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Assessing the Impact of Environmental Education on Sanitation and Hygiene Practices among Undergraduate Students in Bongaon, West Bengal

Dr Sejuti Roy[1], Dr. Sudip Mukherjee[2]

[1]Assistant Professor, Dept.of Zoology, Dinabandhu Mahavidyalaya, Bongaon
[2]Assistant Professor, Dept of Economics, Dinabndhu Mahavidyalaya, Bongaon

Abstract:
This study investigates how undergraduate students in the Bongaon subdivision of West Bengal, India, are influenced by environmental education in terms of their environmental sanitation and hygiene practices (ESHP) and health and hygiene awareness (HHA). Using data collected through structured questionnaires from 401 final semester students, the study explores the association between ESHP and HHA, as well as the influence of gender, locality, and academic stream. Majority of the students have good environmental sanitation and hygiene practices (ESHP) and high health and hygiene awareness (HHA). The findings show that there is a positive association between ESHP and HHA. The ESHP and HHA are different in terms of gender and location.The results highlight how crucial it is to incorporate environmental education into curricula in order to encourage sustainable practices in both individual and community health.

Keyword: Environment, Hygiene, Students, sanitation, Health awareness

Introduction

Environmental as well as hygiene awareness is absolute necessary in everyday life for maintaining a sustainable development. In the present-day situation where pollution is becoming a burning issue day by day, all individuals should address the matter of environmental awareness more permanently. It has been found that more aware the person is in context of environmental health and personal hygiene, more is his/her sensitiveness to the ecological problems of society. Previous data have shown (Rahmatulloh, 2022) that introduction of environmental and hygiene education in school and college level imposes a positive effect on students which further influences their health and makes them more responsible citizen (Dharun et al.,2024). The students always stay on a learning mode for which they can take up more easily the basic steps for maintaining a green environment than any other. It equips them with knowledge and skills to address environmental challenges and adopt healthier lifestyles, ultimately leading to a more sustainable future (Bayaer & Cui, 2023). On the other hand, a negative educational environment can hinder learning and have negative impacts on a student's mental health (Krasny, 2020).

A green environment refers to a state where human activities prioritize the health and sustainability of the natural world. This involves minimizing environmental damage, conserving resources, and promoting practices that benefit both ecosystems and human well-being (Bayaer & Cui, 2023). If a student is being

learned from the school and college level the significance of green environment, they can imply in on their own life which can provide benefits to not only themselves but also to the surrounding communities. Small steps like raising voices against cutting trees or managing the household wastes in a proper way make a person more responsible towards his/her environment. At the same time maintaining personal hygiene like washing hand before handling food or cleaning the kitchen and cooking utensils properly provides health safety to a person and the associated family members.

As a future general civil citizen or a policy maker, a college student always has a responsibility towards making sustainable challenges (Gupta et al., 2024). Guiding these fresh minds in a proper way and direction through environmental and hygiene education is necessary for making significant changes in the way a people survive.

This paper classifies the whole study in separate phases: firstly, the impact of studying the significance of green environment on the college students and then how they apply it in maintaining their personal hygiene and constructing a sustainable ecology in their surroundings. Finally, the study results were analysed on religion, gender and locality basis and accessing the role of these factors (if any) in the learning process.

Literature Review

The matter of environmental awareness among students has been raising a quite big issue over past few years. In 2010, Rabia told that environmental education should be given proper attention keeping in mind their increasing importance. According to Sra, 2012, undergraduate students can develop responsible attitude if they can be made aware by environmental education. Poyyamoli & Alexender, 2014, found that active teaching learning approach is more effective than the traditional teaching method as it encourages the students in a far better way. According to Rahmatulloh (2022), environmental education is based on students' sustainable environment and focuses on students' environmental knowledge, students' environmental attitudes, and students' environmental skills. His view was supported by Yusuf, Yunus, Maimun, &Fajri, 2022 who believed that students will develop attitudes and behaviors that will make them more sensitive and concerned about the world around them if they participate in environmental education. In a descriptive paper- "Development of Environmental Awareness Among Youth: A Review", K.Narwal (2021) investigated the environmental awareness in youth. This study was done with secondary information from journals, websites and books where it was found that post-graduation and graduating students' awareness is higher than that of school-age students. Science and commerce students were found to be more conscious than arts students and gender had no significant role in this matter. Similar type of study was done by Shivani Chandola Barthwal and Vinod B. Mathur (2019) who emphasized on the environmental education system of Ladakh. But here the questionnaire was set on a different subject i.e. wildlife and conservation. The findings showed that Ladakh's population was aware of the region's biodiversity. In the Dindigul district of Tamil Nadu, Verma, A. & Verma, V. (2022) also found the huge impact of environmental awareness among undergraduate regular students in his descriptive study on Arts and Science colleges. Choudhary, 2010 showed that students of high economic level, show better attitude of environmental education than the other categorized students.

