

Statistical Modeling for Air and Water Pollution Awareness



Statistics

KEYWORDS : Environmental Pollution, Frequency distribution, Chi-square test, Henry Garrett Ranking

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ABSTRACT

An investigation was carried out to study the Air and Water pollution awareness of the Arunachalapuram village belongs to Tirunelveli district, Tamil Nadu, India. This study revealed that awareness varies from one age group to another age group and their educational qualifications.

1. INTRODUCTION

Environment comprises air, water and land. It is not easy to give a precise definition of “pollution” or the word “polluting”. The Oxford English dictionary defines “pollute” and “pollution” as follows, Pollute: Destroy the purity or sanctity, Pollution: The act of polluting. It is easier to describe pollution than to define it. Environmental pollution may be described as the unfavorable alteration of our surroundings mainly and occur mainly because of the action and man. Environmental pollution takes place through changes in energy patterns, radiation levels, chemicals and physical constitutions an abundance of organisms. Pollution includes release of materials into atmosphere which make the air unsuitable for breathing, harm the quality of water or soil and give out substances which damage the health of human beings, plants and animals. Through the other environmental pollutants, odour and noise only irritate or disturb they can also sometimes be a danger to health. The effects of pollution to our biosphere are and are numerous and are increasing tremendously. Unless otherwise checked, they could make the whole planet uninhabitable. Air pollution in cities has mounted as more people have crowded. Water pollution has increased with the growth of industry as well as of population. The disposal of solid waste from industrial, commercial and household sources has become more acute due to a tremendous increase in numbers of motor vehicles, industrial operations and building constructions. Radioactive materials and certain other pollutants have begun to spread widely through the atmospheric and ocean systems of the world to cause mutations and other birth defects.

A substances present in nature is greater than natural abundance due to human activity, which ultimately has a detrimental effect on the environment and there from on living organisms and mankind. For example lead, mercury, sulphur dioxide, carbon dioxide, etc. Contaminant of the material which does not occur in nature, but is introduced by human activity into the environment, affecting it composition. A contaminant is classified as a pollutant when it extents a deterrent effect. For example, chlorine gas escaped from a derailed railway tank can near Youngstown, Florida in 1978 and killed eight persons driving a nearby road. This gas does not occur in the atmosphere. So it is undoubtedly a contaminant because of its dangerous effect. It is also a pollutant.

Receptor is the medium which is affected by a pollutant. Man is the receptor of photochemical smog causing irritation of the eye and respiratory tract. Trout fingerlings are receptors of dieldrin in water which causes their death. Oxygen is a vitally important species in water. It is consumed by oxidation of organic/ reducing agents etc. It is an important water quality parameter. The optimum value for good water quality is 4-6 mg/l of dissolved oxygen value indicates water pollution. Chemical oxygen demand is an index of the organic content of water and is an important water quality parameter. The test is based on the chemical oxidation of material in water by $K_2Cr_2O_7$ in 50% H_2SO_4 . Biochemical oxygen demand is also a water quality parameter for organic mater in water, which is empirical in nature. It is

measured by the quantity of oxygen utilized by suitable aquatic micro-organisms during a five-day period. Tarun have reported that the compressive strength of rubberized concrete can be improve when fine aggregate was fully replaced by fine crumb rubber. He also indicated that if the rubberParticles have rougher surface or given a pretreatment, the better and improved bonding may develop with the surrounding matrix, and that may result in higher compressive strength.

1.1. Air Pollution

When, due to some natural processes or human activities the amount of solid waste or concentration of gases other than O_2 increases in the air which normally has constant percentage of different gases in it, the air is said to be polluted and this phenomenon is referred to as air or atmospheric pollutions. Air pollution is one of the most dangerous and common kind of environment pollutions that is reported in the most industrial town and metropolitans of India and abroad. A major source of air pollution is the particular and gaseous matter released by the burning of fossil fuels such as coal, petroleum, etc. Out of this come a variety of emissions.

Consequences of Air Pollution:

Effect on Climate: The disproportionate distribution of the constitutions of air ultimately results in climate changes.

Effect of Visibility: Dust in the air and the smoke released from various source affect proper visibility.

