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UNIVERSITY STUDENTS' PERCEPTION ON CITY'S AIR QUALITY: A TALE OF THREE CITIES IN BANGLADESH

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ABSTRACT

The underlying endeavor of this paper is to understand the air pollution situation, particularly PM 2.5, in the major three cities of Bangladesh through the lenses of university students. In order to achieve this aim, a structured questionnaire was developed and scheduled interview was performed with the students from three universities of Bangladesh, namely Khulna University, Chittagong University, and Dhaka University. Data was collected on three categories: demographic, seasonal variation and consequences, and lastly some prevention perceptions. Accumulated data were analyzed by deploying descriptive statistics. Multinomial logistic regression, Pearson correlation along with PCA and cluster analysis were performed to understand the prevention perceptions. The result shows that air pollution has adverse effects on participants and air quality is most deteriorated during summer season. Statistically, pollution in Dhaka city is the most while least was found in Khulna city. Participants witness and bear the consequences of air pollution, but they think individual prevention measures are not at work. This study unveils the air quality problem in three major cities in Bangladesh and pollution problem is out of individual control. Further studies are encouraged to understand individual pollution control measures and policies.

KEYWORDS: Air Quality, Students' Perception, and Major Cities Bangladesh.

1. INTRODUCTION

Air pollution has become a serious threat to public health, particularly urban health, and are leaving behind, an estimation of, 1.6 billion people worldwide to substandard air quality (World Health Organization, 2005). Study, led by The Global Burden of Disease, confirms that environment or ambient pollution is a prominent cause of adverse health (Lim et al., 2012; Landrigan & Fuller, 2015). Another study of World Bank and the Institute for Health Metrics and Evaluation confirms that around 90% of people across the globe live in exceeded threshold areas, determined by WHO, of pollution (World Bank, 2016). Air pollution is the fourth leading cause of premature death, globally, and second largest death incidence for children aged under five (World Health Organization, 2017). According to Health Effects Institute (2019) report air pollution (ambient PM 2.5, household and ozone) causes about 4.9 million deaths (8.7% of all deaths globally) and loss of 147 million years of healthy life in 2017.

In Bangladesh vehicular emission, from uncontrolled vehicles, along with industrial and other anthropogenic activities because of population density give rise to air pollution problem (Azad & Kitada, 1998). Airborne particulate matter (APM), considered as important pollutant, is the aerosol chemical composition and poses a serious threat to human health (Salam et al., 2003). Rapid industrialization and urbanization, during last few decades, to bolster economic development has resulted in significant population accumulation in many cities of the world, propelling extra demand on transportations, facilities and supplies. From this perspective, Dhaka city is no difference and notably flooded with the burden of unplanned development, which is incessantly worsening environmental quality. Vehicular and industrial emission and brick kilns are notable sources of air pollution in this city (Begum et al., 2004, 2005). In Dhaka city of Bangladesh, over 14 million people live within 1353 km2, which is most densely populated mega city in the world with an annual population growth of 3.1%. It is being estimated that Dhaka city will be the dwelling place of 21 million residents weighing the fifth largest mega city in the world (United Nations, 2019). According to World Bank (2018) Dhaka city air pollution problem is contributed because of the brick kilns, excessive use of fossil fuel burned vehicles, pumping higher level of sulfur, and dust produced from construction works. There are around 5000 brick kilns in the country and about 1000 of them are in the capital city, Dhaka, contributing to the emission of half PM2.5 during the dry season (Begum et al., 2011; Guttikunda et al. 2013; Luby et al., 2015). As studies on particulate pollution have been carried out in both Dhaka and Chattogram and PM collected from Dhaka on study of chemical speciation, corroborated persistence of gaseous pollutants contributes to the particulate pollution (Ahmed & Hossain 2008; Begum et al. 2009; Guttikunda 2009; Islam 2000; Salam et al. 2003).

