

Original Research Article

PUBLIC KNOWLEDGE, ATTITUDE, PRACTICE OF SINGLE USE PLASTICS AND PERCEPTION ABOUT THE LEGISLATION IN A RURAL AREA

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ABSTRACT

Background: Single-use plastics (SUP) account for nearly half of the 300 million tonnes of plastic produced worldwide each year and persist in the environment for decades despite being used only briefly. Andhra Pradesh alone generates an estimated 46,222 tonnes of plastic waste annually, and the Plastic Waste Management (Amendment) Rules, 2021 now ban identified SUP items of low utility and high littering potential. Data on public knowledge, attitude, practice (KAP) and perception of this legislation in rural India remain limited. The Objective is to assess the knowledge, attitude and practice of SUP, and the perception about legislation banning SUP, among residents of a rural area of Visakhapatnam district.

Materials and Methods: This descriptive cross-sectional study was conducted in the field practice area of the Rural Health Training Centre of a private medical college over two months using multistage random sampling, 362 permanent residents aged ≥ 18 years were interviewed with a pre-tested, semi-structured questionnaire. Data were analysed in SPSS version 22 using descriptive statistics, Pearson's chi-square test and other appropriate tests, with $p < 0.05$ considered significant.

Results: The mean age of participants was 37 ± 11.9 years, with females (55.2%) outnumbering males. Mean knowledge, attitude and practice scores were 18.0 ± 4.0 , 19.4 ± 3.2 and 6.5 ± 4.1 respectively. Good knowledge was seen in 90.6% and a good attitude in 97.0% of participants, but only 28.7% demonstrated good practice. Occupation was significantly associated with poor practice ($p < 0.01$). Plastic bags/covers (60.2%) and mineral water bottles (59.9%) were the items most used regularly, mainly because they were easily available, lightweight, cheap and convenient. A majority (86.7%) supported legislative banning of SUP and were willing to adopt eco-friendly alternatives.

Conclusion: Rural residents demonstrated sound knowledge and a favourable attitude toward SUP, but actual practice remained poor, reflecting a marked knowledge-practice gap. Sustained behaviour-change interventions, occupation-targeted strategies and strict enforcement of existing legislation are needed to translate awareness into safer practice.

Keywords: Single-use plastics, Knowledge, Attitude and Practice, Rural population, Plastic ban legislation, Environmental pollution, Cross-sectional study.

INTRODUCTION

Over 300 million tons of plastic is produced worldwide every year and half of this is single use plastics (SUP) which is utilized for just a few moments, but lasting on the planet for at least hundred years.^[1] Plastics are synthetic substances made from organic polymers such as polythene, PVC and nylon that can be moulded into any shape while soft and then made it into firm or slightly elastic structure.^[2] They form are an ideal material for single-use disposable devices as they are easy to use, economical, lightweight and biocompatible.^[3,4] Average per capita consumption of plastic in India in the year 2014-2015 is about 11 kg. An estimate by the Ministry of Petroleum and Natural Gas suggests that the annual per capita consumption in India would be 20 kg by 2022.^[5] As per the details provided by 35 states/UT the estimated plastic waste generation during the year 2019-2020 is approximately 34,69,780 tonnes per annum (TPA). The estimated plastic waste generation in Andhra Pradesh is approximately 46,222 TPA during the time period.^[6] The average daily solid waste including all kinds of plastic in Visakhapatnam is 920 tonnes with gross per capita generation working out to be 470 gm/capita/day.^[7]

SUP are referred to as not reusable plastics which are commonly used for plastic packaging and include substance meant to be used only once before thrown away or recycled.^[4]

They are commonly used for plastic packing and also include grocery bags, food packing, bottles, straws, containers, cups and cutlery.^[8] Plastic bags are among the most commonly used single use plastic items with an estimated usage of 500 billion plastic bags each year worldwide.^[9]

Most of the plastics are non-biodegradable and slowly break down into smaller fragments known as micro plastics. The SUP waste accumulation causes environmental pollution that can be exhibited in several ways. Common problems associated with it are the deterioration of natural beauty of the environment and danger to the existence of domestic and wild animals.^[10]

The Ministry of Environment, Forest and Climate change vide notification dated 12th August 2021 notified the Plastic Waste Management (Amendment) Rules 2021. It aims to prohibit identified SUP items having low utility and high littering potentials, by the year 2022.^[11]

Hence the present study is conducted with an aim to study the public knowledge, attitude and practice of SUP and perception about legislation on SUP in a rural area of Visakhapatnam district.

