AIR POLLUTION AWARENESS AND ITS HEALTH EFFECTS AMONG FOOD DELIVERY PERSONNEL IN MALAYSIA

ABSTRACT

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Food delivery services are increasing in Malaysia which provides many job opportunities to the public. However, the increasing number of vehicles on the road has degraded the air quality, particularly in Malaysia. Food delivery personnel are working for a long period of time on the road has exposed them to air pollution and increase the risk of health effects to the food delivery personnel. Hence, the aim for this to determine the awareness level of the food delivery personnel in Malaysia and assess the self-reported symptoms experienced by the food delivery personnel. Moreover, the objective of this study is also to find the correlation between the self-reported symptoms and the working shift. The method used in this study is by using questionnaire and was distributed through the Facebook group, Twitter, WhatsApp, and Telegram Group. To summarize the result, the majority of respondents age 18-24 years old (52.4%) are aware of air pollution. Most of the respondents obtain information related to the air pollution from the internet (84.7%) and social media (66.1%). Cough (57.6%), sore throat (37.7%), headache (32.5%), and eye irritation (31.9%) are the most common symptoms experienced by the food delivery personnel. This study also found that cough and sore throat has a significant association with the working hour during the food delivery. As conclusion, the food delivery personnel are advised to take measures to reduce air pollution exposure. The management and government of Malaysia also should play important roles to reduce the risk of exposure to the food delivery personnel and to improve the air quality in Malaysia.

Keywords: Air pollution, awareness level, food delivery personnel, health effect, questionnaire

1.0 INTRODUTION

Air pollution is one of the major environmental health issues due to various sources of pollution emitted to the environment. Air pollution can be defined as the increase of the concentration of harmful gases and particles in the atmosphere where give an adverse effect on living conditions (Aydin-Güç et al., 2018). World Health Organization (2020) estimated 4.2 million mortality every year due to exposure of ambient air pollution worldwide where the major sources of air pollution derived from vehicles, power generation, waste incineration, industry, and residential energy for cooking and heating. Air pollution can result in adverse health effects such as stroke, heart disease, lung cancer, and chronic respiratory diseases.

Based on statistics by Road Transport Department (JPJ), it is estimated 31.2 million units of motor vehicles registered by 31 December 2019 in Malaysia which includes cars, commercials vehicles, and motorcycles (Lim, 2020). A high number of vehicles are associated to cause traffic congestion as well as increasing vehicle emissions that reduce the quality of the ambient air quality (Zhang & Batterman, 2013). Vehicle emission released carbon monoxide, nitrogen oxides (NOx), black carbon, and particulate matter which also carried some other pollutants such as benzene, polycyclic aromatic hydrocarbons, and heavy metals (S. V. Liu et al., 2017). Major source of particulate matter in traffic is derived from wear of vehicle components such as brakes and tires. (K. H. Kim et al., 2015). Commercial drivers such as taxi, buses, and motorcycle are exposed to ambient air pollution as their part of the working environment. In fact, the vehicles they drive also contribute to the source of air pollution which causes exposure to themselves and other outdoor

workers (Lawin et al., 2018). Commercial motorcyclists and taxi drivers are vulnerable to inhaled harmful pollutants as their work requires them to travel from one place to another where they may travel from less congested area to more congested area or industrialised area (Ekpenyong et al., 2012).

Malaysian online food delivery market is growing to fulfil the continuous demand from the consumer toward food deliveries. Many foods deliveries companies established in fulfilling this demand. For instance, Grab Food, Foodpanda, Dahmakan, and DeliverEat (Acumen Research and Consulting, 2020). Moreover, the trend for online food deliveries is growing tremendously particularly in Malaysia when Movement Control Order (MCO) is announced by the government in early March 2020 due to the Covid-19 pandemic (FocusMalaysia, 2020). As a result, numerous food delivery personnel are increasing to cope with the growing market of online food delivery services. As they spend most of the time working on the motorcycle has increased the risk of exposure to air pollution

Exposure to a high concentration of air pollution emitted from motor vehicles commonly associated with an increase in morbidity rate which causes by cardiovascular diseases, lung cancer, and respiratory diseases (Vimercati, 2011). Numerous previous studies found that the exposure of motorcyclists to air pollution is higher as compared to other commuting modes (Ekpenyong et al., 2012; Grana et al., 2017). Motorcyclists are found to inhaled higher concentrations of pollutants particularly PM2.5 while commuting as a result of exposure to the high concentration and short-duration peaks. (Li et al., 2017). Ambient particulate matter with a diameter of 2.5μm was declared by the Global Burden of Disease 2013 to be the main factor of death of an estimated 2.9 million in 2013 (Brauer et al., 2016).

Mild health problems related to inhalation of PM2.5 can lead to shortness of breath, chest discomfort and pain, and coughing and wheezing. This is due to the smaller size of the particulate matter able to penetrate into the respiratory tract (K. H. Kim et al., 2015). According to X. Liu et al., (2016) public education help to improve understanding and health awareness toward air pollution and encourage the public to take preventative measure. On the other hand, a study by Shakya et al., (2017) suggested the usage of disposal surgical masks can aid in immediate and temporary reduction of the particulate matter exposure. Thus, this study is interested in evaluating the awareness toward air pollution exposure and its health effect among food delivery service personnel.

To understand the air pollution awareness and its potential health effects among food delivery service personnel, this study aimed to assess their awareness level and determine the self-reported symptoms due to air pollution exposure among the food delivery personnel in Malaysia. Moreover, this paper also focused to determine the correlation between the average working hour and self-reported health effects among them. It is important to study the awareness level of the food delivery personnel toward air pollution to reduce the adverse health effect of air pollution on them. Furthermore, it can help food delivery companies or policies maker to develop and implement a policy to minimize air pollution exposure to the food delivery personnel and improve air quality in general.

