)
Q 4. Do you think value can be added to plastic waste through recycling and upcycling? (Strongly agree = 3, neutral = 2, strongly disagree = 1)

Results and Discussion

The survey was carried out to figure out the perspective on plastic waste, its environmental impact, and management techniques. Out of 77 respondents, 19.5% (15 out of 77) were from CDC, 46.75% (36 out of 77) from SJSS, and 32.46% (25 out of 77) were from SMSS, implying the majority of respondents were from SJSS in the present study.

General information about the participants

Gender of participants

From the survey report, 57.14% (44 out of 77) of the participants represented male, and 42.86% (33 out of 77) represented female respondents, which is presented in Figs 1A and 1B, respectively. The male respondents were higher in CDC and SMSS. In contrast to the fact, female respondents exceeded male respondents by 5.5% in SJSS.

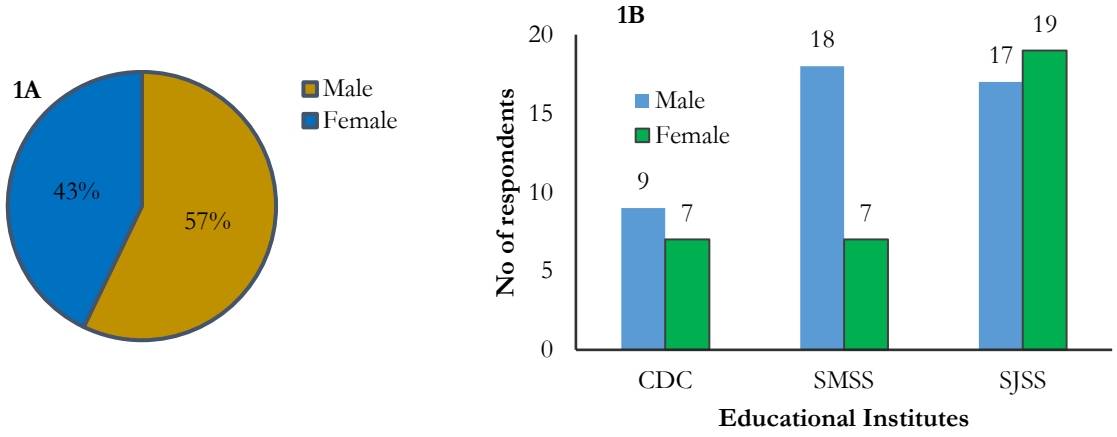

Figure 1A. Total respondents in the present survey (in %) based on gender, **1B:** Gender-wise respondents in different educational institutes.

Age of participants

The age of respondents varied from (under 18 to 50) years, which is represented in Fig. 2. More than 50% of the participants from CDC, SMSS, and SJSS belonged to the 18- 30 years age category. About 37% (29 out of 77) participants from SMSS and SJSS were below 18 years. Similarly, 3.9% of respondents (3 out of 77) represented the (31-50) age group, which was from the CDC only.

Residential information of participants

From the results depicted in Fig. 3, the respondents from CDC, SMSS, and SJSS represented rural, suburban, and urban areas. More than half of the respondents (61%, 47 out of 77) were from rural areas, of which the majority were from SJSS. About one-fourth (19 out of 77) of the respondents were from urban areas. Similarly, the lowest number of participants (14.2%, 11 out of 77) were from suburban areas. The report covered the participants from rural to urban areas.

Information on plastic waste and environmental issues

Awareness of the environmental impact of plastic waste

Among the total respondents, 82% (63 out of 77) strongly agreed that plastic waste creates environmental issues, implying the majority of respondents were aware of the adverse impact of plastic wastes on the environment and public health. Similarly, 17% (3 out of 77) of respondents were neutral about the fact. Only about 1% (1 out of 77) of SJSS were unaware of the environmental impact of plastic waste. From Fig. 4, the majority of participants from CDC (93.7%, 15 out of 77), SMSS (68%, 17 out of 77), and SJSS (86%, 31 out of 36) claimed that they were quite aware of the significant correlation between the environmental impact of plastic waste. Furthermore, there were no significant differences among the different educational institutes in responses to the questionnaire relating to awareness among the respondents with respect to the negative impact of plastic (χ^2 = 5.186, df = 2, p = 0.075). The

level of awareness in different educational institutes was similar with regard to the impact of plastic waste. The high level of awareness among the respondents from CDC compared to SMSS and SJSS regarding plastic waste is due to the fact that educational level, achievements, as well as specialization have a prominent effect on the awareness, opinion, understanding, as well as impact of plastic waste (Yalcinkaya & Çetin, 2018).