Effect on Agriculture: Productivity decreases the quality of agriculture products deteriorates. One of the reasons for this is that air pollution affects the growth of plans and trees.

Effect on Man: Breathing impure air causes different diseases. It affects future generations also.

Effect on Ozone Layer: Air pollution causes apparent depletion of the ozone layer in the atmosphere, the balance of which is immense significance in maintaining the balance of climate conditions.

1.2. Water Pollution

Water pollution is the most important research area in the earth. It is vital for the healthy maintains of all forms of life including that of vegetations. Drinking purpose, sanitation and disposal of waste. Streams, rivers, tanks, wells, canals, ponds, lakes, sea and oceans are the major sources of water. It is now well known that impure water is the root cause of many of the dangerous diseases.

1.2.1. Causes of Water Pollution

Bathing and Washing: It is normal practice to wash clothes and take bath in rivers, canals and ponds. Animals also washed. This would certainly pollute water.

Fertilizers and Pesticides: Modern agriculture relies heavily on

fertilizers and pesticides. To increase production, different fertilizers are used. Chemicals used for killing pests are poisonous materials that make water unfit for drinking and also cause dangerous diseases.

Detergents: Different kinds of detergents are used for cleaning purpose and these ultimately get mixed with review water. These phosphates deposited in the water make it harmful for living creatures.

Dust Particulars: If dust particulars are deposited in water in a great quantity, it will cause pollution of water.

1.5. Profile of the Study Area:

The present study is conducted at Arunachalapuram village in Sankarankovil Taluk; Tirunelveli District. There are 170 families are living in that village. Their major source of income is agriculture. Most of the people are educated in this area but they are also take part in agriculture. Some of the people are emigrated from the village for their business.

1.6. The Objectives of the present study are:

1. To find out the awareness of air and water pollutions and
2. To study the association between the variables by determining how many times they have paired occurrences in their categories.

2. Materials

In order to achieve the objectives of the present investigation primary data related to environmental air and water pollutions have been collected from the resident of Arunachalapuram village based on questionnaire. The questionnaire was designed in a systematic way to cover the present objectives. Face to face field survey method was employed to collect the information from the respondents. A sample of size n=100 have been selected from the village of Arunachalapuram.

In the questionnaire, the first six questions were related to personal details like the name, sex, age, educational qualification, occupation and family details. The following other questions are related to water pollution awareness, air and water pollution awareness, sound pollution awareness and land pollution awareness. In our method, most of the questions are arranged using five point scale. Variables, scoring system and score range is described in below.

Variables	Question Number	Scaling System	Score Range
Water Pollution	18,19,20,21,22,23,24,25,26	1-5	5
Air Pollution	28,29,30,31,32,33,34,35,36	1-5	5
Environment Awareness	9,10,11,12,13,14, 15	1-5	5

3. Methods

3.1 Bivariate Frequencies of Related Variables:

A bivariate table displays the joint frequencies of two variables and attempts to show an association between the variables by determining how many times they have paired occurrences in their categories. This variable is commonly referred to as a cross tabulation or cross tabs. Cross tabulation is a method of tabulating relationship generally among two variables in which joint occurrences of the variables will be reflected as the cells in the table. Constructing a two-way cross tabulation involves the following steps. On the horizontal axis, list the value or name for each category of the first variable. On the vertical axis, list the value or name for each category of the second variable. For each respondent, locate the category on the horizontal axis that corresponds to his or her response. Then fixed the value on the ver-

tical axis that corresponds to his or her response on the second variable. Record a 1 in the cell where the values intersect. Count the 1s in each cell.

Each of the boxes of a table is called a cell. The frequency of a cell is determined by calculating the number of occurrences of a pair of values from the independent and dependent variables. This number is called the cell frequency and is usually denoted by the symbol n_{ij} or n_{rc} where ij and rc stand for the row and column in which the cell is located respectively.