The importance of environmental education was similarly reviewed internationally (Liyanage et al.2021). It showed that Environmental education has an impact on environmental quality (Atisa et. al.2021). Ramos and Caeiro 2009 studied the historical development of environmental education in Indonesia and found that education for sustainable development plays an important role in social politics, cultural freedom, and

poverty eradication. Zafar et al. empirically verified that the environmental quality of a region is significantly affected by the education level of residents.

Different studies from early 2000 till date have shown that there are significant differences among rural and urban area as well as male and female respondents also when survey works were done among higher secondary school students. In 2007, Shoberi et al. showed that there are significant difference in awareness level between girls and boys when survey was conducted with 476 boys and 515 girls from 103 secondary schools of Mysore city, India. Again, a study with 340 students in the district of Hulu Langat, Selangar(Hassana et.al.,2010 showed that science stream students had higher level of awareness than arts stream students whereas urban school students were higher than suburban school students. The T test analysis gave the significant level of 95% ($p < 0.05$). It clearly reveals that the level of education as well as the subject of study has significant effect on student awareness. This fact was also supported by Wan et al. (2015) who kept the higher educated students on the advanced level of awareness than the low educated ones. According to Enger and Smith, 2013, environmental awareness is a science the knowledge of which builds up the common people's behavior. Pena et al. (2018) stated that local issues are also very influential factor regarding this matter. According to the study of R. Danielraja (2019), significant difference existed between the students belonging to science group and arts group and also between science and vocational group, but there were no such differences between arts and vocational group. The gender issue and type of institution had also no significance in this regard. This result was partly contradicted by Dr. Janab Dutta & Miss YumpiNgomle (2022) who conducted their study with school level students from Papum Pare district of Arunachal Pradesh and found significant difference of awareness level between the students of urban and private school and the government rural schools. Similar variability was also shown by male and female elementary school going students. On the other hand, Ankit Verma & Vishal Verma, 2022 focused on students of science and arts colleges in Dindigul district, Tamilnadu as environmental education was the part of their curriculum. This study revealed that the level of awareness was high among the respondents irrespective of genders, but in practice level difference existed between male and female students i.e. males practicing more than females.

Objective:

1. To investigate the Environmental sanitation and hygiene practice (ESHP),among students who studied Environmental science as a compulsory subject in UG first year.
2. To investigate the health and hygiene practice (HHA),among students .
3. To study the association between Environmental sanitation and hygiene practice (ESHP) and health and hygiene practice (HHA)
4. To assess the difference in Environmental sanitation and hygiene practice (ESHP) with respect to gender, locality and stream
5. To assess the difference in Environmental sanitation and hygiene practice (ESHP) with respect to gender, locality and stream

Data and methodology

A structured questionnaire was used to collect data from 434 final semester students of Bongaon subdivision in West Bengal, India. After examination, 401 observations out of 434 were taken into account. Environmental sanitation and hygiene practice (ESHP), health and hygiene awareness (HHA), were the two fields upon which the questionnaires were formed and the responses of the students were recorded on

a 5-point Likert scale. Ten questions about proper practice for green environment, nine questions about health and hygiene awareness were included in the questionnaire. To know about the environmental sanitation and hygiene practice the following questions were asked a) I carry or use plastic bags on regular basis, b) I regularly dispose the used household wastes in garbage bin c)I throw plastic items to drain after use, d) I dispose plastic garbage properly in the garbage bin, e)Burning of garbage is not eco-friendly, f)I clean the used water containers regularly g)I clean the vegetables properly after buying it from market, h)I use water and soap as they are the most effective way to wash hands, i)I Wash hands before handling food for maintaining good hygiene, j) I use sanitizer when eating at outside places.

