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ATTITUDE AND PRACTICES TOWARDS URBAN AIR POLLUTION AMONGST HIGH RISK POPULATIONS IN ILIGAN CITY, PHILIPPINES

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ABSTRACT

This study was conducted to gauge the perceptions and practices of individuals who are at high risk of being constantly exposed to traffic-related air pollution of Iligan City. A total of 84 recruited individuals were interviewed face-to-face guided by a questionnaire. A significant number of respondents (88.10%) claimed to be aware of air pollution, however, despite the claims, 9.459% reported not being proactive in practicing any mitigating measures and actions. Based on the pooled data, several practices were found to be of significant correlation (p-values from 0.045500 to <0.0000001 at 95% confidence interval) among individuals claiming to be with knowledge about air pollution. However, it was also determined that there was no significant difference in the practice of mitigating actions between aware and unaware individuals. This poses the need for local and national government as well as environmental organizations to step up awareness campaigns and to create and implement policies that would improve air quality of Iligan City, Philippines.

Keywords: Urban air pollution, risk perception, attitude, and mitigating practices

INTRODUCTION

Air pollution has long been known as a global concern that causes damages in the environment and facilitates climate change due to toxic emission from road transport, industrial power plants, agricultural activities, and even household activities [1-4]. It also causes hazardous effects to human health: exacerbation of the

respiratory and cardiovascular diseases and may also increase the frequency and the severity of the symptoms of respiratory problems (e.g, breathing difficulty and coughing), decrease in lung function, and increase in the risk of infections in the respiratory system [2,5-11].

Due to the harm it causes to human health, the World Health Organization (WHO) facilitated the establishment of standards which would protect the well-being of the public. However, the effectiveness of the created policies, regulations and intervention programs mainly depends on the perception of individuals towards air pollution [12-13]. Sjöberg et al. [14] defined perception as a subjective assessment of exposure level to an environmental hazard and the concern with the consequences of the exposure. With this, perception becomes an important component of the behavioral changes and the response of the public to environmental exposure. Thus, the environmental health community agreed that there is a significant need to raise awareness and to engage and educate society with the association of air quality and the health of the individuals especially that of the urbanized places [15].

A questionnaire modified from various sources [16-17] was tailor-made specifically to assess what is known and being done by individuals of Iligan City

who are constantly exposed to outdoor pollution due to the nature of their work. This survey was conducted to have a clearer perspective about the population's attitudes and practices towards air pollution. The determination of these information is a necessity as creation and development of policies and measures that would facilitate abatement of air pollution and improvement of air quality is dependent on the perceptions of locales [18-19].

METHODOLOGY

A cross-sectional preliminary survey was conducted amongst individuals of Iligan City, whose nature of work necessitates constant outdoor exposure in traffic-laden areas. Two major groups of individuals were identified: security personnel who are stationed outside establishments and roadside vendors. In conformity with the study design, only individuals who have been working on respective areas for a minimum of two months were recruited to be part of the study population. Participating individuals were also asked to sign a consent form to ensure confidentiality of their identity.

A modified questionnaire adapted from several sources [16-17] was developed, taking into consideration the target population as well as the locality. The survey was conducted via personal

interview which lasted approximately thirty minutes, consisting of three parts including individual perception, attitude and practices concerning ambient air pollution.

Data from completed questionnaires were pooled on to Excel 2010 for data management. Analysis of the data collected used the basic statistical tools, including the mean, median, and mode. *p*-values with a 95% confidence interval (95%CI) were also determined using Fisher's Exact Test and Mid P Exact Test.

RESULTS AND DISCUSSION

A total of 84 respondents agreed to be subjects of this study: 32 of which were male security personnel, 13 were male street vendors, and 39 were female street vendors; with widely varied ages (14-64 years old). More than half of the respondents (56 subjects) reported to be married and attainted a secondary education. Also, there is an almost equal distribution of drinkers and non-drinkers as well as that of smokers and non-smokers. The demographic summary of the recruited population is shown in Table 1.