3.2. Chi-Square test of independence of attributes (Snedecor and Cochran, 1994)

Chi-square test is computed for comparing experimentally obtained results with those expected theoretically and based on the hypothesis. The chi-square is computed on the basis of frequencies in a sample and thus in the value of Chi-square so obtained is a statistic. The chi-square test is a very powerful test for testing the hypothesis of a number of statistical problems. Chi-Square test has a large number of applications in statistics. They are

- To test if the hypothetical value of the population variance $\sigma^2 = \sigma_0^2$
- To test the goodness of fit
- To test the independence of attributes
- To test the homogeneity of independent estimates of the population variance
- To combine various probabilities obtained from independent experiments to give a single test of significance
- To test the homogeneity of independent estimates of the population correlation coefficient

3.3. Test of Independence of Attributes:

Let us considered two attributes X and Y, X divided into n classes A_1, A_2, \dots, A_n , and Y divided into m classes B_1, B_2, \dots, B_m . Let us considered (A_i) is the number of persons possessing the attribute A_i , ($i = 1, 2, \dots, n$), (B_j) is the number of persons possessing the attributes B_j , ($j = 1, 2, \dots, m$) and $(A_i B_j)$ is the number of persons possessing the both the attributes A_i and B_j . The various cell frequencies can be expressed as the contingency table.

The problem is to test if the two attributes X and Y under consideration are independent or not. The theoretical cell frequencies are calculated as follows:

$P(A_i)$ = Probability that a person possesses the attribute $A_i = (A_i) / N$

$P(B_j)$ = Probability that a person possesses the attribute $B_j = (B_j) / N$

$P(A_i B_j)$ = Probability that a person possesses the attributes A_i and $B_j = P(A_i)P(B_j)$

$(A_i B_j)_0$ = Expected number of persons possesses both the attributes A_i and $B_j = (A_i)(B_j) / N$.

The Chi-Square statistic for testing the independence of the attributes defined as

Using the above formula, the chi-square test was used to test the association between the attributes when the sample data is presented in the form of a contingency table with any number of rows or columns. The hypothesis will be stated as below:

H_0 : No association exists between the attributes Vs

H_1 : An association exists between the attributes.

The acceptance and rejection of null hypothesis is based upon how close the sample or observed results are to the expected results.

3.4. Henry Garrett Ranking technique (Rohatgi, 2004)

To find out the most significant factor which influences the respondent, Garrett’s ranking technique is used. As per this method, respondents have been asked to assign the rank for all factors and the outcome of such ranking has been converted into score value with the help of the following formula:

$$\text{Percent position} = 100(\text{Rij}-0.5) / \text{Nj}$$

where, Rij = Rank given for the ith variable by jth respondents, Nj = Number of variable ranked by jth respondents. With help of Garrett’s Table, the percent position estimated is converted into scores. Then for each factor, the scores of each individual are added and then total value of scores and mean values of score is calculated. The factors having highest mean value is considered to be the most important factor.

4. Results and Discussions

The study aims to find out the environmental awareness of the village people. The attitude about the sample respondents are collected based on the objective of study through several aspects. The elements of observations description and analysis of what happens of the corresponding variable are presented under certain circumstances. The factors considered primarily for the statistical analysis are people personal details namely sex, age, occupation, income of the family. Also people view towards the environment and people opinion about environmental awareness. The descriptive measures are based on five point scale analysis, association between the variables, bivariate frequency of the variables used to classify of our objectives. The statistical analysis was carried out using SPSS (Sheridan et al., 2006) package.

4.1. Frequency analysis

In this section, frequency analysis is carried out with the respective variables concerning personal details and environmental awareness view for the sample respondents of the collected data. It provides simple summaries about the sample measures and also describes the basic features of the data in a study.

4.1.1. Frequency of gender

The people are classified into two categories shown below in the table 4.1 and figure 4.1. Among the 100 samples, 38 % people are female and 62% people are male.