2.0 MATERIALS AND METHODS

2.1 Participants

A cross-sectional study was conducted from 9th November to 30th November 2020. The target population for this study is chosen among food delivery personnel in Malaysia specifically focusing on Grab Food and Food Panda riders. The total population is approximately 70000 riders in Malaysia. Population data are obtained by assuming the number of riders in their official Facebook group. A total of 221 food delivery personnel participates in this study and 191 participants are chosen after excluded the exclusion criteria for this study. The exclusion criteria was; food delivery personnel who used a car as their mode of transportation to deliver food.

2.2 Study Design and Data Collection

A questionnaire was used to obtain data related to this study. The questionnaire was adapted from previous research (Chin et al., 2019; Noomnual & Shendell, 2017; Odonkor & Mahami, 2020). The questionnaire consists of two languages, English and Malay. The questionnaire was translated into the local language for a better understanding of the respondents. The questionnaire consists of three sections which include, part 1 demographic data which consist of general information such as age, gender, educational level, working shift duration, and smoking habits. In part 2 awareness toward air quality including their observation on air quality last year, respondents' rate on air pollution quality, and information on air pollution. Lastly, part 3 self-reported respiratory symptoms and respiratory protective mask used which include symptoms such as cough, sore throat, and headache and type of personal protective equipment used when exposed to air pollution. Each

questionnaire takes approximately 10-15 minutes to complete. The questionnaire was created by using Google Form and was distributed through online mediums such as Facebook Group, WhatsApp, Telegram, and Twitter.

Written consent was included at the beginning of the questionnaire to inform about the purpose of the study and to clarify that the participation was voluntary, and participants have the right to withdraw from answering the questionnaire. The consent also provides respondents with confidentially of the data obtained from this study.

2.3 Statistically Analysis

The data obtained from the questionnaire are analysed using SPSS version 25. Descriptive analysis such as frequency is used to analyse general demographic data and respondents' awareness of air pollution. In order to assess participants' awareness, Crosstabulation was used to determine the relationship between several variables such as age and respondents' awareness toward air pollution, educational level and air pollution awareness, the information on air pollution and their attitude in protecting themselves against air pollution, and smoking habit and symptoms of air pollution and type of personal protective equipment used during the exposure. Meanwhile, Chi-square tests is used to determine association between the variables on the awareness, and health effects.

3.0 RESULT

3.1 Demographic Characteristics of Respondents

Table 1 shows the demographic characteristics of the respondents. The age range are from 18 to above 45-year-old. Majority of the respondents are in 18 to 24 age group with 62.8%, followed by 25 to 34 (24.1%), 35 to 44 (11.5%) and the least age group is above 45 years old (1.6%). Most of the respondents (77%) had a tertiary education followed by (16.8%) had secondary education, (5.8%) are postgraduate and primary education is the least with (0.5%). Majority of the food delivery personnel works more than 8 hours per day (34.6%) followed by 3-5 hours (30.4%), 6 – 8 hours (26.7%) and small portion work for less than 3 hours (8.4%). More than half of the respondents are non-smokers (51.8%), respondents who smoke is 34.6% and ex-smoker is 13.6% of the respondents.

Table 1 Demographic Characteristics of the Respondents

Demographic Data (n=191)		Frequency	Percent (%)
Age	18-24	120	62.8
	25-34	46	24.1
	35-44	22	11.5
	Above 45	3	1.6
Educational Level	Primary	1	0.5
	Secondary	32	16.8
	Tertiary	147	77
	Postgraduate	11	5.8
Working Shift	Less than 3 hours	16	8.4
	3-5 hours	58	30.4
	6-8 hours	51	26.7
	More than 8 hours	66	34.6
Smoking Habit	Smoker	66	34.6
	Non-smoker	99	51.8
	Ex-smoker	26	13.8

Pie Chart below represent the working area of the food delivery personnel. Most of the food delivery personnel are working at Klang Valley (55%) followed by the second highest area are in Selangor (14%) followed by Terengganu (7%) and less than (5%) for each state in Malaysia.