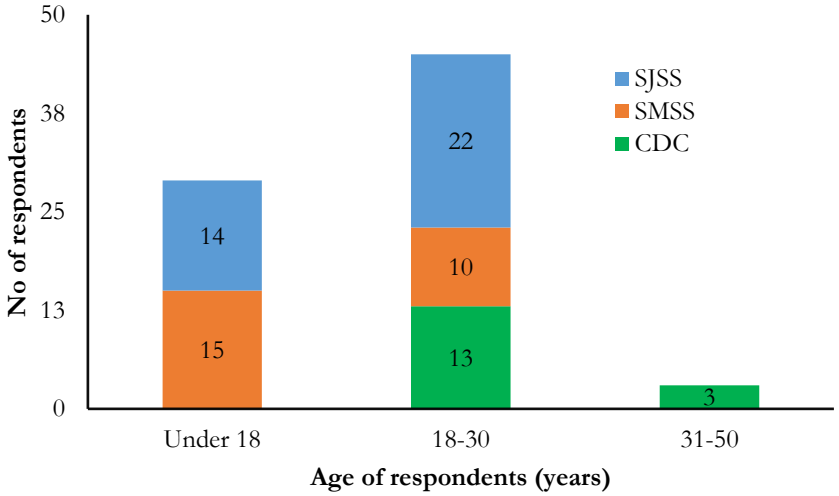

Figure 2. Age distribution of respondents in different educational institutes.

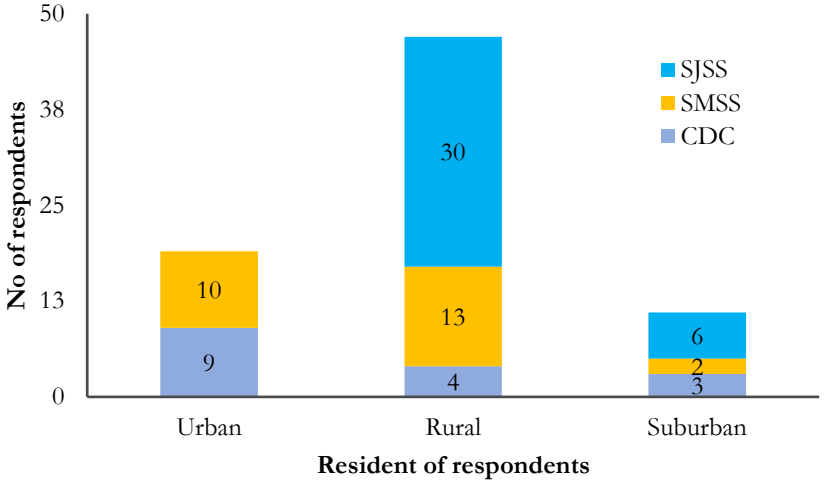

Figure 3. Residential information of respondents of different educational institutes.

Plastic waste as a significant environmental issue

The survey illustrates that out of 77 respondents, 67.5% (52 out of 77) strongly agreed that plastic waste causes environmental issues, but 22% (17 out of 77) of respondents from SMSS and SJSS were neutral to the fact, which is shown in Fig. 5. Only 10% (8 out of 77) of respondents from CDC and SJSS were against the fact that plastic waste causes significant environmental issues. The majority of respondents from CDC (93.75%), SMSS (72%), and SJSS (52.7%) were in agreement with the positive correlation between environmental issues and plastic waste. Similarly, there was a significant difference among the educational institutes about their understanding of plastic waste as a significant environmental issue ($\chi^2 = 13.025$, df = 4, p = 0.011). The respondents in CDC were highly aware of the environmental issue of plastic waste in comparison to respondents from SMSS and SJSS. The high level of awareness among the respondents in the present study is in alignment with the previous studies (Akindele & Alimba, 2021; Anokye et al., 2024; Ayeleru et al., 2018; Basuhi et al., 2021), in which most of the educated respondents were highly aware of the serious effects of plastic waste on the ecosystem and emphasized that the management of plastic waste is affected by the awareness of people regarding the negative impact of plastic on the environment.