Population growth is demanding more urban facilities and vehicles in Dhaka and other cities (i.e., Chattogram, Khulna) resulting in more establishments of industries and fostering excessive use of fossil fuel, contributing more emission in environmental pollution. From this perspective, in consideration of least livable city in the world, according to The Global Livability Index 2018 and EPI 2019, Dhaka city ranked out 179 out of 180 countries. As a result, public health regarding environment is in potential jeopardy (Ansari et al., 2019; Economist Intelligence Unit 2018).

According to IQAir, a Swiss air quality technology company in AirVisual (2018) report world ranking of top five average PM2.5 concentration countries in South Asia are Bangladesh, Pakistan, India, Afghanistan and Bahrain respectively. But from capital city perspective of world countries, Dhaka, Bangladesh, stands as second ranking in highest PM2.5 concentrations. In 2017 globally, Bangladesh stood as number fifth country of deaths due to air pollution (123,000 deaths) (Health Effects Institute, 2019). Deterioration of air quality because of various concentrations of deleterious gases in the atmosphere poses a great health hazard. Because of poor air quality, public health is exposed to many respiratory and cardiovascular diseases comprising asthma, atherosclerosis and myocardial infraction (Meng et al., 2010).

Understanding the importance of air quality in public health sector, the aim of this study is to understand the viewpoint of tertiary students in air quality of their respective area of residence. Causes of air pollution and consequences due to air pollution, along with some alleviative statements and environmental issues on health and wellbeing, have also been assessed.

2. METHODOLOGY

Study Locations and Population

This study was carried out focusing on three major cities in Bangladesh, namely Dhaka, Chattogram and Khulna. According to *IQAir* on World Air Quality Report 2019, Dhaka city ranked as second for highly average annual PM 2.5 concentrations (μg/m³) in the World in regional capital city ranking. Besides Dhaka city is most densely populated city (United Nations, 2019) in the world. As for other two cities, Chattogram, which is a port city, and Khulna are rapidly marching toward industrialization and paving a way for more pollution generating activities. Population for this study was the students of three universities under these three specific study locations. Name of the three universities were Dhaka University (DU), Chittagong University (CU) and Khulna University (KU); total population from these institutions was estimated 30015, 24293, and 5616 respectively. Students were considered as study population because of their conscious and lucid point of view considering their surrounding environment and they are the best to pose any rational policy recommendations concerning air pollution.

Air Pollution Data and Air Quality Measuring Standards

AQI data on PM 2.5 for the three specific study area was got from Clean Air & Sustainable Environment (CASE) project under Department of Environment (DoE) Bangladesh, Ministry of Environment and Forest and World Weather Online, which provides global weather forecast and weather content, during the time span of 2017 to 2019. In this study, we focused on PM2.5, as a representative measure of air pollution, concentrations in the atmosphere. Measurement of AQI data in this study was poised following United States Air Quality Index (US AQI) and annual mean exposure threshold of PM 2.5 is 10 μg/m³ while daily average is 25 μg/m3 (WHO, 2005).

Sample and Survey Method

Survey data for this study was collected during the period from June 2019 to August 2019 through a structured questionnaire. To identify study participants simple random sampling method was employed. Sampling distribution in this study from three locations was determined using the following formula:

$$N = \frac{Total\ number\ of\ population\ from\ each\ place}{1+(Total\ number\ of\ population\ \ from\ each\ place \times e^2)},$$

Where precision level $e = .10$

This resulted 99.67 from Dhaka University, 99.59 from Chittagong University and 98.25 from Khulna University, which further prompted to round up the numbers as 100 for DU and CU but for KU sample number was rounded as 99. All three scenarios culminated the final sample size as 299.

There were 29 questions used, including demographic information: gender, age, duration of residency. Out of 29 questions, 11 questions were measured in 5-scale Likert questions concerning initiatives and stance require in mitigating air pollution. 6 questions were asked in understanding perceptions about air quality.

