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Awareness about traffic-related air pollution among street vendors of Iligan City

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Abstract

Street vending is considered as a major sector in the self-employment category. Street vendors are at most risk to traffic-related air pollutants such as the exhaust and traffic fumes from the passing vehicles. There has been mounting evidences suggesting that air pollution contributes to the large global burden of respiratory and allergic diseases. This study evaluates the knowledge, awareness and attitudes of 52 street vendors towards air pollution by means of question-guided interviews. Forty-three respondents (82.69%) claimed to be aware of pollution in general and 46 (88.46%) reported to be aware of air pollution specifically; perceiving air pollution to be harmful to the environment and health (78.26%), pointing out exhaust from motor vehicles to be the number cause of air pollution (76.09%) and believes that air pollution causes infection and inflammation in the respiratory tract (75%). Thirty-seven individuals believed that air pollution can still be resolved (p=0.00003653).

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Introduction

Street vending is considered as a major sector of self-employment category of the informal economy (Roever, 2014). According to Ortiz and Cummins (2012), the increase in quantity of street vendors is principally the result of lack of employment and can also be linked to the expansion of the informal sector in the developing countries.

Street vendors could either be stationary or mobile: stationary vendors occupy spaces on pavements or other public or private areas while mobile vendors transfer from one place to another depending on the availability of the area (Perera and Tang, 2013).

The working conditions of street vendors expose them to a range of occupational hazards putting their livelihoods and well-being at risk (Skinner, 2011). They are at most risk to traffic-related air pollutants such as the exhaust and traffic fumes from passing vehicles (Karthikeyan and Mangaslewaran, 2014).

Knowledge, attitude and perception towards air pollution are exceedingly important to prevent health risks. Thus, the aim of the study is to evaluate the knowledge, attitude and perception of street vendors of Iligan City towards air pollution by means of questionnaire-guided interview.

Materials and methods

Study area and population

This study was conducted in the streets of Iligan City where 52 street vendors were conveniently recruited to be part of the study.

A question-guided interview was conducted in order to obtain a general knowledge, perception and attitude of street vendors towards air pollution.

Statistical analysis

Significant differences of various relationships in this study was assessed by obtaining p values by means of Fisher's Exact Test (FET), Mid-p exact Test and Simple Proportion Test (McDonald, 2014).

Results and discussion

Demographic characteristics

Of the 52 respondents, 39 (75%) were females while 13 (25) were males (Table 1).

Table 1. Sociodemographic data of the study population.

Variables	Percentage (%)		Mean ± SD	
Gender				
Male	13	25.00	26 ±	18.4
Female	39	75.00	26 ±	18.4
Age (in years)				
Below 20	2	3.85	37.3 ±	56.58
20-30	13	25.00	37.3 ±	56.58
31-40	19	36.54	37.3 ±	56.58
41-50	8	15.38	37.3 ±	56.58
51-60	8	15.38	37.3 ±	56.58
61 and above	2	3.85	37.3 ±	56.58
Civil status				
Single	13	25.00	17.3 ±	15.9
Married	35	67.31	17.3 ±	15.9
Widowed	4	7.69	17.3 ±	15.9
Educational attainment				
Elementary	6	11.54	10.4 ±	11.08
Secondary	28	53.85	10.4 ±	11.08
Vocational	4	7.69	10.4 ±	11.08
Did not disclose	14	26.92	10.4 ±	11.08

The prevalence of the female over male respondents is often seen in the informal sectors (Floro *et al.*, 2009). The ages of the respondents range between ages 19 and 57 years, with a majority being in the age group of 31-40 years, accounting to 36.54% (19 respondents), 35 (67.31%) are married and 38 (73.08%) were able to report their educational attainment, and most of them claimed to have finished high school (28, 53.85%).

Table 2. Knowledge and awareness of the respondents on environmental degradation and pollution.

Criteria	N=43	%	*p* value*
Awareness of pollution	43	82.69	<0.0000001
Believes pollution to be harmful:			
a. To environment	42	97.67	<0.0000001
b. To health	43	100.00	2.00
Perceptions about pollution			
a. Process of making resources unsuitable to use	9	20.93	<0.0000001
b. Environmental contamination	10	23.26	<0.0000001
c. Has several types and believes to be harmful	15	34.88	<0.0000001
d. Does not involve contamination and does not do harm	3	6.98	<0.0000001
e. Unsure	6	13.95	<0.0000001
Knowledge on types of pollution	36	83.72	<0.0000001
Believes that the types of pollution has an effect personally	35	81.40	<0.0000001

*All p values were calculated using simple proportion test; confidence level is set at 95%.

The knowledge of the respondents regarding pollution in general was assessed based on several guidelines (Table 2). Forty-three respondents (82.69%) claimed to be aware of pollution and all believed that pollution is harmful to the health, while only one of the 43 did not believe that pollution can cause harm to the environment.

Table 3. Knowledge and awareness of the study population on air pollution.