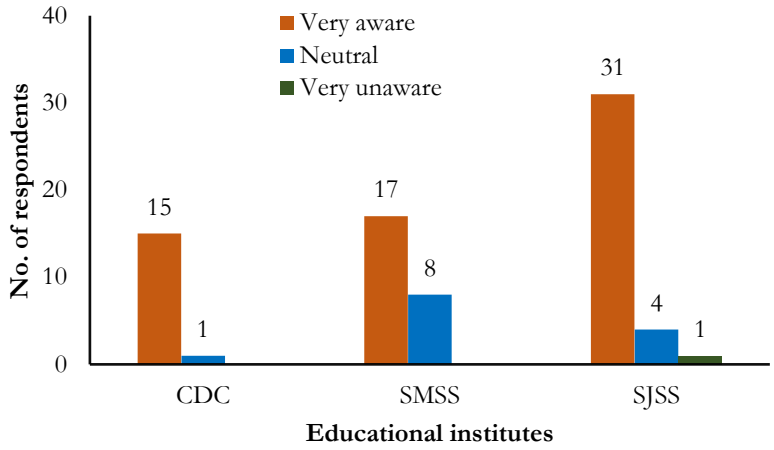

Figure 4. Awareness among the respondents in different educational institutes about the impact of plastic waste on the environment

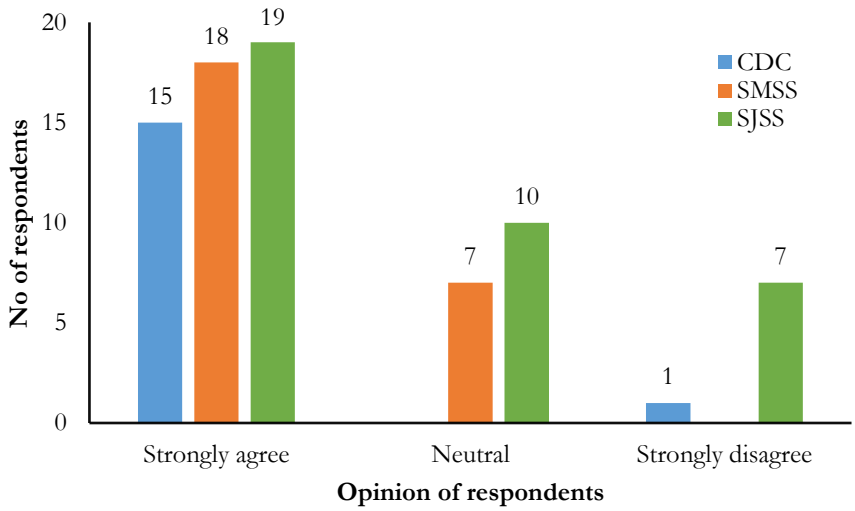

Figure 5. Responses regarding plastic waste as a significant environmental issue

Knowledge of microplastics and nanoplastics

The respondents' knowledge about microplastics and nanoplastics, as presented in the current survey, is illustrated in Fig. 6. Among the total respondents of 77, 51.9% (40 out of 77) claimed that they had good knowledge of microplastics and nanoplastics. But 48.05% (37 out of 77) lack proper knowledge of microplastics and nanoplastics. A higher number of respondents, 87.5% (14 out of 16) from CDC and 56% (14 out of 25), knew plastics and nanoplastics, but the majority of respondents, 66.67% (24 out of 36) from SJSS, had no idea about this regard. The survey indicated that the respondents from the CDC had a good understanding of microplastics and nanoplastics in comparison to the respondents from SMSS and SJSS ($\chi^2 = 13.263$, df = 2, p = 0.001), since there were significant differences in the knowledge of microplastics and nanoplastics among different educational institutes.

In the present study, the majority of the respondents from CDC were well acquainted with the knowledge of microplastics and nano plastics, whereas most of the respondents from other educational institutes, i.e., SJSS and SMSS, lack their understanding and impacts. The differences in understanding micro- and nano-plastics among the respondents are because respondents in CDC are well exposed to up-to-date information, research projects, seminars, advanced courses, and journals regarding recent trends on plastic waste problem and management. However, respondents from SJSS and SMSS with a secondary level curriculum focus on knowledge with broad environment topics and lack exposure to current environment research, emerging pollutants, and have knowledge of broad environment topics only. The result is in agreement with the study by Anokye et al. (2024), which emphasizes that the educational level affects the level of awareness regarding plastic waste.