1. How would you rate the overall air quality of your city in 2019 compared to 2018? (1= Much better, 2= A little better, 3= No differences, 4= A little worse, 5= Much worse)
2. Do you think weather affects air quality? (1= Yes, 2= No, 3= Don't know)
3. To what extent does air pollution affects you? (1= Very much, 2= A little, 3= Not at all)
4. During which season of a year, you noticed air quality issues/problems? Multiple options (Spring, Summer, Monsoon, Autumn, Pre-winter, Winter)
5. What are the main causes of air pollution in your city? Multiple options (Construction, Industrial sources/manufacturing facilities, Increasing use of air conditioner, Motor vehicles, Household cooking and heating, Population growth, Power plants, Smoke of cigarettes, Waste disposal, Burning of Waste, Pollution from other regions)
6. In which of the following ways are you affected? Multiple options (Breathlessness/having more difficulty in breathing, Doing less outdoor activities, Doing more work to stay healthy, Feeling depressed, Irritation to eyes/nose/throat, Skin problems, Wanting to move to other less polluted place, Asthma incidences, Poor visibility, Worrying about the living environment for children)

And lastly there were seven issues related to environment, which were measured in 1 to 7 scale where 1 represented highest concern and 7 as lowest concern.

Statistical Analysis

Descriptive Statistics were used to describe participant's demographics and responses to the multiple questions. A multivariable regression was used to determine the extent of air quality difference in 2019 compared to 2018. Statistical processes, including Pearson Correlation Matrix (PCM), Principal Component Analysis (PCA) and Hierarchical Cluster Analysis (CA) were used to examine the association between various pollution preventive measures. As a data reduction tool, PCA is quite handy for large sample to specify parameters and their confidence level. In the data set of this study, PCA factor variables value of KMO (Kaiser-Maier–Olkin) was 0.724 and the Bartlett's sphericity test significance was p= 0.000 showing fitted for PCA. The number of factors with eigenvalues >1.0 was considered. Pearson correlation and CA both were used to identify associations among items. As CA helps to differentiate the population into various groups, grounding on the same characteristic of the dataset (DeVellis, 1991), this study used hierarchical cluster to identify probable number of clusters. Statistical analysis was performed using SPSS 16.0 and statistical significance was considered at the $p < 0.05$ level.

3. RESULTS

Respondent's demographic characteristics

Table 1: Demographic characteristics of the respondents

	Participants (%)
Gender	
Male	185 (61.9)
Female	114 (38.1)

Table 1: Demographic characteristics of the respondents (continued)

	Participants (%)
Age	
Mean ± SD	22 ± 1.9
≤ 23	192 (64.2)
≥ 23	107 (35.8)
Residency duration (in years)	
≤ 9	140 (46.8)
10 to 18	44 (14.7)
19 to 27	115 (38.5)

Source: Author, 2021

From table 1, out of 299 subjects of the study, 61.9% were male and 38.1% were female bearing mean age of 22. Respondents with age ≤ 23 were 64.2% and ≥ 23 were 35.8%. Major chunk of the respondents (46.8%) are living their respective area ≤ 9 years and 38.5% are living 19 to 27 years.

Weather Affects Air Quality and Participant's View on Air Pollution

Figure 1 shows that 85.6% respondent answered yes with the statement that weather affects air quality and only 6.4% said no, while rest 8% did not know whether weather affects air quality. As presented in Figure 2 explains that 68.2% of the study respondents were very much affected, 29.4% are a little affected and only 2.3% were not at all affected by air pollution.