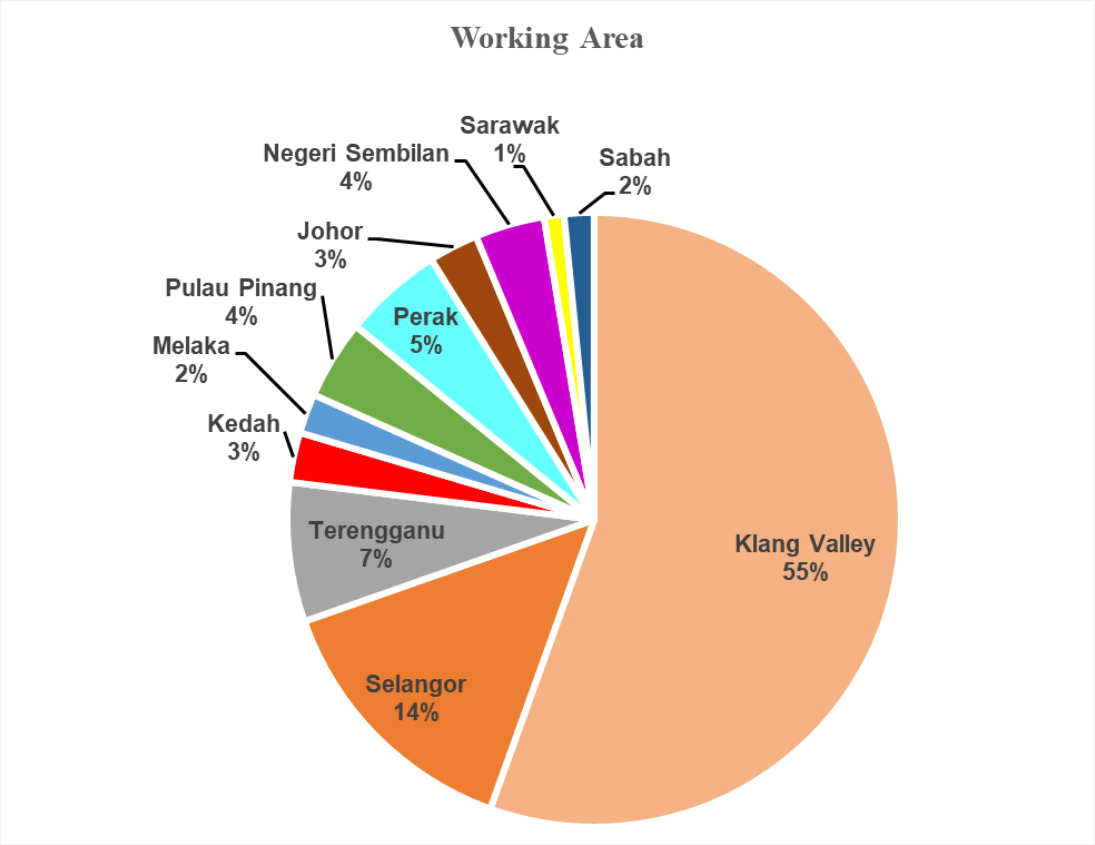

Figure 1 Percentage of Respondents' Working Area

3.2 Respondents' Awareness Toward Air Pollution

Table 2 represent frequency of the data collected; it shows that majority of the respondents are paid attention on the air pollution particularly in the residential area. 82.2% are aware while 17.8% are not paying attention to the air quality in the community they live. 66% of the respondents are not satisfied with the air quality in their area last year while 34% are satisfied. From that data, most of them (55%) rate

fair to describe the overall air quality followed by 28.8% rate good for overall air quality index. Only 6 respondents (3.1%) stated the overall air quality as very poor and 17 participants (8.9%) rate poor to air quality. 69.4% of respondents are strongly agreed that every citizen is responsible in maintaining and improving the good environment and 30.4 % are agreed on this statement. 92 respondents (48.2%) believe air quality will be improve within 3 to 5 years and 82 respondents (42.9%) stated air quality need at least 10 years to improve. Only small portion of respondent (8.9%) mentioned air quality will improve in short term.

Table 2 Frequency of Respondents' Awareness Toward Air Pollution

Variable (n=191)		Frequency	Percent (%)
Have you paid attention to the air pollution in the community where you live?	Yes	157	82.2
	No	34	17.8
Were you satisfied with the air quality in your community last year?	Yes	65	34
	No	126	66
How do you rate the overall air quality in your community last year?	Very Good	7	3.7
	Good	55	28.8
	Fair	105	55
	Poor	18	9.4
	Very Poor	6	3.1
Do you agree that improving the environment is the responsibility of every citizen?	Strongly Agree	133	69.6
	Agree	58	30.4
How long do you think it will take for air quality to improve?	In short term	18	9.4
	3-5 years	92	48.2
	More than 10 years	81	42.4

Figure 2 illustrate crosstabulation of age and respondents' awareness toward air pollution. More than half of the respondents from age 18-25 years old are aware about the air pollution followed by 20.9% of respondents from 25-34 years old and 7.9% are 35-44 years old. The least are respondents who age more than 45 years old (1%).

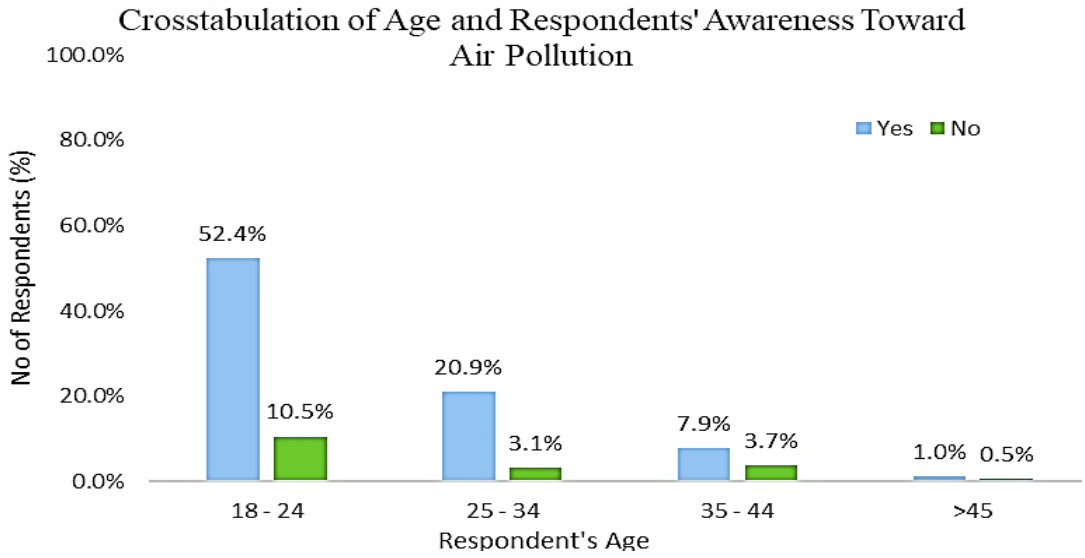

Figure 2 Crosstabulation of Age and Respondents' Awareness Toward Air Pollution

Table 3 illustrate the association between the respondents' belief on improving air quality is the responsibility of the citizen and the time taken for the air quality to improve. Majority of the respondents who are belief that air quality will be improve within 3 to 5 years.

Table 3 Association between Belief and Time taken for Air Quality to Improve

		Time Taken for Air Quality to Improve			
		In short term	3-5 years	More than 10 years	Total
Do you agree that improving the environment is the responsibility of every citizen?	Strongly Agree	7	67	59	133
	Agree	11	25	22	58
Total		18	92	81	191

Based on Table 4, Pearson Chi Square value is 8.884 and the degree of freedom is 2. The p-value of the chi square test is 0.012 which is less than 0.05 and the minimum expected count is 5.47 which is more than 1. Hence, this can be concluded that 67 respondents strongly belief air quality will improve within 3-5 years.