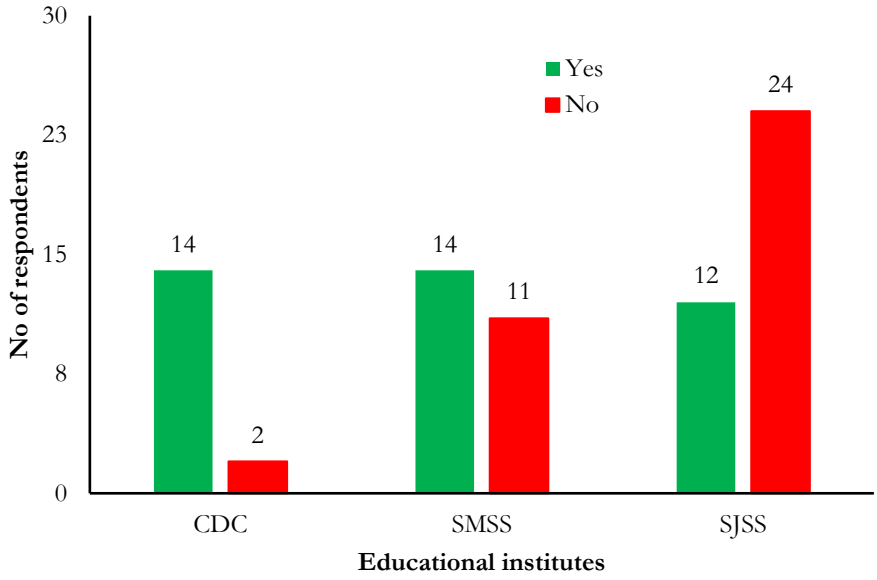

Figure 6. Knowledge among the respondents in different educational institutes regarding microplastics and nanoplastics

Use of plastic items

Figure 7 depicts the data on how often the participants in the survey use plastic items. The majority of respondents (80.5%, 62 out of 77) use plastic items every week, and 5.2% (4 out of 77) use plastic items every month. In addition to this, 14.28% (11 out of 77) of respondents from SMSS and SJSS have never used plastic items in their day-to-day life. There was no significant difference among the educational institutes about the use of plastic items (χ^2 = 5.267, df = 4, p= 0.261). In the present study, high usage of plastic items was observed among the participants; the result aligned with the study of Bharadwaj et al. (2021). In comparison to SJSS and SMSS, respondents from CDC were observed for frequent use of plastic items. The previous studies also revealed higher waste generation in urban cities and households due to a lack of resources and monitoring mechanisms (Park et al., 2024). The results of the current study clearly exhibited a discrepancy in the knowledge and behaviour of respondents regarding plastic. The strong willingness towards plastic products may be due to their several positive traits, viz, light weight, durable, versatile, and economical nature (Azeez, 2018). Similarly, no better substitute for plastic, a lack of penalties for high plastic usage, as well as ineffective implementation and monitoring of laws and policies on plastic by the government, act as factors for enhancing plastic consumption in Nepal (Park et al., 2024).

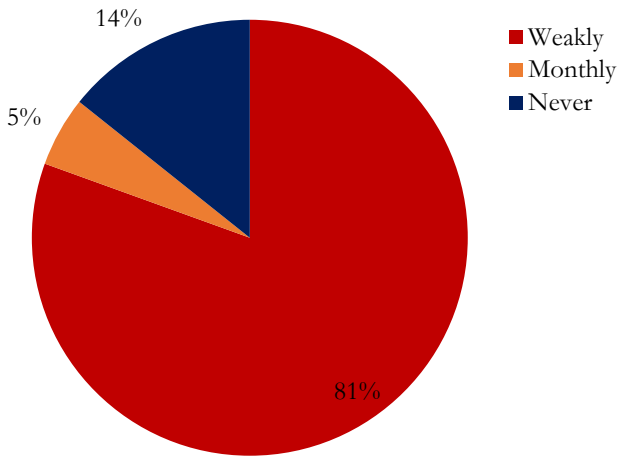

Figure 7. Information on the usage of plastics by the respondents from different educational institutes

Knowledge of the storage and dumping of plastic waste

The survey report illustrates that the majority of respondents, 44% (34 out of 77), claimed that they always store and dump plastic waste, which is shown in Fig. 8. Similarly, 28.57% (22 out of 77) dumped and stored plastic waste sometimes, but 38.96% (30 out of 77) responded that they had never dumped or stored the plastic waste. From the report, more respondents from the CDC, 68.75% (11 out of 16), always dumped and stored plastic waste, implying respondents from the CDC are more alert to plastic waste management and storage in comparison with respondents from SMSS and SJSS. However, there was no significant association of the knowledge of management of plastic waste, i.e., store and dump plastic waste, and the educational institutes (χ^2 = 9.327, df = 4, p =0.053).