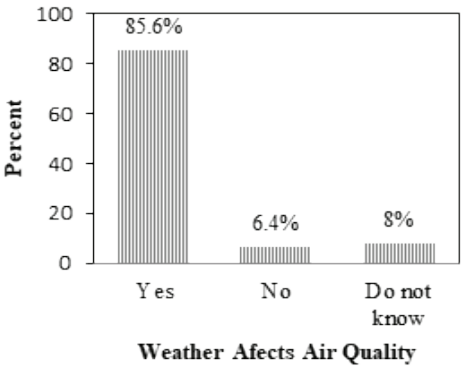

Figure 1: Percentage of responses on weather affects air quality
Source: Author, 2021

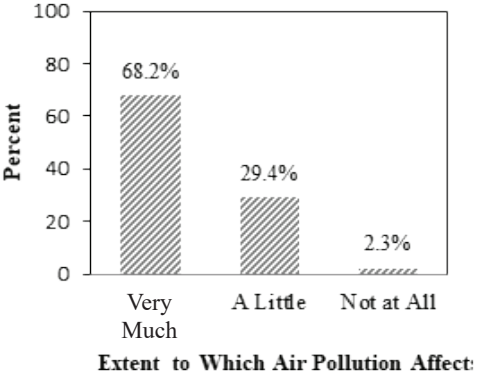

Figure 2: Percentage of responses on which extent air pollution affects
Source: Author, 2021

Major Problems Due to Air Pollution

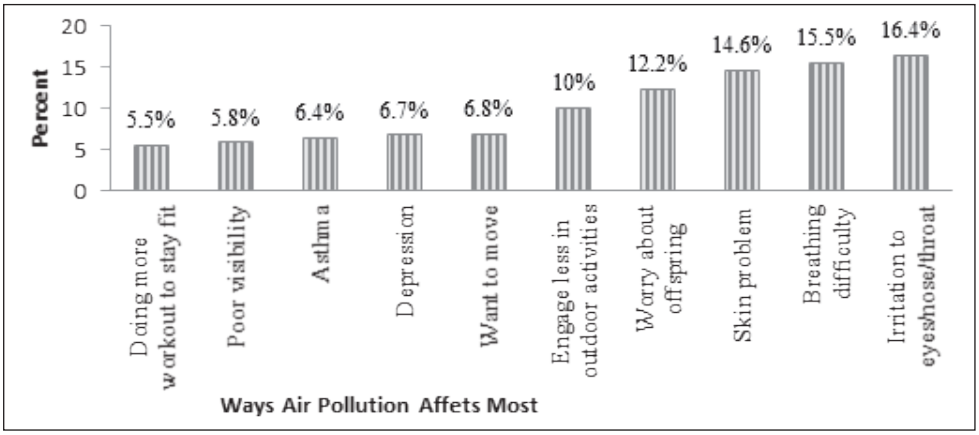

Figure 3: Percentage of responses on problems due to air pollution
Source: Author, 2021

Figure 3 shows that most acute problem due to air pollution is irritation to eyes/nose/throat 16.4%. Breathing difficulty 15.5% is second most and third is skin problem 14.6%.

Season Wise Air Quality Problems and Causes of Air Pollution

Air quality noticing problems in different seasons and causes of air pollution in three cities is summarized in table 2. Respondents of three cities Dhaka, Chattogram and Khulna respectively confirm that summer (37.9%, 33% and 49.7%), winter (18%, 24.6% and 18.5%) and spring (15.5%, 14.3% and 13.4%) are the most deteriorating air quality seasons. In understanding causes of air pollution, 'motor vehicles emissions' (14.7%, 14.6% and 14.4%) is the prime source of pollution in Dhaka, Chattogram and Khulna city respectively. But for individual city wise scenario in Dhaka city and Khulna city, major air pollutants are construction dusts (13.9%), pollution with population growth (13.7%), industrial sources (12.6%), and unplanned waste disposal (11.3%). In Chattogram city, industrial sources (13.4%) construction dusts (13.2%) are major causes of air quality deterioration.