Table 4.1 Frequency of gender

		Frequency	Percent	Valid %	Cumulative %
Valid	Female	38	38.0	38.0	38.0
	Male	62	62.0	62.0	100.0
	Total	100	100.0	100.0	

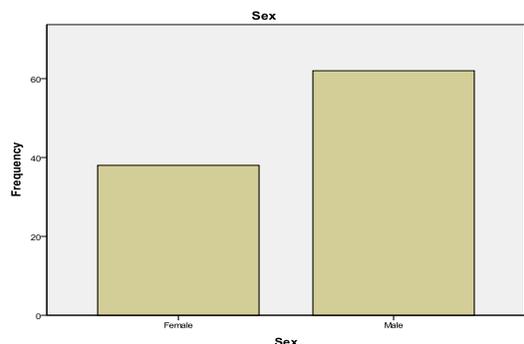


Figure 4.1 Frequency diagram of gender

4.1.2. Frequency of age

In Arnachalapuram village, people age is classified into four categories shown below in the table 4.2 and figure 4.2. Among the respondents, 80% belongs to age category 20-30 years of age, 7% belongs to age category 31-40 years of age, 10% belongs to age category 41-50 years of age, 3% belongs to age category 50 above age.

Table 4.2 Frequency of age

Age group	Frequency	Percent	Valid Percent	Cumulative Percent	
Valid 20-30	80	80.0	80.0	80.0	
	31-40	7	7.0	7.0	87.0
	41-50	10	10.0	10.0	97.0
	50 above	3	3.0	3.0	100.0
	Total	100	100.0	100.0	

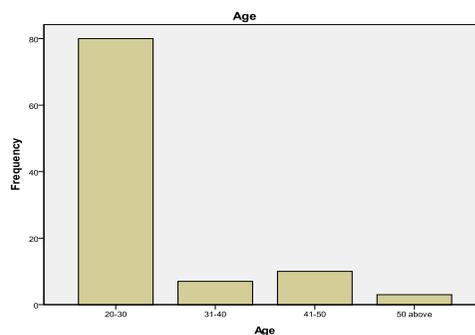


Figure 4.2 Frequency diagram of age

4.1.3. Frequency of occupation

The occupation of the given respondents are categorized into six categories shown below in the table 4.3 and figure 4.3. Among the sample respondents, 45% of them have no job, 12% people of them working in the government sector, 30 % people of them working in the private sector, 8% people are former, 4% people of them doing business and remaining 1% working as a coolie.

Table 4.3 Frequency of occupation

	Frequency	Percent	Valid %	Cumulative Percent	
Valid No Job	45	45.0	45.0	45.0	
	Government job	12	12.0	12.0	57.0
	Private job	30	30.0	30.0	87.0
	Former	8	8.0	8.0	95.0
	Self Business	4	4.0	4.0	99.0
	Coolie	1	1.0	1.0	100.0
	Total	100	100.0	100.0	

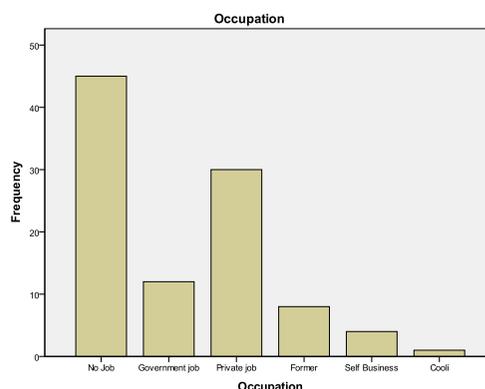


Figure 4.3 Frequency Diagram of Occupation

4.1.4. Frequency of educational qualification

The educational qualifications of the respondents are classified into four categories shown below in the table 4.4 and figure 4.4. With respect to educational qualification view, the individual frequency are computed and described. Among the respondents, 5 % of the respondents having primary level education, 8% of the respondents having secondary level education, 9% of the respondents having higher secondary level education and the remaining 78% of the respondents having other qualifications such as nursing, diploma, PG and UG qualification etc.

Table 4.4: Frequency of educational qualification

		Frequency	%	Valid %	Cumulative %
Valid	Primary level	5	5.0	5.0	5.0
	Secondary level	8	8.0	8.0	13.0
	Higher secondary level	9	9.0	9.0	22.0
	Others	78	78.0	78.0	100.0
	Total	100	100.0	100.0	

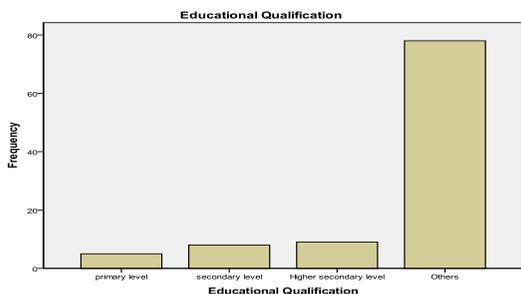


Figure 4.4 Frequency Diagram of Educational Qualification

4.1.5. Awareness about boiled water

The result is shown below in the table 4.5 and figure 4.5. reveals that among the respondents, 14% of the respondents are always drinking boiled water, 22% of the respondents rarely drinking boiled water, 49% of our respondents drinking boiled water in rainy season only the remaining 15% respondents never drinking the boiled water.