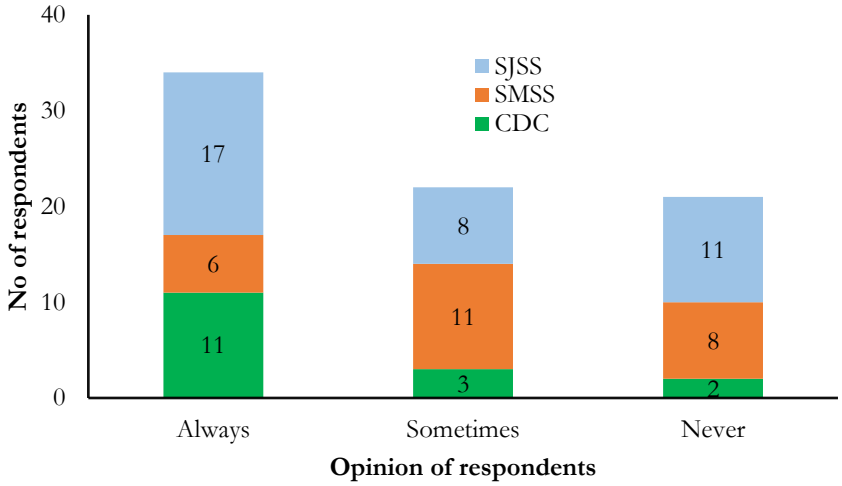

Figure 8. Storage and dumping practice of plastic waste by the respondents in different educational institutes

The majority of participants from the CDC were aware of plastic waste management, whereas most of the participants followed storage and dumping as a method of plastic management. However, more than 30% respondents were also observed with a lack of awareness of managing plastic waste, mostly from SJSS and SMSS. The differences in education level, access to information, access to the internet, awareness programs, and educational resources between respondents of university level (CDC) and secondary level (SJSS and SMSS) account for the disparity in knowledge of plastic waste management. Similarly, Khanal et al. (2021) and Khatoon et al. (2020) also revealed poor plastic waste management with landfilling and dumping near sources of water, along with limitations of source segregation. The study by CGED also revealed the weak enforcement of laws and policies on plastics, and its monitoring mechanism creates a hindrance to plastic waste management (Maharjan et al., 2024). The use of landfills as a plastic waste management strategy has been surpassed by other plastic waste management strategies like reuse, recycling, and recovery of plastic waste (CGED, 2023).

Recycling and upcycling of plastic waste

The responses on whether the recycling and upcycling of plastic waste adds value to the plastic waste from the survey conducted in different educational institutes are represented in Figs. 9 and 10. A maximum of the respondents (94.8%, 73 out of 77) were in strong agreement with the fact that recycling and upcycling of plastic waste adds value to plastic waste. About 2.5% (2 out of 77), basically from CDC and SJSS, were neutral to the fact, and 2.5% (2 out of 77) from SMSS and SJSS expressed their strong disagreement with the fact. However, there were no significant differences in the responses from different educational institutes regarding recycling and upcycling of plastic waste (χ^2 = 2.091, df = 4, p = 0.719).

The majority of the respondents in the present study were positive about the fact that recycling plastic waste is for its management. The different recycling methods, such as biological recycling, chemical recycling, mechanical recycling, thermal recycling/pyrolysis for plastic waste, have been discussed with due emphasis on mechanical recycling for managing the plastic waste in Nepal (Bhandari et al., 2021). In the context of Nepal, the process of recycling plastic is not at a satisfactory level. Khanal et al. (2022) emphasized that the lack of an effective sorting and collection system is a major hindrance to recycling plastic waste in Nepal. Similarly, Caldera et al. (2020) explained different challenges for an effective recycling system, such as effective policies, funding by the government, lack of skilled manpower, equipment, etc. Hence, the government and NGOs need to initiate community-based strong initiatives and action plans for recycling and upcycling of plastic waste, as this management strategy is highly supported by respondents.