Table 2: Season wise air quality problems and city wise causes of air pollution

	Dhaka N (%)	Chattogram N (%)	Khulna N (%)
Noticing Air Quality issue/problem Season			
Summer	78 (37.9)	74 (33)	78 (49.7)
Winter	37 (18)	55 (24.6)	29 (18.5)
Spring	32 (15.5)	32 (14.3)	21 (13.4)
Pre-winter	23 (11.2)	25 (11.2)	9 (5.7)
Monsoon	20 (9.7)	22 (9.8)	16 (10.2)
Autumn	16 (7.8)	16 (7.1)	4 (2.5)

Table 2: Season wise air quality problems and city wise causes of air pollution (continued)

	Dhaka N (%)	Chattogram N (%)	Khulna N (%)
Main causes of air pollution in city			
Motor vehicles emissions	80 (14.7)	82 (14.6)	65 (14.4)
Construction dusts	76 (13.9)	74 (13.2)	58 (12.9)
Industrial sources/manufacturing facilities	69 (12.6)	75 (13.4)	44 (9.8)
Pollution with Population growth	75 (13.7)	67 (12)	53 (11.8)
Smoke of cigarettes	50 (9.2)	46 (8.2)	42 (9.4)
Unplanned waste disposal	61 (11.3)	57 (10.2)	64 (14.3)
Burning of Waste	54 (9.9)	61 (11)	44 (9.8)
Increasing use of air conditioner	28 (5.1)	37 (6.6)	28 (6.3)
Power plants	21 (3.8)	19 (3.4)	11 (2.4)
Household cooking and heating	17 (3.1)	26 (4.7)	26 (5.7)
Pollution from other regions	15 (2.7)	15 (2.7)	14 (3.2)

Percentages cumulated in column, N= number of responses
Source: Author, 2021

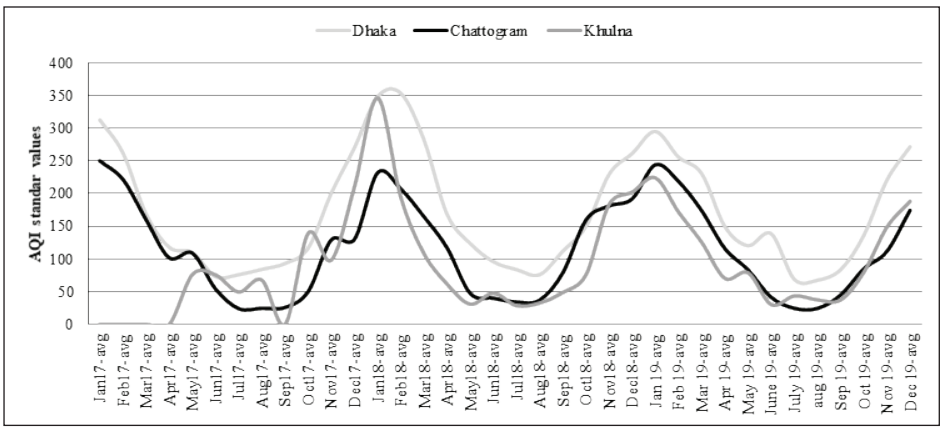

Figure 4: Average air quality (PM 2.5) of each month from 2017 to 2019
Source: (CvASE project)

According to Bangladesh's air quality measuring standard there are total six standard values of air quality index ranging from 0 to 50, 51 to 100, 101 to 150, 151 to 200, 201 to 300 and 300 to 500 implying good, moderate, caution, unhealthy and very unhealthy respectively. Figure 1 shows the average monthly air quality based on PM 2.5 concentrations in the air from 2017 to 2019. Graph shows that in all three cities during winter season (mid-December to mid-February) PM 2.5 concentrations is highest in the air. Second highest PM 2.5 concentrations season is spring (mid-February to mid-April) and summer (mid-April to mid-June) stands as third highest air quality deterioration season.