Table 4.5: Awareness about boiled water

		Frequency	%	Valid %	Cumulative %
Valid	1	14	14.0	14.0	14.0
	2	22	22.0	22.0	36.0
	3	49	49.0	49.0	85.0
	4	15	15.0	15.0	100.0
	Total	100	100.0	100.0	

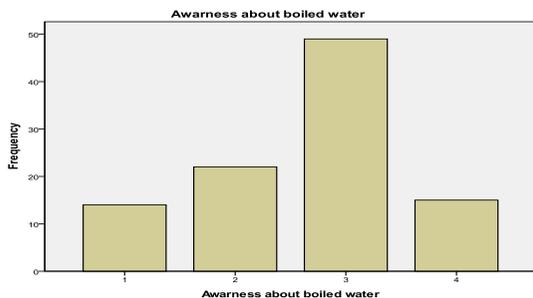


Figure 4.5 Frequency Diagram of Awareness about Boiled Water

4.1.6. Source of knowing about environmental awareness

The result is shown below in the table 4.6 and figure 4.6. shows that among the respondents, 6% of the respondents got the knowledge about environmental awareness from the parents, 37% of the respondents got the knowledge about environmental awareness from the media, 7% of the respondents got the knowledge about environmental awareness from radio, 50% of the respondents got the knowledge about the environmental awareness from the news paper.

Table 4.6: Frequency of source of knowing about Environmental Awareness

		Frequency	%	Valid %	Cumulative %
Valid	Parents	6	6.0	6.0	6.0
	Media	37	37.0	37.0	43.0
	Newspaper	50	50.0	50.0	93.0
	Radio	7	7.0	7.0	100.0
	Total	100	100.0	100.0	

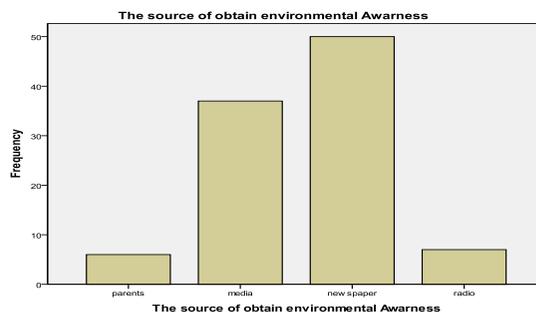


Figure 4.6: Frequency diagram of sources of about Environmental Awareness

4.1.7. Main reason for air pollution

Among the respondents, 1% of the respondents said, industrial smoke is the main reason for Air Pollution. The remaining 99% of the respondents said, all factors such as smoking, smoking by vehicle, Industrial smoke are the main reason for Air Pollution (Table 4.7 and figure 4.7).

Table 4.7 Frequency of main reason for Air Pollution

		Frequency	%	Valid %	Cumulative %
Valid	Industrial smoke	1	1.0	1.0	1.0
	All of these	99	99.0	99.0	100.0
	Total	100	100.0	100.0	

4.2. Bivariate Analysis

In this section, we have calculated bivariate frequencies for the correlated variables based on our sampled respondents. The SPSS output of bivariate frequencies (in the form of cross tables) are presented in this section.

4.2.1. Age and Awareness about the Boiled Water

Age of the respondents and awareness about the boiled water are considered here. The SPSS output of the cross tabulation is presented in table 4.8.