Table 4 Pearson's Chi Square Test for Belief and Time taken for Air Quality to Improve

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	8.884[a]	2	.012
Likelihood Ratio	8.085	2	.018
N of Valid Cases	191		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 5.47.

Based on Table 5 and Table 6 show association between educational level and awareness toward air pollution. The Pearson Chi Square is 9.951 and the p value is 0.019 is less than 0.05 which indicate association between this variable. The

hypothesis null is also rejected. Moreover, the minimum expected value is 0.18 is less than 1, thus the result is not conclusive.

Table 5 Cross Tabulation for Educational Level and Air Pollution Awareness

Educational Level	Air Pollution in the Community Where you Live (%)	
	Yes	No
Primary	0	1 (2.9)
Secondary	22 (14.0)	10 (29.4)
Tertiary	125 (79.6)	22 (64.7)
Postgraduate	10 (6.4%)	1 (2.9)

Table 6 Pearson's Chi Square for Educational Level and Awareness Toward Air Pollution

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	9.951[a]	3	.019
Likelihood Ratio	8.360	3	.039
Linear-by-Linear Association	7.330	1	.007
N of Valid Cases	191		

a. 3 cells (37.5%) have expected count less than 5. The minimum expected count is .18.

Figure 3 illustrate respondents' medium to access information on air pollution. Internet (84.7%), social media (66.1%) and television (65.6%) is the most medium for the respondents to obtain information regarding the air pollution and related protective measure. Books and newspaper, expert lecture and friends, and municipal assembly recorded at least than 20% which counted as 20.6%, 15.3% and 14.3% respectively as source of information on air pollution. Very few respondents which consist of 8 respondents (4.2%) do not access the information related to air

pollution. Majority of the respondents (90.6%) of the respondents wearing mask and (5.8%) cover their nostril with a handkerchief to protect themselves against air pollution. Only 7 respondents (3.7%) do not do anything to protect themselves when air pollution occurred.

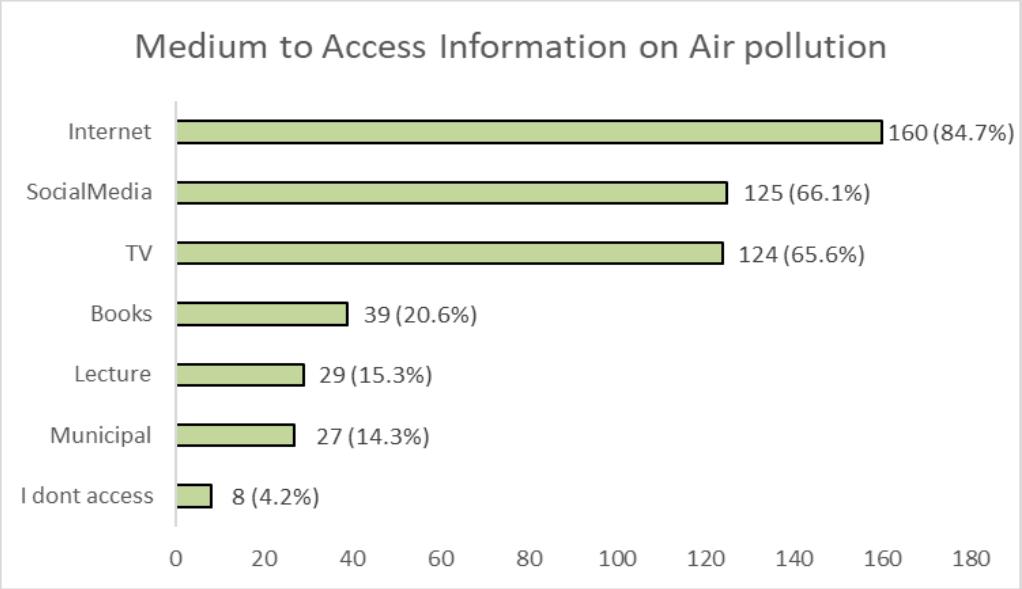

Figure 3 Respondents' Medium to Access Information on Air Pollution

Based on table 7, it can be observed on how the information received by the respondents can contribute to their practice on how the respondents protect themselves when exposed to the air pollution. Information obtained through various media shows that majority of the respondents wearing face mask and cover their nostril with handkerchief during air pollution.

Table 7 Cross Tabulation of Information Access and Their Attitudes during Air Pollution

		Attitude when Exposed to Air Pollution		
		I wear a face mask	Cover my nostril	I do nothing
Access Information	TV	113	7	4
	Internet	146	9	5
	Books	34	4	1
	Lecture	26	3	0
	Municipal	25	2	0
	Social Media	113	7	5
	I do not access	6	0	2

3.3 Self -Reported Symptoms due to air pollution exposure among Food Delivery Personnel

Figure 4 indicate multiple responses of symptoms were selected by the participants which indicate the participants are experiences several health effects due to air pollution exposure. Cough is the most symptom experienced by 110 participants (57.6%) followed by sore throat (37.7%), headache (32.5%), eye irritation (31.9%), nasal congestion (28.3%), fatigue (24.6%), short of breath (22%), dizziness (16.2%), phlegm (15.2%), others (13.1%), lower respiratory symptoms (6.8%), fever (6.8%) and the least symptoms experienced by the respondents is upper respiratory symptoms (4.7%).