The following questions were made in order to collect information regarding health and hygiene awareness .a)Maintaining good hygiene is important to be healthy/free from sickness, b)Hand cleanliness is an important aspect of maintaining sanitation and hygiene, c)Food hygiene is essential in our daily lives, d)Keeping a clean house helps to maintain good sanitation, e)Garbage and wastewater in surroundings are a sign of poor sanitation and hygiene, f)Regularly cleaned kitchen surfaces maintain proper hygiene, g) Tap water consumption without purification is hygienic and healthy, h) Open street foods and drinks do not have any effect on good hygiene, i)Proper disposal of solid wastes & faeces are necessary for good hygiene.

The overall score for the environm”ntal’sanitation and hygiene practice is calculated as the sum of the responses to all 10 questions. The score ranges from 10 to 50. Students are divided in three groups – good practice, moderate practice and poor practice .The students whose score is equal or more than the 70% of 50 are in good practice group, students with score equal and more than 50% of 50and less than 70% of 50 are in moderate practice group and students with score less than 50% of 50 are in poor practice group. The sum of answer of nine questions for health and hygiene awareness determines the overall score. The score ranges from 9 to 45.Three categories of students are formed: high aware, moderate aware and less aware. Students in the high aware group have scores equal to or higher than 70% of 45, those in the moderate aware group have scores equal to or higher than 50% of 45 and lower than 70% of 45, and those with scores below 50% of 45 are in the less aware group.

The hypothesis of the study is as follows:

H_0^A: There is no association between environmental sanitation and hygiene practice and health and hygiene awareness

H_0^B : There is no significant difference in environmental sanitation and hygiene practice scores with respect to gender, location and stream.

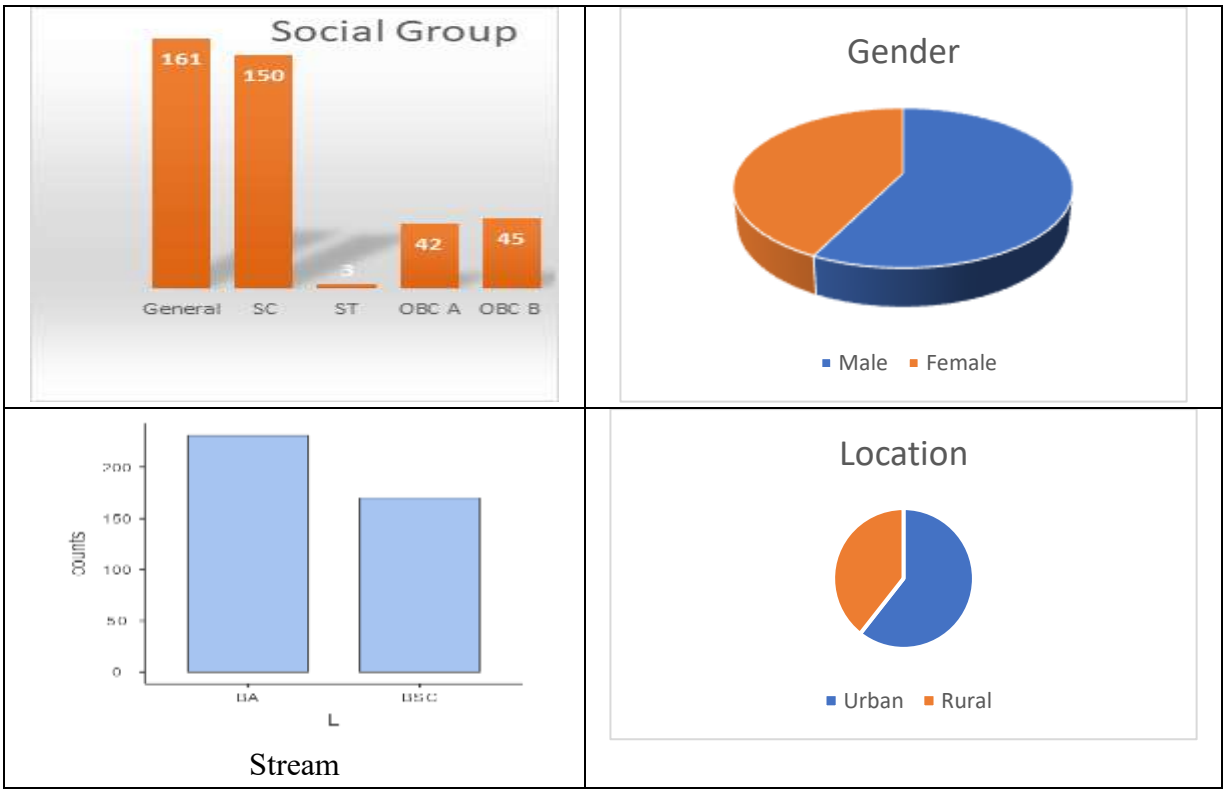
H_0^C: There is no significant difference health and hygiene awareness score with respect to gender, location and stream.