Objectives

- To assess the knowledge, attitude and practice of single use plastics (SUP) among the people residing in a rural area.

- To assess the perception about legislation banning the use of single use plastics (SUP) among those residents.

MATERIALS AND METHODS

This descriptive cross-sectional study was carried out in the field practice area of the Rural Health Training Centre (RHTC) of a private medical college over a period of 2 months, from 12 October 2023 to 12 December 2023. The study population comprised people residing in the field practice area of the RHTC. The sample size was calculated using the formula $n \geq Z^2 p q / l^2$ taking a prevalence of 70% from a previous study¹², 95% confidence interval, and 5% absolute precision, which yielded a minimum sample size of 325; after adding 10% for non-response, the final sample size was 358. Permanent residents aged 18 years and above who were cooperative and willing to participate were included in the study, while residents below 18 years of age and those who were sick were excluded. A multistage sampling technique was used. After obtaining permission from the Institutional Ethical Committee (RC.No.GVPIHCMT/IEC/20231017/04), written informed consent was taken from all participants after explaining the nature, purpose, and conduct of the study. In the first stage, all sub-centres in the field practice area were listed, and one sub-centre was selected by simple random sampling. In the second stage, all villages in the selected sub-centre were enumerated, and one village was chosen randomly. In the third stage, all households in the selected village were listed, and 358 households were selected by simple random sampling. Since the number of households in the selected village was insufficient, another village was selected randomly after removing the initially selected one from the list to complete the required sample size. Households that remained locked after three consecutive visits were excluded and replaced by the next randomly selected household. Data were collected using a pre-tested, pre-designed, semi-structured questionnaire administered through interviews with residents of the selected households after explaining the study. The questionnaire was translated into the local vernacular language. Confidentiality was maintained by ensuring that the information collected was not disclosed and was stored securely, with access limited to the investigator and the guide. The questionnaire collected socio-demographic details such as age, gender, literacy, occupation, and per capita monthly income, along with information on knowledge, attitude, and practices regarding single-use plastics and perceptions about legislation banning them. Socio-economic status was assessed using the modified B.G. Prasad classification¹³ based on the All India Consumer Price Index for Industrial Workers for September 2023, which was 137.5¹⁴. Participants who answered at least 50% of

the questions correctly in the knowledge, attitude, and practice domains were classified as having good knowledge, good attitude, and good practice, respectively. The collected data were entered into Microsoft Excel spreadsheets and analyzed using SPSS version 22. Descriptive statistics such as

percentages and mean with standard deviation were used, along with inferential statistics including Pearson's chi-square test and other appropriate tests. A p-value of less than 0.05 was considered statistically significant.

RESULTS

Table 1: Distribution of study participants as per socio-demographic variables (n=362)

Variable	Category	Frequency	Percentage
Age group in years	18-25	96	26.5
	25-35	53	14.6
	35-45	112	30.9
	45-55	86	23.8
	>55	15	4.1
Gender	Male	162	44.8
	Female	200	55.2
Education	Illiterate	23	6.4
	Primary	8	2.2
	Secondary	27	7.5
	Higher secondary	75	20.7
	Graduate	169	46.7
	Post Graduate	60	16.6
Occupation	Student	72	19.9
	Housewife	52	14.4
	Unskilled	14	3.9
	Semi-skilled	26	7.2
	Skilled	114	31.5
	Professionals	84	23.2
SES as per modified B.G. Prasad's classification of SES	Class I (Upper Class)	161	44.5
	Class II (Upper Middle Class)	137	37.8
	Class III (Middle Class)	22	6.1
	Class IV (Lower Middle Class)	29	8.0
	Class V (Lower Class)	13	3.6

Out of 362 study population, majority (30.9%) of them were in the age group of 35-45 years. The mean age of the study subjects was 37 + 11.9 years with a range being 18-63 years. Females, 200(55.2%) outnumbered the males,162 (44.8%).