Table 4.8: Cross tabulation of age and awareness about the Boiled Water

		Awareness about boiled Water				Total	
		Always	Rarely	Rainy Days Only	Never		
AGE	20-30	Count	13	17	39	11	80

	31-40	Count	0	0	5	2	7
	41-50	Count	1	3	4	2	10
	50 above	Count	0	2	1	0	3
		% of Total	.0%	2.0%	1.0%	.0%	3.0%
Total		Count	14	22	49	15	100

Among 100 respondents, out of 13 respondents belong to always drinking the boiled water, 17 respondents belong to rarely drinking the boiled water and 39 respondents belong to drinking the boiled water in the rainy days, remaining 11 respondents belong to never drinking the boiled water, in the age group of 20-30 respondents. Among 100 respondents, out of 5 respondents belong to drink the boiled water in the rainy days, the remaining 2 respondents belong to never drinking the boiled water in the age group of 31-40 respondents. Among 100 respondents out of 1 respondent belong to always drinking the boiled water, 3 respondents belong to rarely drinking the boiled water and 4 respondents belong to drinking the boiled water in the rainy days, the remaining 2 respondents belong to never drinking the boiled water, in the age group of 41-50 respondents. Among 100 respondents, out of 2 respondents belong to rarely drinking the boiled water, the remaining 1 respondents never drinking the boiled water, in the age group of above 50 respondents.

4.2.2. Age and source of knowing details about environment awareness

		Main Reason for Water Pollution		Total	
			Factories	all of these	
AGE	20-30	Count	8	72	80
	31-40	Count	1	6	7
	41-50	Count	3	7	10
	50 above	Count	1	2	3
Total		Count	13	87	100

Age of the respondents and source of Knowing details about environment awareness are considered here. The SPSS output of the cross tabulation is presented in table 4.9.

Table 4.9.: Cross tabulation of age and source of knowing details about environment awareness

		Source of obtained Environmental Details				Total
		Parents	Media	News paper	Radio	
Age	20-30	5	31	40	4	80
	31-40	0	2	3	2	7
	41-50	1	3	5	1	10
	50 above	0	1	2	0	3
Total		6	37	50	7	100

Among 100 respondents, out of 5 respondents belong to parents are the source of knowing the environmental details, the 31 respondents belong to knowing the environmental details by media, the maximum 40 respondents belong to knowing the environmental details by newspaper, the remaining 4 respondents belong to knowing the environmental details by radio in the age group of 20-30 respondents. Among 100 respondents, out of 2 respondents belong to knowing the source of environmental details by media, the 3 respondents belong to knowing the environmental details by news papers, the remaining 2 respondents belong to knowing the source of environmental details by radio, in the age group of 31-40 respondents. Among 100 respondents, out of 1 respondent belong to knowing the environmental details by parents, the 3 respondents belong to knowing the source

of environmental details in media, the 5 respondents belong to knowing the environmental details in news papers, the remaining 1 respondent belong to knowing the environmental details by ratio in the age group of 41-50 respondents. Among the 100 respondents the 1 respondent belong to knowing the environmental details by media, the 2 respondents belong to knowing the environmental details by newspaper, in the age group of above 50.

4.2.3. Age and awareness of water pollution

Age of the respondents and awareness of water pollution are considered here. The SPSS output of the cross tabulation is presented in table 4.10.

Table 4.10: Cross tab.of age and awareness of Water Pollution

Among the 100 respondents, the 8 respondents belong to say the main reason for water pollution in factories, the maximum of 72 respondents belong to say the main reason for water pollution is all factors such as factories, cattle, wastages and human beings in the age group of 20-30. Among the 100 respondents, the 1 respondent belong to say the main reason for water pollution is factories, the remaining 6 respondents belong to say the main reason for water pollution is factories, the remaining 6 respondents belong to say the main reason for water pollution is all factors such as factories, cattle, wastages and human beings in the age group of 31-40. Among the 100 respondents, the 3 respondents belong to say the main reason for water pollution in factories; the 7 respondents belong to say the main reason for water pollution is all factors such as factories, cattle, wastages and human beings in the age group of 41-50. Among the 100 respondents, the 1 respondent belong to say the main reason for water pollution in factories, 2 respondents belong to say the main reason for water pollution is all factors such as factories, cattle, wastages, Humans in the age group of above 50.