Air Quality Comparison in Three Cities in 2019 than 2018

Table 3: City wise air quality in 2019 compared to 2018

	Dhaka		Chattogram	
	β (Standard Error)	Odds ratio (P)	β (Standard Error)	Odds ratio (P)
Much better	-2.597 (.956)	.074 (.007)*	-1.009 (.797)	.365 (.205)
A little better	-2.540 (.578)	.079 (.000)*	-1.868 (.595)	.154 (.002)*
No difference	-2.454 (.519)	.086 (.000)*	-1.600 (.528)	.202 (.002)*
A little worse	-2.415 (.473)	.089 (.000)*	-1.255 (.479)	.285 (.009)*
Much worse (Ref.)				

Ref= Reference category

The analysis reference category was 'Khulna'.

* Statistically significant at $p < 0.05$

A multinomial multiple logistic regression analysis was performed to identify air quality differences between 2018 and 2019 among three cities. As presented in Table 3, results from multinomial logistic regression analysis show that there are significant differences in air quality among three cities in 2019 compared to 2018 associated with participant's experience. Respondents of Dhaka city compared to Khulna city are less likely to choose much better, a little worse, no difference and a little worse than much worse and the odds are .074, .079, .086 and .089 respectively, which are also statistically significant. The odds of selecting much better (.365), a little better (.154), no difference (.202) and a little worse (.285) than much worse are less in choosing air quality of Chattogram city compared to Khulna city.

Perceptions on Preventive Measures: Results of Statistical Analysis

Relationship Assessment

In this study, Pearson correlation matrix (PCM) was used to understand the relationship among various preventive measures and perceptions of air quality deterioration (Table4). There is a significant strong positive correlation between statement S9 and S10 showing people who cannot control pollution individually and they observe pollution as a major problem. Second correlation is observed between S6 and S7which illustrates as improving the environment is the responsibility of every citizen, so that demands the initiation of recycling programs. Beside significant positive correlation is found within the statement S1 and S2, S1 and S7, and S4 and S6 showing link with different perceptions and preventive measure statements.

Consistency of respondent's perception

In this study, principal component analysis (PCA), and cluster analysis (CA) applied to examine the association between the respondent's perceptions and factors responsible for air pollution. From Table 5, 3 factors or principal components were extracted, representing 52.616% of total variance. In PCA, score loading is categorized as strong >0.75, moderated .75- .50 and lastly weak .50-.30 (Liu et al., 2003). In this study, interpreted factor loadings < .30 are omitted for the feasibility of a better understanding of the results. The first factor handles 24.28% of the total variance and has strong positive loadings of S10 (.831) and S9 (.782). Second factor handles 18.17 of the total variance and is correlated with S11 (.660) and S6 (625). And lastly 10.16% of total variance is explained by factor 3 and S1 (.773), S2 (725) and S3 (573) are contributing factors to that variance.

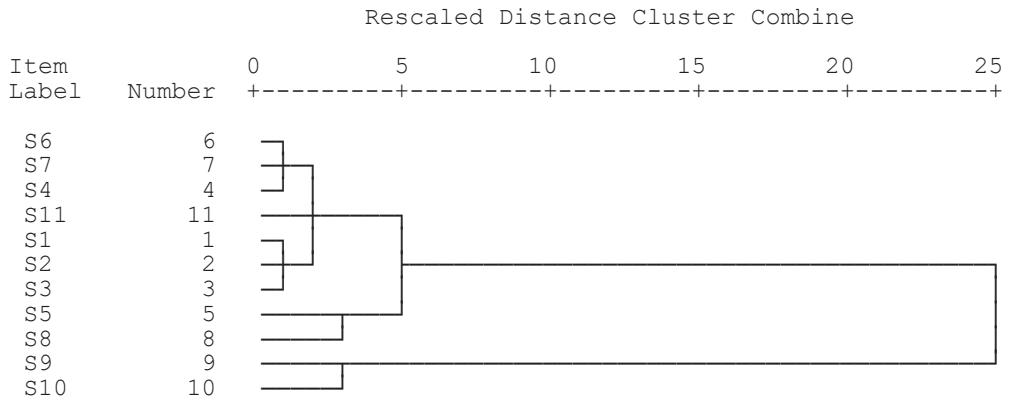

Figure 5. Dendrogram based on agglomerative hierarchical clustering for 11 items of perceptions measures

Application of Cluster Analysis (CA) further confirms the linkages among different perception variables. In this study, cluster analysis results are like the findings of PCA results, and are divided into three major clusters (Figure 2). Cluster 1 comprises with S1 to S4, S6, S7 and S11. In PCA analysis, these statements are with similar values. Second cluster holds S5 and S9. Finally, the big difference creates the cluster 3 with S9 and S10.