Majority (46.7%) of the study population were graduates. Most (31.5%) of them were skilled workers. Maximum (44.5%) were in Class I or Upper Class as per modified BG Prasad's classification of socio-economic status.

Table 2: Distribution of study subjects as per knowledge of single use plastics (n=362)

Domains	Frequency	Percentage
Predominant single use plastic		
Plastic juice straw	248	68.5
Plastic coffee cup	195	53.9
Mineral water bottle	303	83.7
Food plastic container	235	64.9
Plastic bag/cover	280	77.3
Plastic cutlery	190	52.5
Plastic plates and cups	203	56.1
Important source for plastic bag generation		
Supermarket	293	80.9
Fish market	244	67.4
Vegetable market	256	70.7
Departmental store	258	71.3
Garbage disposal	256	70.7
Meat stall	260	71.8
Single use plastic effect on health		
Not harmful	19	5.2
Harmful	323	89.2
Not aware	20	5.5
If harmful		
Respiratory diseases	322	89.0
Cancer	316	87.3
Others	314	86.7
Single use plastic results in global warming and climate change		
True	350	96.7

False	12	3.3
Single use plastic will affect the following species		
Animals	357	98.6
Birds	347	95.9
Marine fish	352	97.2
None are affected	36	9.9
The time taken for the plastic to degrade		
Few months/<1 year	12	3.3
Few years/<50 years	37	10.2
Very long time	226	62.4
Doesn't degrade	87	24.0
Whether single use plastic is banned in their area		
Yes	181	50.0
No	116	32.0
Don't know	65	18.0

Among the various single-use plastic items, mineral water bottles were most commonly identified (83.7%), followed by plastic bags/covers (77.3%) and plastic juice straws (68.5%). Regarding sources of plastic bag generation, supermarkets were recognized as the predominant source (80.9%), followed by meat stalls (71.8%) and departmental stores (71.3%).

A large majority of participants (89.2%) perceived single-use plastics as harmful to health, and among those who considered it harmful, respiratory diseases (89.0%) and cancer (87.3%) were the most commonly cited effects. Nearly all respondents

(96.7%) agreed that single-use plastic contributes to global warming and climate change. With respect to species affected, animals (98.6%), marine fish (97.2%), and birds (95.9%) were widely recognized as being impacted by single-use plastics.

Regarding the perceived degradation time of plastic, 62.4% of participants believed it takes a very long time to degrade, while 24.0% believed it does not degrade at all. Only half of the participants (50.0%) were aware that single-use plastic was banned in their area, while 32.0% were unaware of any ban and 18.0% did not know.

Table 3: Distribution of study subjects as per attitude on single use plastics (n=362)

Domains		Frequency	Percentage
Concerns related to plastic use			
Littering and dirty looks	Disagree	69	19.1
	Not sure	72	19.9
	Agree	221	61.0
Effect on health	Disagree	38	10.5
	Not sure	17	4.7
	Agree	307	84.8
Effect on environment	Disagree	43	11.9
	Not sure	9	2.5
	Agree	310	85.6
Single use plastic must be banned			
Disagree		42	11.6
Not sure		6	1.7
Agree		314	86.7
Items should be banned			
Plastic juice straw		326	90.1
Plastic coffee cup		324	89.5
Mineral water bottle		289	79.8
Food plastic container		309	85.4
Plastic bag/cover		339	93.6
Plastic cutlery		317	87.6
Plastic plates and cups		328	90.6
None has to be banned		71	19.6
Willing to replace the following items			
Plastic juice straw		323	89.2
Plastic coffee cup		330	91.2
Mineral water bottle		307	84.8
Food plastic container		317	87.6
Plastic bag/cover		332	91.7
Plastic cutlery		324	89.5
Plastic plates and cups		329	90.9
Not willing to replace any item		89	24.6

Regarding concerns related to plastic use, the majority of participants agreed that single-use plastics have an adverse effect on the environment (85.6%) and on health (84.8%), while 61.0% agreed

that it causes littering and creates an untidy appearance. A large majority of participants (86.7%) agreed that single-use plastics must be banned, while 11.6% disagreed and 1.7% were not sure.