4.2.4. Age and awareness of Air Pollution:

Age of the respondents and awareness of Air Pollution are considered here. The SPSS output of the cross tabulation is presented in table 4.11.

Table 4.11: Cross tabulation of age and awareness of Air Pollution

		Main Reason for Air pollution		Total	
			industrial smoke	all of these	
AGE	20-30	Count	1	79	80
	31-40	Count	0	7	7
	41-50	Count	0	10	10
	50 above	Count	0	3	3
Total		Count	1	99	100

Among the 100 respondents, the 1 respondent belong to say the main reason for air pollution in industrial smoke, the 79 respondents belong to say the main reason for air pollution is all factors such as smoke of vehicles, industrial smoke in the age group of 20-30. Among 100 respondents, the 7 respondents belong to say the main reason for air pollution is all factors such as smoke of vehicles, industrial smoke in the age group of 31-40. Among 100 respondents the 10 respondents belong to say the main reason for air pollution is all factors such as smoke of vehicles, industrial smoke in the age group of 41-50. Among 100 respondents the 3 respondents belong to say the main reason for air pollution is all factors such as smoke of vehicles, industrial smoke in the age group of above 50.

4.3. Chi-Square test for relatedness or independence of attributes

In this section, chi-square test was used to test a hypothesis that the given two attributes are independent or not. Here the association between two attributes sex and awareness about drinking boiled water is checked using chi-square statistic. For testing the association between these two attributes, the null hypotheses and alternative hypothesis are formulated as following.

H_0 : No association between sex and awareness about drinking water. H_1 : Association exists between sex and awareness about drinking water

Table 4.12: Characteristics of Chi-Square test

Statistics	Value	DF	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)
Pearson Chi-Square	5.344(a)	3	.148	.154
Likelihood Ratio	5.276	3	.153	.172
Fisher's Exact Test	5.236			.153
N of Valid Cases	100			

Table 4.13: Characteristics of Symmetric Measures

		Value	Approx. Sig.	Exact Sig.
Nominal by Nominal	Chi-Square	.230	.152	.150
	Cramer's V	.230	.152	.150
	Contingency Coefficient	.224	.152	.150
N of Valid Cases		100		

From the above table, it is concluded that, Pearson test statistic has a value of a 5.344 with a significance of 0.148. This level indicates a value greater than 0.05 and is therefore not significant.

We have also checked for association between other attributes such as age and people respondents, sex and people respondents, educational level and people respondents. Underneath chi-square table there are some footnotes relating to the assumption that expected counts should be greater than 5. If any frequency cell having expected frequencies less than 5, then chi-square statistic value is not accurate. In this situation the best remedy is to collect more data to boost the proportion of cases falling into each category. The association between age and people respondents, sex and people respondents, educational level and people respondents are checked and some frequency cell having expected frequencies less than 5.

4.4. Henry Garrett Ranking Technique

4.4.1. Awareness about environment pollution

The respondents opinions towards awareness about environment pollution differ for everyone. To evaluate the environment awareness among the respondents, the factors are categorized and discussed in the following table 4.14.

Table 4.14: Garrett's ranking for awareness about Environment Pollution

Sr.No.	Factors	Total Score	Mean Score	Rank
1.	Over population	6472	64.72	III
2.	Sleeping under tree at night	6465	64.65	IV
3.	Water resource is affected due to land pollution	6360	63.60	V
4.	Rainwater harvesting save the underground water	7637	76.37	II

5.	Wastage from home can biodegraded naturally	5856	58.56	VI
6.	Plastic and glass materials are biodegradable	7695	76.95	I
7.	No harm on using plastic bags	5741	57.42	VII

Table 4.14 exhibits Garrett's ranking and scores which helps to decide the most impact factor of awareness about environmental. It is assumed that score one represented as strongly agree and score 5 represented as strongly disagree. So least is the best procedure is followed to interpret the result. Plastic and glass materials are biodegradable is ranked in the first position with total score 7695 points. It is inferred that, this factor is the lowest influenced factor of the respondents. No harm on using plastic bags is ranked in the last position with total score 5741 points. It is inferred that, this factor is the most influenced factor of the respondents.