Criteria	N=46	%	*p* value*
Awareness of air pollution	46	88.46	<0.000000001
Perception of air pollution			
a. Harmful to the health and environment	36	78.26	<0.000000001
b. Contamination of air with gases, dusts, fumes in harmful amounts	22	47.83	<0.000000001
c. Introduction of harmful substances in the air	5	10.87	
d. Contamination in the bodies of water and produces annoying levels of noise and destroys the soil	12	26.09	<0.000000001
e. Has no knowledge	1	2.17	<0.000000001
Knowledge about air pollutants	34	73.91	<0.000000001

*All p values were calculated using simple proportion test; confidence level is set at 95%.

Forty-six street vendors (88.46%) reported to be aware of air pollution (Table 3), of which, majority perceived air pollution to be harmful to the health and the environment (36, 78.26%). However, a portion of the respondents (12 out of 52) have misconceptions and attributed air pollution to be contamination of bodies of water, production of annoying levels of noise and the destruction of soil ecosystem.

As shown in Table 4, 35 (76.09%) of the respondents believed that the exhaust from motor vehicles causes air pollution, 30 respondents (65.22%) believed it is caused by industrial sources/power plants while 28 (60.87%) said it is caused by improper waste disposal.

A few individuals believed that pollution is due to household cooking and heating (7 out of the 45 respondents who claimed to be aware of air pollution).

In the study conducted by Dimitriou and Christidou (2011), the main anthropogenic sources of pollutants released in the atmosphere are human activities such as transportation (motor vehicles, aircrafts), burning coal, or other fossil fuels for energy demands, industrial processes, or use of chemicals in agriculture, and facilities like power plants, incinerators, landfills, or waste deposition.

Table 4. Knowledge of the study population on possible causes of air pollution.

Causes of Air Pollution	N=46	%	*p* value*
Exhaust from motor vehicles	35	76.09	<0.0000001
Industrial sourcces/power plants	30	65.22	<0.0000001
Improper waste disposal	28	60.87	<0.0000001
Smoke of cigarettes	27	58.70	<0.0000001
Burning of waste	25	54.35	<0.0000001
Constructon	15	32.61	<0.0000001
Pollution from other cities/municipalities	11	23.91	<0.0000001
Population growth	10	21.74	<0.0000001
Increased use of air conditioner	9	19.57	<0.0000001
Household cooking and heating	7	15.22	<0.0000001

*All p values were calculated using simple proportion test; confidence level is set at 95%.

Thirty-nine respondents (75%) said that air pollution can cause infection and inflammation of the respiratory tract, 30 (57.69%) said that it causes chronic and respiratory disease and 20 (38.46%) claimed that air pollution can cause heart diseases (Table 5). Indoor and outdoor air pollution cause respiratory diseases such as exacerbating asthma and chronic obstructive pulmonary disease (COPD), and other diseases such as cardiovascular disease specifically atherosclerosis; it could also trigger arrhythmias, cardiac failure and stroke, which could be fatal (Abelsohn and Stieb, 2011; Arbex *et al*., 2012; Hoek *et al*., 2013; Uzoigwe *et al*., 2013). It is imminent to the street vendors that air pollution can cause infection and inflammation of the respiratory tract; not only that but also chronic and respiratory disease such as difficulty in breathing and shortness of breath.

Table 5. Possible health risks by air pollution as identified by the respondents.

Health Risks	% of Respondents
Infection and inflammation of the respiratory tract	75.00
Chronic and Acute respiratory diseases	57.69
Heart diseases	38.46
Cancer	30.77
Prevent uptake of oxygen	23.08
Stroke	15.38
Diabetes mellitus	9.62
Chlamydia	1.92

Aside from the health effects, 44 respondents (84.62%) stated that air pollution causes other harm (Table 6): 37 (71.15%) pointed out that air pollution can damage the environment, 35 (67.31%) reported damage to both plants and animals and 23 (44.23%) said that air pollution will ultimately cause damage to the economy. The results show that the members of the study population are well aware of the health risks that air pollution causes and are also acquainted to other effects of air pollution.

Table 6. Other effects of air pollution identified by the respondents.

Effects	% of Respondents
Damage to environment	71.15
Damage to plants	67.31
Damage to animals	67.31
Damage to economy	44.23
Damage to structures	26.92
Presence of ground level ozone	7.69
Acidification	3.85
Eutrophication	3.85

Having to work on the streets, street vendors are exposed to various occupational hazards (Roever, 2014). Thirty-five respondents (67.31%) admit that they are aware of their exposure to various air pollutants, however only 28 respondents (53.85%) recognize their increased susceptibility to a number of health problems. Since the effect of air pollution on health has become a major concern in the recent years, epidemiological researches into air pollution has been conducted and demonstrated cardiorespiratory health effects that range from minor respiratory symptoms to increased hospital admissions and mortality (Kjellstrom *et al.*, 2006). Urban air pollution has surfaced as a significant international environmental concern due to the large concentration of minority and low income residents living in urban environments having an unhealthy quality of air (Samet and White, 2004).

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