When asked which items should be banned, plastic bags/covers were the most favoured for a ban (93.6%), followed by plastic plates and cups (90.6%) and plastic juice straws (90.1%); mineral water bottles were the least favoured for a ban (79.8%). Only 19.6% of participants felt that none of the items should be banned. With regard to willingness to replace single-use plastic items, most

participants expressed willingness to replace plastic coffee cups (91.2%), plastic bags/covers (91.7%), and plastic plates and cups (90.9%), while mineral water bottles had the comparatively lowest willingness for replacement (84.8%). Nearly a quarter of participants (24.6%) were not willing to replace any item.

Table 4: Distribution of study subjects as per practice of single use plastics (n=362)

Domains	Frequency	Percentage
Use the item on a regular basis		
Plastic juice straw	154	42.5
Plastic coffee cup	167	46.1
Mineral water bottle	217	59.9
Food plastic container	182	50.3
Plastic bag/cover	218	60.2
Plastic cutlery	143	39.5
Plastic plates and cups	149	41.2
Use the item occasionally		
Plastic juice straw	206	56.9
Plastic coffee cup	202	55.8
Mineral water bottle	229	63.3
Food plastic container	255	70.4
Plastic bag/cover	189	52.2
Plastic cutlery	213	58.8
Plastic plates and cups	216	59.7
Number of single use plastics obtained/ used in a week		
None	21	5.8
1 to 3	170	47.0
6 to 10	102	28.2
> 10	69	19.1
Reason for using single use plastic		
Cheap and free of cost	312	86.2
Easily available	332	91.7
Convenience	307	84.8
Light weight	319	88.1
Lack of alternative material	259	71.5
Use of bag for shopping		
Plastic bag provided by the shopkeeper on purchase of items	151	41.7
Using a non-plastic bag because it is banned	146	40.3
Using a plastic bag provided earlier by a shopkeeper	65	18.0

With respect to regular use, plastic bags/covers (60.2%) and mineral water bottles (59.9%) were the items most commonly used on a regular basis, while plastic cutlery (39.5%) and plastic plates and cups (41.2%) were used regularly by comparatively fewer participants. For occasional use, food plastic containers (70.4%) and mineral water bottles (63.3%) were most frequently reported. Regarding the number of single-use plastic items obtained or used per week, nearly half of the participants (47.0%) used 1 to 3 items, 28.2% used 6 to 10 items, and 19.1% used more than 10 items, while only

5.8% reported using none. The most common reasons cited for using single-use plastics were easy availability (91.7%), light weight (88.1%), and being cheap and free of cost (86.2%), followed by convenience (84.8%) and lack of alternative material (71.5%). With regard to the use of bags for shopping, 41.7% of participants used a plastic bag provided by the shopkeeper at the time of purchase, 40.3% used a non-plastic bag because plastic was banned, and 18.0% reused a plastic bag provided to them earlier.

Table 5: Descriptive statistics of knowledge, attitude and practice scores

Domain	Maximum Total Scores	Mean	SD	Minimum	Maximum
Knowledge Score	24.0	18.0	4.0	5.0	24.0
Attitude Score	22.0	19.4	3.2	5.0	22.0
Practice Score	16.0	6.5	4.1	0.0	16.0

The mean knowledge score of the study subjects was 18.0 ± 4.0 with the minimum score of 5.0 and a maximum score of 24.0. The mean attitude score of the study subjects was $19.4 \pm$

3.2 with the minimum score of 5.0 and a maximum score of 22.0. The mean practice score of the study subjects was 6.5 ± 4.1 with the minimum score of 0.0 and a maximum score of 16.0.

Table 6: Distribution of study subjects as per knowledge score (n=362)

Knowledge	Frequency	Percentage
Good	328	90.6
Poor	34	9.4
Total	362	100.0

About 90.6% of the study subjects had a good knowledge score of single use plastics while the rest, 9.4% of them were having poor knowledge score.

Table 7: Distribution of study subjects as attitude score (n=362)

Attitude	Frequency	Percentage
Good	351	97.0
Poor	11	3.0
Total	362	100.0

97.0% of the study subjects had a good attitude score about single use plastics while the rest 3.0% of them were having poor attitude score.