Table 4: Pearson correlation matrix of the studied factors of human stress (significant values (>0.5) are in bold typeface).

Compt.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11
S1	1										
S2	.320**	1									
S3	.279**	.373**	1								
S4	.180**	.147*	.259**	1							
S5	0.041	.187**	.209**	.202**	1						
S6	.304**	.199**	.218**	.303**	.213**	1					
S7	.237**	.216**	.173**	.257**	.178**	.537**	1				
S8	.181**	.224**	.212**	0.078	.231**	0.093	0.108	1			
S9	-0.006	0.106	0.07	-0.09	.213**	-.144*	-.140*	.210**	1		
S10	0.026	0.076	.116*	-0.026	.210**	-.185**	-.235**	.290**	.562**	1	
S11	0.025	0.063	.181**	.167**	.166**	.206**	.139*	.178**	0.024	0.028	1

** Correlation is significant at the 0.01 level (2-tailed). * Correlation is significant at the 0.05 level (2-tailed).

Table 5: Principle components analysis of the studied factors

	Items	PC1	PC2	PC3
S1	Polluting companies should be finned	-	-	.773
S2	Power stations and factories should switch to cleaner processes	-	-	.725
S3	Government should do more to promote and encourage a better environment	-	-	.573
S4	NGOs can play an important role for encouraging a better environment	-	.547	-
S5	Police should stop and check car emissions more frequently	.417	.564	-
S6	Improving the environment is the responsibility of every citizen	-	.625	.367
S7	Recycling programs should be put in place	-.319	.565	.357
S8	I am actively involved in cleaning up the environment	.491	-	-
S9	The pollution is out of individual control	.782	-	-
S10	I observe air pollution as a major problem	.831	-	-
S11	If I knew how to better contribute to a cleaner environment, I would take action	-	.660	-
% of Variance		24.281	18.172	10.164
Cumulative %		24.281	42.453	52.616
Kaise-Meyer-Oklin sampling adequacy .724				

Loadings < .30 are omitted. Rotation method Varimax

4. DISCUSSIONS

Air pollution can cause cardiovascular disease (CVD), asthma, stroke, chronic obstructive pulmonary disease (COPD) and lung cancer (WHO, 2014). In Bangladesh, major fatality due to air pollution are cardiovascular disease, cancer and respiratory diseases and mortality rate because of air pollution has increased by 52% in the last two decades (Rahman et al., 2019). Global state of an air report in 2015 confirmed 122,400 cases of death because of the exposure

to PM 2.5 in Bangladesh (Health Effects Institute, 2019). In our study, major problems due to air pollution are irritation to nose/eyes/ throat, breathing difficulty and skin problems. Exposure to polluted air, depending on constituents of pollutants and exposure time, can lead to multiple adverse effects on human health, ranging from nausea and breathing difficulty, skin irritation to cancer. Sometimes, it can cause birth defects and delayed developmental process in children. Although air pollution primarily infects cardiovascular and respiratory systems, as epidemiological and animal model data suggest, it can also affect other organs (Cohen et al., 2005; Huang & Ghio, 2006; Kunzli & Tager, 2005; Sharma & Agrawal, 2005). Nose and throat irritation for asthmatic individuals is also observed because of exposure in sulphur dioxide and nitrogen oxides mixed air (Balmes et al., 1987; Kagawa, 1985). Particulate matter goes through the alveolar epithelium, cause lung inflammation (Ghio & Huang, 2004; Uysal & Schapira, 2003).