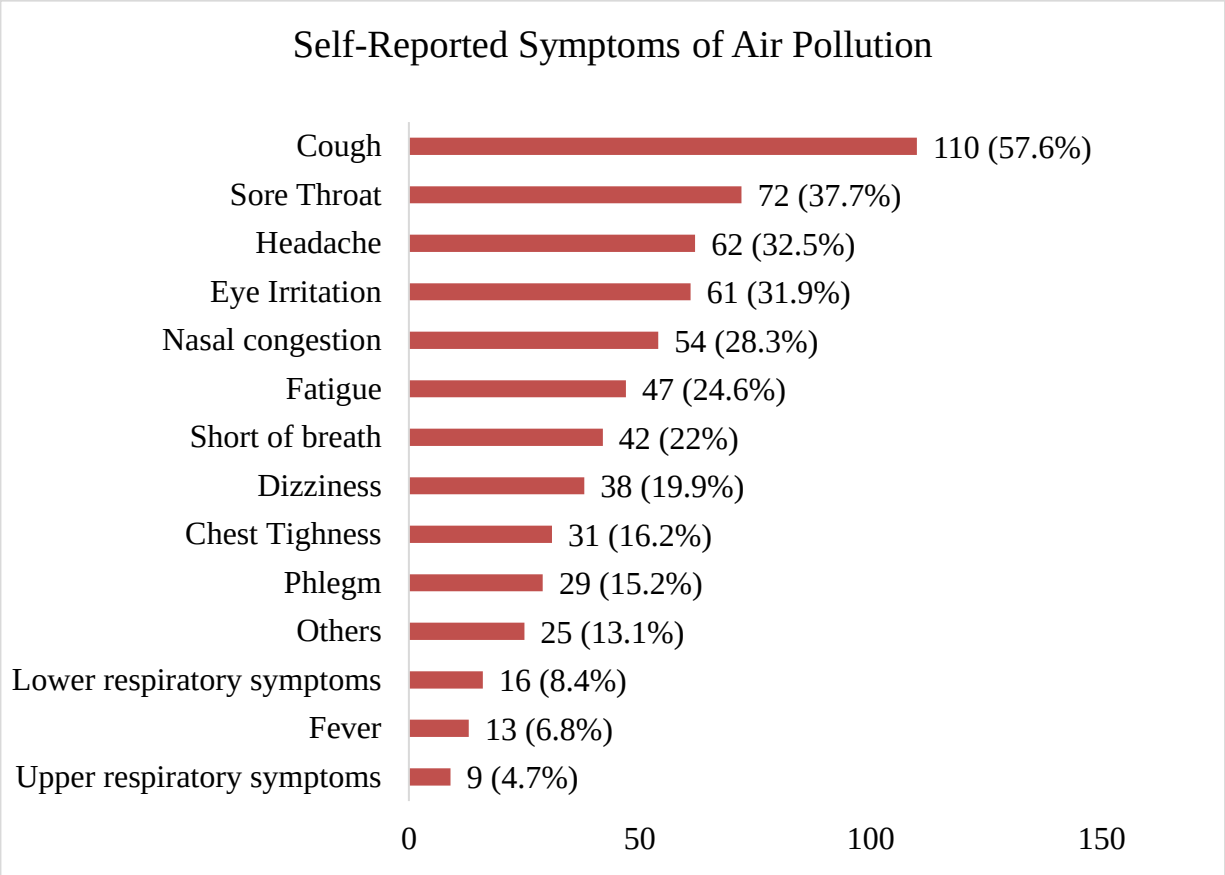

Figure 4 Self- Reported Symptoms of Air Pollution

Figure 5 represent the frequency of the food delivery personnel wearing personal protective equipment during working. 35% of the respondent are often wearing PPE during working followed by 25% are wearing PPE at all time when exposed and 23% are wear any PPE during work occasionally . Less than 10 % of the respondents are rarely or never wear any protective equipment when exposed to air pollution.

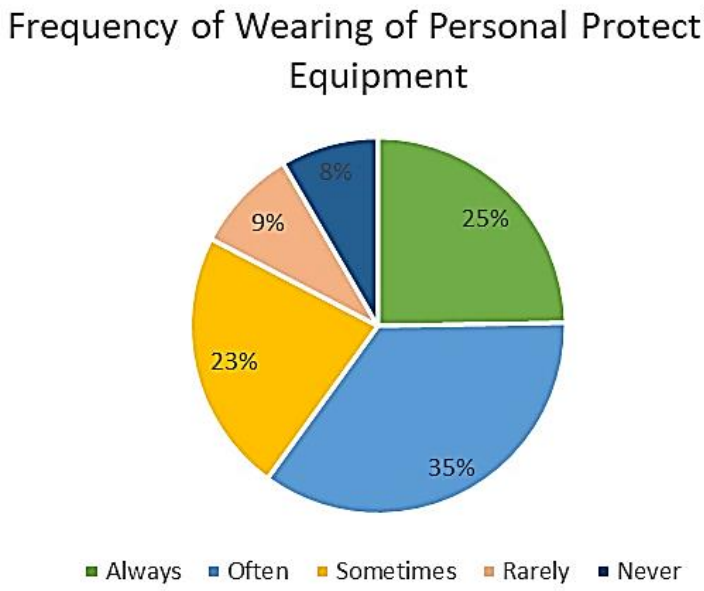

Figure 5 Frequency of Wearing Personal Protective Equipment

Table 8 represent cross tabulation of smoking habit and symptoms of air pollution and type of personal protective equipment used during the exposure. Chi Square analysis was run to find the association between these variables. However, chi square test for type of personal protective equipment used and the self-reported symptoms show no significant association.

Table 8 Cross Tabulation of Smoking Habit and Symptoms of Air Pollution and Type of Personal Protective Equipment Used During the Exposure

		Self-Reported Symptoms of Air Pollution													
		Lower respiratory symptoms	Cough	Phlegm	Chest Tightness	Short of breath	Upper respiratory symptoms	Nasal congestion	Sore Throat	Headache	Fever	Eye Irritation	Dizziness	Fatigue	Others
Smoking Habit	Smoker	7	43	18	12	15	6	23	28	26	4	23	13	18	10
	Non-smoker	7	51	7	16	20	2	23	36	29	9	27	22	25	11
	Ex-smoker	2	16	4	3	7	1	8	8	7	0	11	3	4	4
Type of PPE	Surgical Mask	7	51	18	15	20	3	30	34	31	5	28	15	24	15
	Anti-dust mask	7	42	9	11	18	5	18	25	23	6	25	15	13	8
	Carbon Mask	1	2	0	1	1	0	0	1	0	0	1	1	2	0
	n-95	1	15	2	4	3	1	6	12	8	2	7	7	8	2

Table 9 represent Chi square test for phlegm and smoking habit. Based on the table, the Pearson chi square is 12.551 and the p value is 0.02 which is less than 0.05. this indicate a significant association between phlegm and smoking habit. The minimum expected count is 3.95 which is more than 1. Thus, the result is conclusive and hypothesis null is rejected.