4.4.2. Awareness about Water Pollution

The respondents opinions towards awareness about water pollution differ for everyone. To evaluate the water pollution awareness among the respondents, the factors are categorized and discussed in the following table 4.15.

Table 4.15: Garrett's ranking for the awareness about Water Pollution

S.No	Factors	Total Score	Mean Score	Rank
1.	Jaundice affect the people due to water pollution	7563	75.63	II
2.	Communicable disease can be easily spread by water pollution	6130	61.30	IX
3.	Boiled water may be contained bacteria	6323	63.23	VII
4.	Detergents pollute the water	7321	73.21	III
5.	It is necessary to control water pollution for the safety environment	6210	62.10	VIII
6.	It is not to good placed toilet into our home	6873	68.73	IV
7.	The bacteria secreted by waste water should get destroyed	6438	64.38	V
8.	Through purified water the communicable disease spread	7680	76.80	I
9.	Water pollution cannot be controlled by purifying the sewages by appropriate filtering method	6343	63.43	VI

Table 4.15 exhibits Garrett's ranking and scores which helps to decide the most impact factor of awareness about water pollution. It is assumed that score one represented as strongly agree and score 5 represented as strongly disagree. So least is the best procedure is followed to interpret the result. Through purified water the communicable disease spread is ranked in the first position with total score 7680 points. It is inferred that, this factor is the lowest influenced factor of the respondents. Communicable disease can be easily spread by water pollution is ranked in the last position with total score 6130 points. It is inferred that, this factor is the most influenced factor of the respondents.

4.4.3. Awareness about Air Pollution:

The respondents opinions towards awareness about air pollution differ for everyone. To evaluate the air pollution awareness among the respondents, the factors are categorized and discussed in the following table 4.16.

Table 4.16: Garrett's ranking for the awareness about Air Pollution

Sr.No.	Factors	Total Score	Mean Score	Rank
1.	Air pollution not the reason Asthma	3809	38.09	IX
2.	Pollen grains make allergy for human	5743	57.43	VIII
3.	Air pollution controlled by trees	7804	78.04	I
4.	Air Polluted by fireworks like crackers	6099	60.99	VI
5.	Ozone layer affected by more vehicles is not the reason for air pollution	6153	61.53	V
6.	Making the distance between Building apartments will control air pollution	5983	59.83	VII
7.	If we use current or sun energy for the petrol vehicle control air pollution	6307	63.07	III
8.	Using bicycle is one of the remedy for control air pollution	7189	71.89	II
9.	Air pollution affected friends and relatives	6283	62.83	IV

Table 4.16 exhibits Garrett's ranking and scores which helps to decide the most impact factor of awareness about air pollution. It is assumed that score one represented as strongly agree and score 5 represented as strongly disagree. So least is the best procedure is followed to interpret the result. Air pollution controlled by trees is ranked in the first position with total score 7804 points. It is inferred that, this factor is the lowest influenced factor of the respondents. Air pollution not the reason Asthma is ranked in the last position with total score 3809 points. It is inferred that, this factor is the most influenced factor of the respondents.

5. CONCLUSIONS

From the result, it is concluded that Pearson test statistic has a value of a 5.344 with a significance of 0.148. This level indicates a value greater than 0.05 and is therefore not significant. The relationship for sex and respondents awareness, age and people respondent's awareness, education and respondents' awareness have checked. But, expected cell frequencies have less than 5. So it is suggested that, more sample should be collected to increase the proportion of cases falling into each category which cell have less than five frequencies.

Henry Garrett's ranking technique is used to find out the most influenced factor of awareness about environmental pollution among the respondents, awareness about water pollution, awareness about air pollution, awareness about noise pollution, awareness about land pollution. From the Garrett's ranking technique, it is concluded that Plastic and glass materials are biodegradable is the lowest influenced factor and no harm on using plastic bags is the most influenced factor of the respondents for awareness about environmental pollution. Through purified water the communicable disease spread is the lowest influenced factor and communicable disease can be easily spread by water pollution is the most influenced factor of the respondents for Awareness about Water Pollution. Air pollution controlled by trees is the lowest influenced factor and air pollution not the reason for asthma is the most influenced factor of the respondent for Awareness about Air Pollution.

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