In this study, highest concentration of PM 2.5 is observed in the summer and winter season. Being consistent with the study a previous study confirmed that during humid rainy monsoon months (July- September) lowest values of PM 2.5 and during cooler, dry winter season (December- February) highest values of PM 2.5 was recorded (Salam et al., 2003). In Dhaka city, PM 2.5 peaks in winter season and is related to weather pattern. Analysis of the constituents of ambient air pollutants shows that 30% of fine PM is because of the brick kiln in winter season in Dhaka. One plausible explanation of that is the lack of rainfall and temperature alteration during winter season (Begum et al., 2011). Brick kilns coal burning emits sulfur (4 to 6%) representing soil dust containing 9.5% of the fine mass mixing with crustal elements through motor vehicle sources contributes to the 36% of fine particle mass has a maximum peak in winter (Begum et al., 2013). Study validates that there is an association between PM 2.5 increase and winter season (Gurley et al., 2013). In a study of aerosol optical depth (AOD) which measures particles in the atmosphere confirms that in pre-monsoon season it increases and decreases in monsoon season again the rise is noticed in post-monsoon through winter season (Mamun et al., 2014). As in monsoon season, brickfields are inactive due to flood, which reduces the emission of fine particles in large extent. Relatively high humidity in monsoon season also has an influence on low PM 2.5 (Rahman et al., 2019).

This study confirms that major sources of pollution are motor vehicles, construction dust and industrial sources. In Bangladesh, sources of air pollution are vehicular emissions, industrial emission, and brick kilns (Khwaja et al. 2012). In city areas, major sources of pollution are vehicular emissions and industrial emissions. Brick kilns contribute to that list in dry seasons (Mahmood, 2011). Brick kilns cause 58% of particulate matter emission, motor vehicular emission 10%, and dust from unpaved asphalt and tarmac 17% are notable sources of air quality deterioration (Begum & Hopke, 2014). National pollution profile reveals that industries and its subsectors are also responsible for a large percentage of pollution (Islam, 2003).

Study participants point out polluting companies should be brought under financial punishments. Recycling programs also should put in place. In Bangladesh major pollutant industries are tannery 21%, pulp and paper 15%, pharmaceuticals industry 13%, fertilizer industry 12%, industrial chemicals 9%, food industry 6%, metal industry 5%, cement industry 4%, petroleum

3%, and others 6% (Nishat et al., 2001). Reducing in industrial pollution extents requires introduction of recycling and reuse, improving operation conditions, improving maintenance procedure and material purification (Hoque & Clarke, 2013).

According to this study, checking car emissions and traffic system improvement in reducing pollution are also necessary preventive measures. Initiatives from government in better transportation systems along with traffic system improvement and introducing non-motorized vehicles will curb down emission problem significantly (Alam, 2010).

5. LIMITATIONS

There are several limitations in this study which might be amended in the further study. First, as students are the sole participants in the study, there are students who only inhabit a few years in the respective city, which might be inadequate in capturing perfect air quality trends over long-term time span. Second, this study only investigates PM 2.5, which is not only particulate matter that affects human health. This is the first study on tertiary student perceptions of air quality in Bangladesh.

6. CONCLUSION

This study was aimed at understanding student's perceptions of air quality in three major cities in Bangladesh. The result of the study reveal that seasonal change brings changes in air quality. Most notably during winter season, air quality deteriorates most and Dhaka city air pollution problem is highly observable than the other two cities. Motor vehicles and industrial activities are highly responsible reasons for air pollution. The study suggests that individuals are callous about to minimize air pollution problem as there is already enough pollution in the environment. If there is any way to instigate individual consciousness in curbing down air pollution, there needs to be started recycling programs. More initiatives are required in fining polluting industries and switching them to clean process. Non-government organizations can also play an important role in encouraging a better environment.

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