Table 1: Sociodemographic data of the study population

Variables	%	Mean ± SD	Variables	%
Age (in years)			**Marital Status**	
<20	2 (2.380)	36.4±10.95	Married	56 (66.67)
20-29	23 (27.38)	36.4±10.95	Single	22 (26.19)
30-39	28 (33.33)	36.4±10.95	Cohabit	1 (1.190)
40-49	18 (21.42)	36.4±10.95	Separated	1 (1.190)
50-59	11 (13.10)	36.4±10.95	Widowed	4 (4.762)
60-64	2 (2.381)	36.4±10.95		
Educational Attainment			**Smoking Habit**	
Elementary	6 (7.140)		Smoker	20 (23.81)
High School	41 (48.81)		Non-smoker	37 (44.05)
Vocational	11 (13.10)		Former Smoker	9 (10.71)
College	2 (2.380)		No Data	18 (21.43)
No Data	24 (28.57)			
Alcohol Consumption				
Alcohol Consumer	32 (38.10)			
Non-drinker	30 (35.71)			
Former Drinker	3 (3.571)			
No Data	19 (22.62)			

According to the data gathered, 74 respondents (88.10%) claimed to have some knowledge about air pollution and believed that it is harmful to the environment. This subpopulation is further categorized as "aware" individuals. The remaining members of the study population are otherwise classified as the "unaware" group.

Several studies has shown that higher level of education allows an individual to have more concern, and a better perception and awareness on air quality than individuals with no or little education [20-22]. With the use of Fisher's Exact Test and a confidence interval of 95%, it was determined that only the respondents with primary education had a significant correlation as to their

awareness of air pollution (Table 2). The inconsistency of the lack of significance between higher education levels and increased awareness may be attributed to the discrepancy in the population size between aware and unaware respondents.

It is postulated that populations considered highly aware of the current status of air quality and those with knowledge of air pollution should have a better attitude and thus would be practicing mitigating actions to minimize the effect of air pollution [20]. The gathered data from the survey shows that 79 of the respondents (94.05%) claimed to care about the environment where they are working, but only 59 (70.24%) believes that they can contribute to minimize ambient air pollution. However, the remaining 25 respondents (29.76%) reported that there is nothing that could be done in order to solve the continued degradation of air quality.

Ideas were also gathered from the respondents on the possible methods that can be done to mitigate air pollution, specifically via vehicular emission. Twenty-five respondents (51.19%) suggested tree planting could definitely help improve air quality. Reduction of the use of smoke-producing vehicles was cited by 38.10% of the population, intensified reporting and collection of fines from smoke-belching vehicles (34.52%), and the

suggestion of regular engine tune-ups and care maintenance checks (16.67%).

The respondents were further questioned about their regular routines that would contribute in mitigating the effects of ambient air pollution. This question also serves as a comparison to the prior question in order to assess whether the respondent's methods are being translated into action. Unfortunately, thirty-seven respondents (44.04%) claimed that they have not and are not taking action out of concern for air quality. The rest of the 47 respondents (55.95%) claimed that they are practicing some activities that would mitigate air pollution: 34 of the 47 (40.48%) practice waste segregation, 31 (65.96%) have regularly participated in tree planting activities, 16 (34.04%) advocates the non-burning of waste, and 13 (27.66%) are into recycling non-biodegradable waste.

Using binomial proportion - normal theory method, with a confidence interval of 95%, environmental activities, such as tree planning, reduced use of vehicle/carpooling, use of energy conserving grade motor oil, proper waste disposal, smoke-belching awareness, are shown to be significant activities among the aware population. Precautionary measures, such as wearing of mask, avoiding heavy traffic, cleaning, check-up and such, are

found to be significant in this population also.