Descriptive statistics, illustrative statistics, Mann-Whitney U test, chi square test is used for analysis. The R-studio is used for analysis.

Analysis and finding

Figure 1 shows the demographic characteristics of the study participants, including their gender, place of residence, social group and stream. 43% of the total respondents are male and remaining are female. 61% of them reside at urban area and remaining in rural area. 161 of them belongs to general caste and 150 of them belongs to SC. 57.6 % of the students are in B.A. stream and 42.4% of them are in B.Sc.

Figure:1



After going through due courses of environmental education in school and college level, the students were found to have raised some level of awareness among them. From the study results, it was documented that most of the students strongly disagreed to throw the plastic bags or other wastes directly to the drain or other open spaces; rather they are now more habituated to use the garbage bin for throwing their regular household wastes. But despite of being aware of the deleterious effect of plastic item on environment, using plastic carry bags in the market are still in practice in at least some percentage of people. The main reason behind this may be the scarcity in availability of the jute, paper or cloth made bags in comparison with huge amount of plastic carry bags available in the market. In addition, water or other liquid item may destroy the paper bag which can be another reason for more acceptability of the plastic bags.

Most percentage of students (50-70%) preferred to wash their hand properly with soap and water before handling or consuming food and use sanitizer when eating outside (Table 1). Washing the containers regularly or the vegetables after buying from the market were also matter of concerns in them.

Table 1: Responses on environmental sanitation and hygiene (ESH)

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
I carry or use plastic bags on regular basis	9.23	27.43	23.69	23.19	16.46
I regularly dispose the used plastic items & household wastes into garbage bag.	26.43	41.15	14.71	10.97	6.73
I throw plastic items to drain after use	4.24	6.48	11.72	27.68	49.88

I dispose plastic garbage properly in the garbage bin	51.62	34.41	6.73	2.99	4.24
Burning of garbage is not eco-friendly.	48.13	26.68	11.47	4.99	8.73
I clean the used water containers regularly	46.63	41.90	8.98	2.24	0.25
I clean the vegetables properly after buying it from market	67.83	30.67	1.25	0.25	0.00
I use water and soap as they are the most effective way to wash hands.	56.36	33.92	6.48	2.24	1.00
I Wash hands before handling food for maintaining good hygiene.	66.83	30.92	1.75	0.25	0.25
I use sanitizer when eating at outside places	51.12	33.67	12.97	1.75	0.50

From table 2, 92% of the students had good practice regarding environmental sanitation and hygiene and 32% had moderate practice .The mean score is quite high 40.2 with sd 3.78.

Table 2: Percentage of students with respect to ESH category

Practice level	Frequency
Good(>= 35)	369 (92%)
Moderate (25<= score <35)	32 (8%)
mean	40.2
s.d	3.78

Including environment and hygiene study in the regular curriculum of college was found have a huge impact on the students who have gone through this. They developed an increased level of hygiene awareness also which was reflected in their responses to the questionnaire made for this study. Maintaining personal hygiene like hand cleanliness and consuming hygienic food were the preference of above 80% of students while a very few (16-18%) agreed to consume tap water without purification or open street food (Table 3). A huge percentage also strongly agreed with the matter that proper disposal of solid wastes and faeces is absolute necessary for maintaining a clean house and surrounding. But when gender and locality were considered and analysed separately on statistical basis, it had been found that the female students were one step ahead than the male students who were a little casual when hygiene or environmental awareness comes in question (Table 3). Likewise more awareness was found to have grown in urban students than the rural ones.