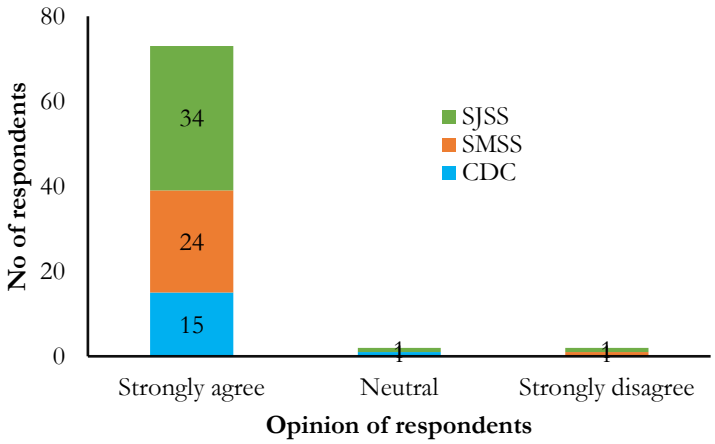

Figure 9. Information from the respondents regarding the recycling and upcycling process, in addition to the value of plastic waste

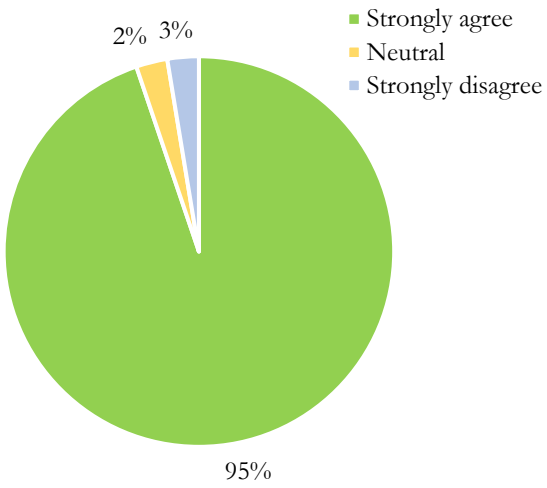

Figure 10. Opinion of respondents on recycling and upcycling plastic waste

Role of NGOs in plastic waste management

The data showing the effectiveness of the role of NGOs in plastic waste management and control collected from the current survey is presented in Fig. 11. Out of 77 participants, 44.16% (34 out of 77) believed that the role of NGOs is sufficient in plastic waste reduction, whereas 38.96% (30 out of 77) have expressed their dissatisfaction with the role of NGOs in minimizing plastic waste. Similarly, 16.9% (13 out of 77) of respondents were not sure whether the actions of NGOs are sufficient or not in solving the plastic waste problem. Forty four percent (11 out of 25) of SMSS and 55.56% (20 out of 36) of SJSS were satisfied with the present role of NGOs, but in contradiction to the fact, 50% (8 out of 16) respondents from CDC were not satisfied with the role of NGOs in plastic waste management. There were significant differences among the educational institutes in the evaluation of the effectiveness of NGOs in plastic waste management ($\chi^2 = 9.652$, df = 4, p = 0.047). The respondents in the current study were not fully satisfied with the role of NGOs in plastic waste management and control. The study shows that NGOs must further intensify their significant role in the plastic waste problem and management in different geographical regions through awareness-raising campaigns and training on recycling, proper storage, separation, and dumping of plastic waste, as well as alternatives to plastics. NGOs are important organizations that have a significant role in raising public awareness as well as assisting the government in effective plastic waste control and management (Hermawan et al., 2020).

Integration of topics relating to plastic and its products in the curriculum

In response to the questionnaire stating the topics relating to plastic and plastic-based products in the present curriculum, a higher number of respondents 54.54% (42 out of 77) have given preferences to all the topics i.e. environmental impact of plastic waste, environmental benefits of plastic waste, employment opportunities from plastic and plastic waste to be included in the curriculum which is presented in Fig. 12. About 27% (23 out of 77) have chosen the environmental impact of plastic, 14.2% (11 out of 77) have chosen the environmental benefits of plastics, and only 1.29% (1 out of 77) have given preference to

employment opportunities from plastic waste as an important topic to be covered in the present curriculum. When the topics regarding the impact of plastic waste are included in the curriculum, it assists in raising awareness among people, which brings behavioral changes in them regarding plastic waste and its sustainable management (Hartley et al., 2018).