All the environmental actions and precautionary measures summarized in Table 3 are found to be all significantly

correlated with the unaware population. However, there is great possibility that the results obtained is due to the small population size of this population.

Table 2: Correlation between educational attainment and awareness of air pollution among the study population

Educational Attainment	Aware (N=74)	Unaware (N=10)	p-value*
Primary Education	3	4	0.00631800
Secondary Education	37	3	0.39670000
Vocational	6	1	>0.9999999
Tertiary Education	6	0	0.91150000
No Data	22	2	0.82310000

p-value used is Fisher's Exact Test with confidence interval of 95%

Table 3: Environmental actions and precautionary measures taken by aware and unaware respondents

Practices	Aware			Unaware		
	N=74	%	p-value*	N=10	%	p-value*
Environmental Actions						
a. Tree planting	26	35.14	0.0105400	0	0.0	0.001565
b. Non-burning of waste/trash	11	14.86	<0.0000001	0	0.0	0.001565
c. Reduced use of vehicles/carpooling	10	13.51	<0.0000001	0	0.0	0.001565
d. Use recyclable plastic	4	5.405	<0.0000001	2	20	0.057780
e. Recycle non-biodegradable waste	4	5.405	<0.0000001	1	10	0.011410
f. Use energy-conserving grade motor oil	3	4.054	<0.0000001	0	0.0	0.001565
g. Proper waste disposal	2	2.703	<0.0000001	0	0.0	0.001565
h. Report smoke-belching vehicles	2	2.703	<0.0000001	0	0.0	0.001565
i. Dust Collection	1	1.351	<0.0000001	0	0.0	0.001565
j. Use of Solar Energy	1	1.351	<0.0000001	0	0.0	0.001565
k. Do nothing	7	9.459	<0.0000001	7	70	0.205900
Precautionary Measures						
a. Use of handkerchief	38	51.35	0.8162000	2	20	0.057780
b. Go on exercise	29	39.19	0.0628900	1	10	0.011410
c. Wear mask	24	32.43	0.0025070	1	10	0.011410
d. Avoid heavy traffic	11	14.86	0.0024970	1	10	0.011410
e. Avoid going outside	2	2.703	<0.0000001	0	0.0	0.001565
f. Avoid Dirty Air	2	2.703	<0.0000001	0	0.0	0.001565
g. Cleaning	2	2.703	<0.0000001	0	0.0	0.045500
h. Check-up	1	1.351	<0.0000001	0	0.0	0.045500
i. Drinking of medicine	1	1.351	<0.0000001	0	0.0	0.045500
j. Do nothing	9	12.16	<0.0000001	5	50	0.001565

p-value used is Binomial Proportion, Normal-Theory Method with confidence interval of 95%.

In order to determine the significance between the aware and unaware populations in correlation with their reposted mitigating practices, the Fisher's exact test was used. With a confidence interval of 95%, it was found out tree planting (p-value = 0.03780 at $p<0.05$) has a significant difference between the aware and unaware population with their

practices. Meanwhile, the rest of the results show no significant correlation with other environmental actions that would help reduce the effects of air pollution nor with precautionary measures that are indicative of the knowledge of the respondents about air pollution and its risk.

CONCLUSION

Majority of the population despite of educational attainment reported to be aware of air pollution. However, it was also found out that aware and unaware population have a significant correlation with individuals that attained primary education as their highest educational attainment.

Some environmental activities and precautionary measures which are previously identified mitigate the deterioration of air quality were found to be significant activities amongst individuals who claimed to be aware of our air pollution. It was also observed that there is no significant difference, except for tree planting, between the aware population and the unaware population with respect to the environmental actions and precautionary measures being practiced.

It is thus highly recommended that future researchers conduct longitudinal studies with increased sample size to further ascertain and affirm the perceptions and attitudes of the high risk population. It would be ideal that air quality monitoring device be present in survey areas in order to have a thorough investigation of the effects of the traffic-congested areas towards the health of population.

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