Table 9 Pearson's Chi Square Analysis for Phlegm and Smoking Habit

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	12.551[a]	2	.002
Likelihood Ratio	12.432	2	.002
Linear-by-Linear Association	5.804	1	.016
N of Valid Cases	191		

a. 1 cells (16.7%) have expected count less than 5. The minimum expected count is 3.95.

3.4 Correlation between self-reported symptoms and working hours

Table 10 represent data analysis to determine the correlation between self-reported symptoms of air pollution and the working shift by using chi-square test. It is found that cough and sore throat has association with the working duration. Pearson Chi Square value is 3.956 and 5.855 with the degree of freedom of 1 for cough and sore throat respectively. The p-value of each cases chi square test is 0.047 and 0.016 which is less than 0.05 which indicate association between these factors. Hence, this can be concluded that longer duration of working hour may cause cough and sore throat when exposed to air pollution. Thus, hypothesis null for cough and sore throat are rejected whereas hypothesis null for other symptoms is accepted.

Table 10 Correlation Between Self-Reported Symptoms and Working Hour

Self-Reported Symptoms of Air Pollution	Working Shift				Pearson's Chi Square	p value	df
	Less than 5 hours		More than 6 hours				
	Count	Column Valid N %	Count	Column Valid N %			
Lower respiratory symptoms	4	5.5%	12	10.3%	1.390	0.238	1
Cough	36	49.3%	74	63.2%	**3.956**	**0.047**	**1**
Phlegm	9	12.3%	20	17.1%	0.856	0.355	1
Chest Tightness	10	13.7%	21	17.9%	0.656	0.418	1
Short of breath	13	17.8%	29	24.8%	1.377	0.241	1
Upper respiratory symptoms	1	1.4%	8	6.8%	3.039	0.081	1
Nasal congestion	19	26.0%	35	29.9%	0.402	0.526	1
Sore Throat	20	27.4%	52	44.4%	**5.855**	**0.016**	**1**
Headache	21	28.8%	41	35.0%	0.918	0.338	1
Fever	5	6.8%	8	6.8%	0.000	0.983	1
Eye Irritation	23	31.5%	38	32.5%	0.410	0.840	1
Dizziness	13	17.8%	25	21.4%	0.411	0.522	1
Fatigue	22	30.1%	25	21.4%	1.709	0.191	1
Others	11	15.1%	14	12.0%	0.335	0.563	1

4.0 DISCUSSION

Based on the data collected from the study showed that almost all respondents among the food delivery personnel are aware of the air pollution occurrence in their community. According to Reames & Bravo (2019), knowledge and self-efficacy play an important contribution to public perception and health concern in which knowledge or awareness play roles to the individual consciousness toward the risk of the exposure whereas self-efficacy is the individual action and attitude to do something in order to improve the air quality. Association between education level and awareness level were found significantly associated. Based on the demographic data, it is found that more than half (52.4%) of the respondents' age between 18 to 24 years old were found to pay attention to the air quality particularly in the community they live. This is contradicting with the study by Kim et al., (2012) whereby he mentioned that younger individual has a poor perception of the air quality. A study from Odonkor & Mahami, (2020) mentioned the reason why the youth was found has a better awareness toward air pollution is because of frequent use of social media and the internet to access information. This is supported by the result where most of the respondents received information on air pollution through the internet (84.7%) and social media (66.1%). On the other hand, it is important for the young generation to have a high awareness of the environmental issue, particularly the air pollution issue. As stated by the United Nation (2018), youth has the power to advocate a campaign that enhanced environmentally friendly practices and policies. Moreover, the article also mentioned how youngsters adapted both conventional and non-conventional approaches to improve the environment. For instance, a campaign on the online platform may be influential to approach the policymaker and national

leaders. Furthermore, most of the respondents (69.6%) believe that every citizen has a great responsibility in improving air quality, especially in Malaysia. One of the actions that can be taken by the food delivery personnel in minimising the air pollution emission is frequent maintenance and service of their motorcycle. This indicate good behaviour of the citizens specifically among food delivery personnel toward improving the quality of the air. (Ahirrao et al., 2016)

Exposure to air pollution among the food delivery personnel has resulted in several symptoms such as cough (57.6%), sore throat (37.7%), headache (32.5%), and eye irritation (31.9%). A study by Sharma et al., (2017) also found that eye irritation, headache, throat irritation, and cough as common health effects on police traffic when exposed to air pollution. Besides, from the same study, it is found that the main factor of the health effect was the exposure time during working outdoors. Ali et al., (2017) mentioned that working on the road or along the main road for minimum of 6 hours per day are significantly exposed to the air pollution of road traffic. As a comparison, in this study cough and sore throat show a significant association to the working hour duration in which 63.2% of the respondent experienced cough and 44.4% developed sore throat when working more than 6 hours. Cough is known as a common physiological defence reflex of the body to protect the airways from irritation and infection. However, prolonged exposure to the pollutant may result in morbidity and disturbance to individual daily activity and quality of life. Exposure to air pollutants and irritants such as particulate matter, occupational dust, cigarette smoke can lead to chronic cough (Jo & Song, 2019). However, the result of the symptoms developed on the respondents is not associated with the smoking habits of the respondents except for phlegm which shows a