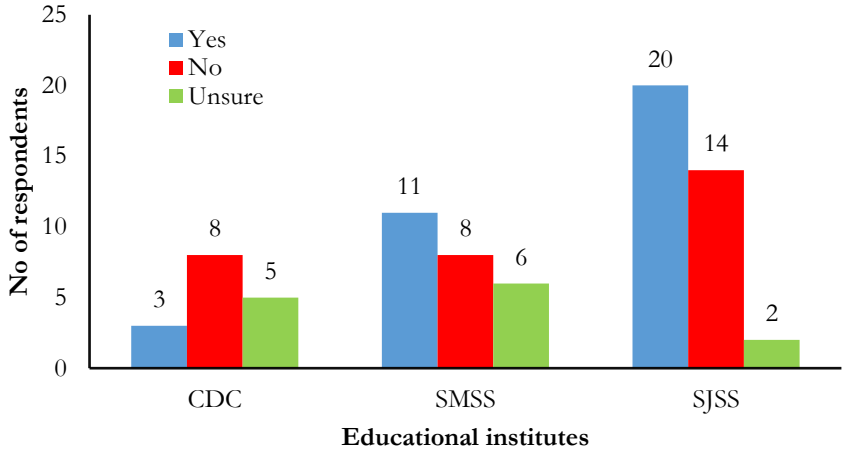

Figure 11. Opinion of respondents from different institutes about the effectiveness of the involvement of NGOs in plastic waste management

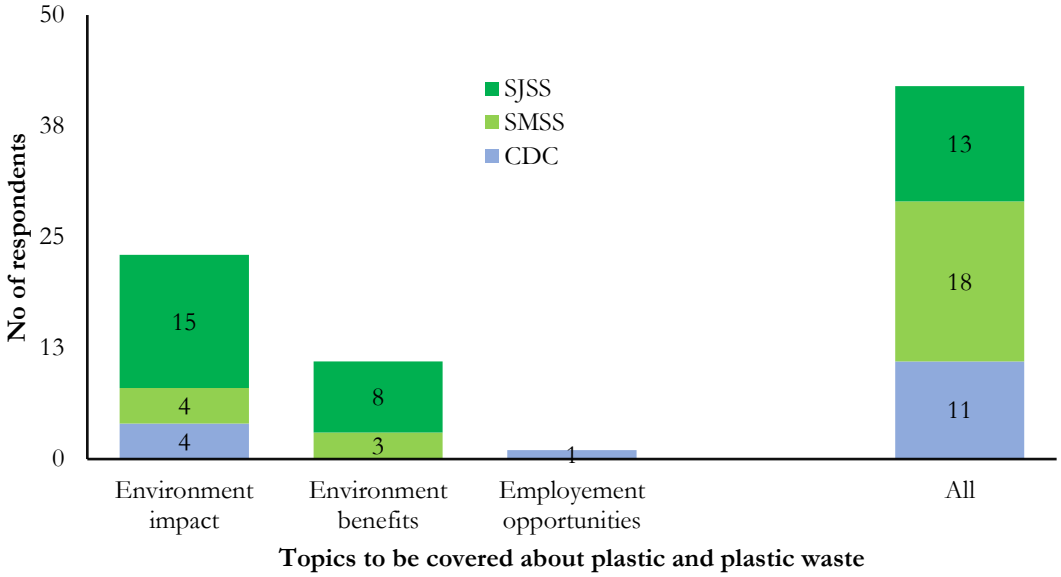

Figure 12. Preferred topics for institutes to be included in the present curriculum regarding plastic and plastic waste by the respondents from different educational institutes

Correlation Analysis

The association of knowledge and awareness of plastic waste and behavior of the respondents from different educational institutes for its management is determined by calculating Kendall's rank correlation for all the variables. The result of the correlation analysis is presented in Table 1.