Table 3: Responses on health and hygiene awareness (HHA)

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Maintaining good hygiene is important to be healthy/free from sickness.	80.30	17.71	1.25	0.25	0.50

Hand cleanliness is an important aspect of maintaining sanitation and hygiene.	80.80	17.46	1.00	0.75	0.00
Food hygiene is essential in our daily lives.	80.05	17.96	1.50	0.50	0.00
Keeping a clean house helps to maintain good sanitation.	76.81	20.20	2.49	0.50	0.00
Garbage and wastewater in surroundings are a sign of poor sanitation and hygiene.	65.34	25.19	5.24	2.74	1.50
Regularly cleaned kitchen surfaces maintain proper hygiene.	71.57	25.19	2.49	0.50	0.25
Tap water consumption without purification is hygienic and healthy.	16.96	11.97	12.97	23.44	34.66
Open street foods and drinks do not have any effect on good hygiene.	18.20	10.72	18.20	22.19	30.67
Proper disposal of solid wastes & faeces are necessary for good hygiene.	61.35	27.93	5.24	3.74	1.75

From table 4, 95.3% of the students high aware regarding health and hygiene and 4.7% had moderately aware .The mean score is quite high 40.2 with sd 3.78.

Table 4: Percentage of students with respect to HHA category

Practice level	Frequency
high(>= 31.5)	382(95.3%)
Moderate (22.5 <=score <31.5)	19 (4.7%)
mean	39
s.d	4.16

Chi square test is used to test the following null hypothesis:

H_0^A: There is no association between environmental sanitation and hygiene practice and health and hygiene awareness

The Chi square value is 9.13 with p-value 0.003. The p value is less than 0.05 (table 5) suggests the rejection of null hypothesis. There exits association between environmental sanitation and hygiene practice and health and hygiene awareness.

Table: 5 : Result of Chi square test

Chi square	p-value	
9.13	0.003	

The following hypothesis is developed in order to investigate the differences in ESHP scores and HHA scores according to gender, location, and stream.

H_0^{B1}: The average ESHP scores for male and female are same

H_0^{B2}: The average ESHP scores for rural and urban are same

H_0^{B3}: The average ESHP scores for BA and BSc students are same

H_0^{C1}: The average HHA scores for male and female are same
H_0^{C2}: The average HHA scores for rural and urban are same
H_0^{C3}: The average HHA scores for BA and BSc students are same
Independent t test is appropriate to test the above hypothesis. Independent t is application if the sample data follows normality. Shaprio –Wilk test is used to determine the normality of the sample data. As the p-value of the variables ESHP and HHA are less than 0.05, it suggests that the data is not following normal distribution Since the data is not following normal distribution, to test the above mentioned hypothesis independent t test is not appropriate. Mann-Whitney (MW) U statistics is used to test the above hypothesis.

Table 6: Result of Normality test

Variable	**Shapiro-Wilk**	P-value
ESH	0.982	<0.001
HHA	0960	<0.001

Table 7 represents the result of Mann-Whitney (MW) U test. There exits significant difference in ESHP score between male and female students (P-value is 0.003 which is less than 0.05) . Students in rural and urban areas have significantly different average ESHP scores (p value=.003). The HHA scores of male and female students differ significantly (P-value is 0.009, which is less than 0.05). The average HHA score of Students in rural and urban areas differ significantly (p value=.003).

Table 7: Results of Mann-Whitney U test

	gender		location		Stream	
	Mann-Whitney U	P-value	**Mann-Whitney U**	P-value	**Mann-Whitney U**	P-value
ESHP	**17285**	0.03	**15859**	0.003	**18518**	0.328
HHA	**16670**	0.009	**16802**	0.034	**19336**	0.727

Conclusion:
After analysing the findings of the study it can be concluded that the behaviour, attitude and responsibility of the undergraduate students have changed considerably after getting the environment and hygiene education. They have become more aware about maintaining their personal hygiene as well as about the sustainable development of their neighbouring ecology. The study has revealed the fact that the student's mentality could be moulded towards eco friendly behaviour rather than adopting modernity through degradation of their health and environment. The awareness level is little more in female students than males and the urban area students developed higher responsibility sense than rural ones.

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