Table 8: Distribution of study subjects as practice score (n=362)

Practice	Frequency	Percentage
Good	104	28.7
Poor	258	71.3
Total	362	100.0

28.7% of the study subjects had a good practice score about single use plastics while the rest 71.3% of them were having poor practice score.

Table 9: Association of socio-demographic variables with practice of use of SUP

Variable	Category	Practice				P-value
		Poor		Good		
		Count	%	Count	%	
Age	18-25	64	66.7%	32	33.3%	0.21
	25-35	44	83.0%	9	17.0%	
	35-45	82	73.2%	30	26.8%	
	45-55	57	66.3%	29	33.7%	
	>55	11	73.3%	4	26.7%	
Gender	Female	145	72.5%	55	27.5%	0.64
	Male	113	69.8%	49	30.2%	
Education	graduate	119	70.4%	50	29.6%	0.37
	higher secondary	48	64.0%	27	36.0%	
	illiterate	16	69.6%	7	30.4%	
	post graduate	48	80.0%	12	20.0%	
	primary	7	87.5%	1	12.5%	
	secondary	20	74.1%	7	25.9%	
Occupation	Housewife	34	65.4%	18	34.6%	0.01
	Professionals	60	71.4%	24	28.6%	
	Semi-skilled	15	57.7%	11	42.3%	
	Skilled	95	83.3%	19	16.7%	
	Student	45	62.5%	27	37.5%	
	Unskilled	9	64.3%	5	35.7%	
SES	I	111	68.9%	50	31.1%	0.81
	II	98	71.5%	39	28.5%	
	III	16	72.7%	6	27.3%	
	IV	23	79.3%	6	20.7%	
	V	10	76.9%	3	23.1%	

Among the study subjects in various occupations there was a high proportion of poor practice of single use of plastics among professionals and skilled workers. The association of various occupations with single poor practices of single use plastic was found to be statistically significant. ($p < 0.05$).

DISCUSSION

The study aimed to assess the knowledge, attitude and practice of single use plastics (SUP) and also the

perception about legislation banning the (SUP) among the rural people. Maximum proportion (30.9%) of study participants were in the age group of 35-45 years which differed with the observations made in the studies by Adane L^[10], Manuel J et al.,^[16] Joseph N et al.,^[17] Praveena GB,^[19] Raja Danasekaran et al.,^[22] Gabuya RJB,^[25] and Coco Chin KK et al.,^[27] The mean age of the study subjects was 37 ± 11.9 years with a range being 18-63 years which concurred with the findings in the studies by Shaira H et al.,^[12] and Aghdam FB et

al.,^[24] and differed with the studies by Joseph N et al.,^[17] Pandirajan S et al.,^[21] Duraisamy K et al.,^[23] and Seddik Hamza W^[28]. Females formed the maximum proportion (55.2%) of the study population compare to males (44.8%) which was consistent with the findings in the studies by Shaira H et al.,^[12] Manuel J et al.,^[16] Joseph N et al.,^[17] Raja Danasekaran et al.,^[22] Duraisamy K et al.,^[23] Aghdam FB et al.,^[24] Khanal A^[26] and Seddik Hamza W^[28]. It differed with that of the observations in studies by Adane L^[10] and Pandirajan S et al.,^[21] where the majority of the study population were males.