significant association with the smoking habit. This result similar to the study by Bajaj et al., (2017) where symptoms such as thick sputum and shortness of breath is not associated with the smoking habits but those symptoms are mainly caused by long working shift duration. Author Strak et al., (2017) also found weak association between lifestyles such as smoking habit and long-term exposure to air pollution exposure. Nevertheless, synergic interaction was found between air pollution and smoking habit where the risk of lung cancer specifically is greater when combined with the smoking factor (Samet, 2007). Apart from that, WHO et al., (2019) stated that enforcement of control measures of air pollution exposure is the main concern for outdoor workers such as food delivery personnel. It is because the main priority of the hierarchy of control which is elimination and engineering control of the source of pollution is not applicable as compare to those exposed to indoor air pollution. Hence, personal protective equipment is the least control measure that can be taken by the food delivery personnel to reduce air pollution exposure. Based on the result, the majority of the respondents are wearing personal protective equipment when exposed to air pollution during working. However, wearing different type of personal protective equipment is not associated with the symptoms experienced by the food delivery personnel. This is contradicting with several previous studies (H et al., 2019; Shakya et al., 2017) where most of the studies suggested the use of face mask to reduce the prevalence of the health effect when exposed to air pollution.

Food delivery personnel are susceptible to expose to poor air quality or haze occurrence while working, thus the Ministry of Health Malaysia (MOH) has recommended several measures that can be taken to reduce the impact to health. First, if possible, reduce outdoor activities especially for those who suffered from

chronic diseases such as heart or respiratory illness, or use respiratory protection equipment for those have prolonged exposure. outdoor workers are advised to drink more water and increase the intake of fruits and vegetables to aid the body to eliminate the toxin absorbed and improve the immune system. In addition, avoid smoking and reduce alcohol and coffee intake. (Portal Rasmi Kementerian Kesihatan Malaysia, 2020) Furthermore, food delivery personnel are suggested to be alert and keep up to date on the air pollution index (API). According to Usmani et al., (2020) air quality prediction able to reduce the chance of the exposure of harmful substance to the individuals. Author Liu et al., (2016) mentioned media such as internet, social media, television, and radio plays important roles in reporting and giving information on the air pollution situation. The communication of this information at the same time help to improve public knowledge, attitude, and practice toward air pollution.

According to Occupational Safety and Health Act 1994 (OSHA), the employer needs to carry out a risk assessment and implement appropriate measure when the API exceeding 100 which indicate to minimize the risk of exposure to the workers. Moreover, the employer are recommended to identify any susceptible employees such as those having heart and respiratory, ask employees to seek medical treatment if any symptoms develop when exposed to air pollution, conduct respirator fit testing for those who essentially working outdoors, provide sufficient n95 respirator and implement hazard communication between workers and employers. (DOSH,2013). In addition, Malaysia government has developed few strategies to encounter the air pollution issue in Malaysia through the 9th and 10th Malaysia Plan in which during the 9th Malaysia Plan, the Clean Air Action Plan was developed to improve air quality whereas the 10th Malaysia tackle issues on climate change to

reduce the emission of greenhouse gases. Establishment of Malaysia Ambient Air Quality Guidelines (MAAQG), API, and haze action plan for the same purpose to improve the air quality. (Sahani et al. 2016)

5.0 CONCLUSION

Outdoor workers such as food delivery personnel, mail carrier, and street vendors workers are vulnerable to the risk of exposure to air pollution. However, this type of work always overlooked to be considered as an occupational hazard. Cough, sore throat, headache, and eye irritation are the common symptoms experienced by the food delivery personnel when exposed to air pollution. Furthermore, cough and sore throat have an association with the duration of exposure. The type of personal protective equipment and smoking habit however does not show any significant association to the symptoms develop by the respondents. Nevertheless, the management should take some initiative to protect their employees from the adverse effect of prolonged exposure to air pollution. For instance, provide education and training programs related to air pollution to increase the knowledge and awareness of the workers toward air pollution. Government and policy marker should be stringent in law and regulations enforcement to reduce the emission of the air pollutants such as encourage the use of public transport, ensure sustainability in the built environment. Efforts to provide information and spread education awareness should be done continuously and frequently especially via the internet and social media. Focusing on educating youngster help to improve the air quality in the future. On the other hand, the limitation for this study is the duration of the study and it might be some bias when the respondents answer the questionnaire as they are distributed online, and no guidance is provided during answering the questionnaire. More research needs to be done to find the correlation between the exposure time, smoking habit, and the use of personal protective equipment against self-reported symptoms of air pollution.

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APPENDICES

I. Questionnaires Google Form

Air Pollution Awareness and Its Health Effect among Food Delivery Personnel in Malaysia

Notice of consent.

I am a final year student of the Bachelor of Environmental Health and Safety at Universiti Teknologi Mara (UiTM) Puncak Alam collecting data for the Year End Project entitled Air Pollution Awareness and Its Health Effect among Food Delivery Personnel in Malaysia. The purpose of this study was to assess the level of awareness on air pollution and health risks among food delivery riders in Malaysia

This questionnaire takes about 15 - 20 minutes. Please complete this questionnaire based on your knowledge. You have the right not to complete this questionnaire if you feel uncomfortable. All information obtained from this questionnaire is CONFIDENTIAL. All data is used for the purposes of this project only.

If you have any questions, please contact Intan Nurhanis Binti Sufendi at intannurhanis17@gmail.com or can contact my supervisor Dr. Shantakumari Rajan at shanta@uitm.edu.my

Your cooperation in completing this questionnaire is greatly appreciated. Thank you.

Pemakluman persetujuan.