There was a significant positive correlation between awareness of plastic waste in the store and management of plastic waste ($r = 0.602$, $p < 0.001$) and reuse and recycle of plastic ($r = 0.493$, $p < 0.001$). The awareness of people regarding plastic waste plays a significant role in plastic waste management. Similarly, the significant positive correlation between awareness of plastic with knowledge of microplastic and nano plastic (0.490, $p < 0.001$) as well as the environmental impact of plastic (0.619, $p<0.001$) indicates that the respondents with proper awareness of plastic waste issues are with good understanding of microplastic and nano plastic as well as the adverse effect of plastic on environment. The significant negative correlation between use of plastic items with awareness on plastic (0.686, $p < 0.01$), knowledge of microplastic ($r = 0.5$, $p <0.01$), store and manage plastic ($r = 0.614$, $p <0.001$), reuse and recycle of plastic ($r = 0.467$, $p < 0.001$), knowledge of plastic

waste as environment issue ($r = 0.742$, $p < 0.001$) implies that on increasing the awareness, understanding and good knowledge of negative impact of plastic as well as method of proper management of plastic help in reduction of the consumption of plastic in daily life. Similarly, the role of NGO is significant in creating awareness on plastic waste and its proper management since there is a positive correlation between the role of NGO with storing and managing plastic ($r = 0.441$, $p < 0.001$), knowledge of plastic as an environmental issue ($r = 0.433$, $p< 0.001$). The result from correlation analysis in the present study is in accordance with the theory of behavioral change, which explains that an increase in knowledge helps to develop positive attributes to cause a positive impact on the environment (Steg & Vlek, 2009). In the present study, the theory is supported by a negative correlation between the knowledge of plastic waste and the use of plastic items, which was in alignment with the study of Situmorang et al. (2020). The respondents from different educational institutes with good knowledge of the impact of plastic waste have positive attributes to manage plastic waste, as well as its reduction.

Table 1: Kendall's rank correlation between knowledge on the negative impact of plastic waste and students' behavior to reduce plastic waste (N = 77).

	Awareness of plastic	**Use of plastic**	**Knowledge of microplastics**	**Store and manage plastic**	**Role of NGO**	**Reuse and recycling of plastic**	**Plastic waste as environmental issue**
Awareness of plastic	-						
Use of plastic	**-0.686****	-					
Knowledge of microplastics	**0.490****	**-0.500****	-				
Store and manage plastic	**0.602****	**-0.614****	**0.654****	-			
Role of NGO	0.212	**-0.278****	**0.356****	**0.441****	-		
Reuse and recycle plastic	**0.493****	**-0.467****	**0.242***	**0.297****	0.022	-	
Plastic waste as environmental issue	**0.619****	**-0.742****	**0.686****	**0.716****	**0.433****	**0.382****	-

* Correlation is significant at the 0.05 level, ** Correlation is significant at the 0.01 level., * ** Correlation is significant at the 0.001 level.

Conclusions

Plastic waste is emerging as a serious environmental issue due to high usage of plastic and its poor management. In the context of Nepal, landfill dumping is popularly utilized for plastic waste, which results in environmental pollution, challenging ecological integrity, and public health. There is growing awareness among the educated population regarding the impacts of plastic waste and the preference for alternative management like recycling and upcycling. In order to overcome the limitations of current plastic management practices, proper integration of environmental education, sustainable management, and advanced topics like microplastics and nanoplastics has to be prioritized. Similarly, community engagement programs led by NGOs, waste collection strategies, and infrastructure development assist in developing positive behavioral attributes for sustainable management of plastic waste. In the present study, a small sample size limits statistical power and the generalizability of results. Hence, the future study with a large sample size, coverage of other variables (effect of additives on plastics), diverse demographic and regional groups, with a longitudinal study with mixed methods, is suggested for further study for an extensive representative study and deep insights into knowledge, attitudes, and practices regarding plastic waste management.

Acknowledgements: One of the authors (Chandradip Kumar Yadav) would like to thank Rajarshi Janak University for this research work, which was awarded under the scheme of the Innovative Idea Award-2080BS. This research was funded by the Research Center, Rajarshi Janak University (RJU), Janakpurdham, Madhesh Province, Nepal (Innovative Idea Award 2080 B.S.).

Author Contributions: CKY: Conceptualization, methodology, project administration, writing – original draft, funding acquisition, data curation; JM: Writing – original draft, software, data analysis, writing – review & editing; DKY and RKJ: Investigation, resources, formal analysis; AB: Visualization, validation, writing – review & editing.

Conflicts of Interest: The author declares no conflicts of interest.

Data Availability Statement: The data that support the findings of this study are available from the corresponding author upon reasonable request.

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