Majority (46.7%) of the study subjects were graduates. Similar observations was noted in a studies by Adane L^[10], Joseph N et al.,^[17] Coco Chin KK et al.,^[27] and Seddik Hamza W^[28]. This contradicted with that of the studies by Praveena GB^[19], Raja Danasekaran et al.,^[22] Aghdam FB et al.,^[24] and Khanal A^[26]. Majority (31.5%) of the study population were skilled workers by occupation which differed with the findings of the studies by Shaira H et al.,^[12] Manuel J et al.,^[16] by Joseph N et al.,^[17] Praveena GB,^[19] Raja Danasekaran et al.,^[22] Duraisamy K et al.,^[23] Coco Chin KK et al.,^[27] and Seddik Hamza W^[28]. In the present study it was seen that majority (44.5%) of the study population were in Class I (Upper Class) as per modified B.G.Prasad's classification of SES which was consistent with the study by Pandirajan S et al.,^[21] and contradicted to the observation made by Raja Danasekaran et al.,^[22] These demographic patterns broadly concurred with, and in some respects diverged from, comparable KAP surveys conducted in other rural and semi-urban Indian and international settings, reflecting the influence of local literacy levels, occupational structure and study-area selection on sample composition. With regard to knowledge of single use plastics among the study subjects, the predominant single use plastic was mineral water bottle used (83.7%), followed by plastic bag/cover (77.3%). Most (80.9%) of them had knowledge of the important source for plastic bag generation which was supermarket. About the single use plastic effect on health, 89.2% had knowledge about the harmful effects, 89.0% study subjects were aware then it would cause respiratory diseases, 87.3% of them had knowledge that it would cause cancers and 86.7% of them were aware that it would cause other diseases. 96.7% had knowledge that single use plastic would result in global warming and climate change. 98.6% had knowledge that single use plastic would affect animals, 97.2% of them were aware that it would affect marine fish and 95.9% were aware that it would affect birds. 62.4% knew that the time taken for the plastic to degrade was very long time, 10.2% were aware that it would take few years to less than 50 years, 3.3% opined that it would take few months to less than 1 year and 24.0% were not aware of anything of the time taken for plastic to degrade. 50% were aware of the plastic being banned in their area. Similar observations

were made by Joseph N et al.,^[17] wherein it was noted that 86.4% of the study subjects were aware of at least one health hazard of plastic. Majority (81.9%) of them were aware that plastics were non-biodegradable. Majority (85.2%) were aware of the legislation concerning banning the use of plastic bags. Gabuya RJB^[25] noted that 96.15% of the study population were aware of the harmful effect of plastic waste on human health which corroborates with the finding in the present study. Coco Chin KK et al.,^[27] observed that a majority (94.2%) of the respondents were aware that plastic pollution could affect environment and human health at every stage of its lifecycle. Contradictory findings were observed in the studies by Shaira H et al.,^[12] Pandirajan S et al.,^[21] Raja Danasekaran et al.,^[22] Duraisamy K et al.,^[23] Seddik Hamza W^[28] concerning knowledge of SUP. pointing to a gap between generic environmental awareness and awareness of local regulatory measures. As per the attitude concerning the single use plastic, 61.0% of the study subjects agreed that it was responsible for littering and dirty looks. About the effect of single use plastic on health, 84.8% of them agreed. As far as the effect of single use plastic on environment was concerned, 85.6% of the study population agreed. Regarding banning of single use plastics, 86.7% of the study subjects agreed. Regarding the items that should be banned, majority (93.6%) of the study population agreed with plastic bag/cover. About the attitude on willingness to replace the various items, majority (91.7%) of the study subjects agreed to replace plastic bag/cover, followed by plastic coffee cup by 91.2% of them. Similar observations were made in the study by Shaira H et al.,^[12] about the attitude of study participants regarding SUP as concerns related to plastic use and on banning SUP. However, regarding the attitude of study subjects to items to be banned and items to be replaced it differed with that of the present study. A study by Seddik Hamza W^[28] revealed that 43% of the study subjects agreed that plastic was a danger to humans or environment. As per the practice of single use plastic on a regular basis, it was seen that plastic bag/cover was used by 60.2% and mineral water bottle by 59.9% of them. Regarding number of single use plastics obtained or used in a week, 19.1% of the study subjects said they were using more than 10 single use plastics per week, 28.2% of them were using 6-10 plastics per week, 47.0% of them were using 1-3 plastics per week and 5.8% of them were using none of them. Among the various reasons for using single use plastic, 91.7% of the study subjects were using because they were easily available, 88.1% of them were using because they were light weight, 86.2% of them were using because they were cheap and free of cost, 84.8% of them were using because they were convenient and 71.5% of them were using because of lack of an alternative material. As per the practice of using a bag for shopping, 41.7% of the study population were using the plastic bag provided

by the shopkeeper on purchase of items. Shaira H et al.,^[12] and Pandirajan S et al.,^[21] in their studies differed with the observations of the present study. Among plastic bag using participants, 53.2% were using less than 5 bags per week, 25.2% were using more than 10 bags per week and remaining 21.6% were using 6-10 bags per week. Gabuya RJB^[25] reported in his study that all types of plastics like plastic bags (100%), plastic bottles (100%), kitchen/household wares (100%). On ascertaining the reasons for using plastic products, 58.97% of the study subjects used them because of low price, 71.79% of them said of easy availability, 88.46% said because of light weight, 66.67 % said there was no alternative and 84.6% said because of durability. Khanal A^[26] observed in his study that 1.1% of the study subjects were not using any plastic bags, 31.1% of them were using 1-3 plastic bags, 41.1% of them were using 4-6 plastic bags, 14.1% of them were using 7-9 plastic bags and 10 and above plastic bags were used by 12.7% of them. On ascertaining the reasons for using plastic bags, 52.9% of the respondents said they were cheap, 80.8% said that they were easily available, 29.2% said they were light weight, 30.1% said that there was no other alternative. This contradicted with the findings of the present study. Seddik Hamza W^[28] observed that 61% of the study population were buying plastic as it was cheap which differed with the observation of the present study.

The mean knowledge score of the study subjects was 18.0 ± 4.0 with the minimum score of 5.0 and a maximum score of 24.0. The mean attitude score of the study subjects was 19.4 ± 3.2 with the minimum score of 5.0 and a maximum score of 22.0. The mean practice score of the study subjects was 6.5 ± 4.1 with the minimum score of 0.0 and a maximum score of 16.0. Studies by Manuel J et al.,^[16] Aghdam FB et al.^[24] and Seddik Hamza W^[28] however differed with the findings of the present study.

90.6% of the study subjects had a good knowledge score of single use plastics while the rest, 9.4% of them were having poor knowledge score. 97.0% of the study subjects had a good attitude score about single use plastics while the rest, 3.0% of them were having poor attitude score. 28.7% of the study subjects had a good practice score about single use plastics while the rest, 71.3% of them were having poor practice score. Seddik Hamza W^[28] noted that knowledge score was inconsistent while attitude score and practice score were consistent with the finding of the present study. This knowledge–attitude–practice discordance is a recurring theme in the SUP literature and suggests that awareness campaigns alone are unlikely to translate into behaviour change unless accompanied by accessible, affordable alternatives and consistent enforcement. The association of various occupations with poor practices of single use plastic was found to be statistically significant. ($p < 0.01$) which differed with the observations in studies by Coco Chin KK et al.,^[27] and Seddik Hamza W.^[28] This

suggests that occupational routines and time constraints, rather than educational attainment alone, may be an important determinant of sustained SUP use in this population, an area that merits further targeted qualitative exploration.

CONCLUSION

The study points out that the residents of the rural area were having sound knowledge and good attitude towards single use plastics but the practice towards the same was poor. Most of the study participants were aware of SUP and their effects on health of man, animals, birds, marine fish and environment. They were also aware of the biodegradability of SUP and they were in favour of the ban on SUPs and were willing to replace the SUP.

Recommendations

Various campaigns about the effect of plastics on health of animals, human and the environment have to be organized to mobilize the public and the various stakeholders like the government agencies, business associations, retailers, donors, research institutions, non- governmental organizations, women associations, religious institutions and the media against indiscriminate use of SUP and their disposal. Schools and colleges should incorporate in their curriculum about SUP and its harmful effects on animals, birds, marine life and humans so that children as they grow to adults will effectively avoid the use of them and put into practice of using their alternatives. Government of the day in collaboration with concerned authorities should encourage people to use environment-friendly and cost-effective alternative materials to start with, like cloth bags, paper bags and natural fibre bags instead of plastic bags which are rampantly used. Strict implementation of legislation with fines to be imposed on shopkeepers who promote and consumers who use plastic bags. Incentives like discounts or reduced GST (Goods and Services Tax) are given on articles by shopkeepers which are not SUP to consumers and the government should support the same.

Limitations

As the study design was cross-sectional, no causal association can be drawn with the determinants and the knowledge, attitudes and practices of single use plastics. As the study was confined to the residents and the ecology of the rural area, the salient findings of the study cannot be generalised to the entire population of Visakhapatnam.

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