Saya pelajar tahun akhir Sarjana Muda Kesihatan dan Keselamatan Persekitaran di Universiti Teknologi Mara (UiTM) Puncak Alam sedang mengumpul data untuk Projek Akhir Tahun bertajuk Air Pollution Awareness and Its Health Effect among Food Delivery Personnel in Malaysia. Tujuan kajian ini dijalankan adalah untuk menilai tahap kesedaran terhadap pencemaran udara dan risiko kesihatan dalam kalangan penghantar makanan di Malaysia

Soal selidik ini mengambil masa lebih kurang 15 - 20 minit. Sila lengkapkan soal selidik ini berdasarkan pengetahuan anda. Anda mempunyai hak untuk tidak melengkapkan soal selidik ini jika anda berasa kurang selesa. Semua maklumat yang diperolehi dari soal selidik ini adalah SULIT. Semua data hanya digunakan untuk tujuan projek ini sahaja.

Jika ada sebarang pertanyaan, sila hubungi Intan Nurhanis Binti Sufendi melalui intannurhanis17@gmail.com atau boleh berhubung dengan penyelia saya Dr. Shantakumari Rajan at shanta@uitm.edu.my

Kerjasama anda melengkapkan soal selidik ini amatlah dihargai. Terima kasih.

*Required

1. With this I have read and understood the information stated above. By clicking "Yes" signifies my consent to participate in this study *

   Dengan ini saya telah membaca dan memahami maklumat yang dinyatakan diatas. dengan klik "Ya" menandakan persetujuan saya untuk mengambil bahagian dalam kajian ini

   Mark only one oval.

   ◯ Yes/ Ya

Part A : Demographic Data

Bahagian A : Data Demografik

2. Age *

   Umur

   Mark only one oval.

   ◯ 18 - 24
   ◯ 25 - 34
   ◯ 35 - 44
   ◯ 45 and above / 45 dan keatas

3. Gender *

   Jantina

   Mark only one oval.

   ◯ Male / Lelaki
   ◯ Female / Perempuan

4. Race *

Bangsa

Mark only one oval.

- ◯ Malay / Melayu
- ◯ Chinese / Cina
- ◯ Indian / India
- ◯ Others / Lain-lain

5. Highest Educational Level *

Tahap Pendidikan

Mark only one oval.

- ◯ Primary / Sekolah Rendah
- ◯ Secondary / Sekolah Menengah
- ◯ Tertiary (College/ University) / Pengajian Tinggi (Kolej/ Universiti)
- ◯ Potgraduate (Master/ PhD) / Siswazah (Sarjana/ PhD)

6. Employment Status *

Status Pekerjaan

Mark only one oval.

- ◯ Full Time / Sepenuh Masa
- ◯ Part Time / Separuh Masa

7. Working shift duration *

Tempoh Masa Bekerja

Mark only one oval.

- ◯ Less than 3 hours / Kurang dari 3 jam
- ◯ 3-5 Hours/ Jam
- ◯ 6 – 8 Hours/ Jam
- ◯ More than 8 hours/ Lebih dari 8 jam

8. Work experience as Food Delivery Rider *

Pengalaman Bekerja sebagai Penghantar Makanan

Mark only one oval.

- ◯ Less than 1 year / Kurang dari setahun
- ◯ 1 - 5 Year/Tahun
- ◯ 6 -10 Year/Tahun
- ◯ More than 10 Years / Lebih dari 10 tahun

9. Mode of Transportation *

Jenis Pengangkutan

Mark only one oval.

- ◯ Car / Kereta
- ◯ Motorcycle / Motorsikal

10. Working Area *

Kawasan Bekerja

Mark only one oval.

- Klang Valley / Lembah Klang
- Selangor
- Negeri Sembilan
- Melaka
- Perak
- Johor
- Pahang
- Kelantan
- Terengganu
- Kedah
- Perlis
- Pulau Pinang
- Sabah
- Sarawak

11. Smoking Habit *

Tabiat Merokok

Mark only one oval.

- Smoker / Perokok
- Non-smoker / Bukan Perokok
- Ex-smoker / Bekas Perokok

Part B : Awareness Towards Air Quality

Bahagian B : Kesedaran Terhadap Kualiti Udara

12. Have you paid attention to the air pollution in the community where you live? *
Adakah anda memperhatikan pencemaran udara di komuniti tempat anda tinggal?

Mark only one oval.

- ◯ Yes/ Ya
- ◯ No/ Tidak

13. Were you satisfied with the air quality in your community last year? *
Adakah anda berpuas hati dengan kualiti udara di komuniti anda tahun lepas?

Mark only one oval.

- ◯ Yes/ Ya
- ◯ No/ Tidak

14. How do you rate the overall air quality in your community last year? *
Bagaimana anda menilai kualiti udara keseluruhan dalam komuniti anda tahun lalu?

Mark only one oval.

- ◯ Very Good/ Sangat Bagus
- ◯ Good/ Bagus
- ◯ Fair/ Sederhana
- ◯ Poor/ Teruk
- ◯ Very Poor/ Sangat Teruk
- ◯ Don't Know/ Tidak Tahu

15. How do you rate the air quality in your community last year compared to 5 years? *
Bagaimana anda menilai kualiti udara di komuniti anda tahun lalu berbanding 5 tahun?

Mark only one oval.

- ◯ Much Better/ Jauh Lebih Baik
- ◯ A little Better/ Sedikit Lebih Baik
- ◯ No Difference/ Tiada Perubahan
- ◯ A little Worse/ Sedikit teruk
- ◯ Much Worse/ Sangat Teruk
- ◯ Don't Know/ Tidak Tahu

16. How severe would you say is the air pollution in the community where you live? *
Seberapa teruk anda mengatakan pencemaran udara di komuniti tempat anda tinggal?

Mark only one oval.

- ◯ Low/ Rendah
- ◯ Moderate/ Sederhana
- ◯ High/ Tinggi

17. Do you agree that improving the environment is the responsibility of every citizen? *
Adakah anda bersetuju bahawa memperbaiki persekitaran adalah tanggungjawab setiap rakyat?

Mark only one oval.

- ◯ Strongly Agree/ Sangat Setuju
- ◯ Agree/ Setuju
- ◯ Disagree/ Tidak Setuju
- ◯ Strongly Disagree/ Sangat Tidak Setuju
- ◯ Don't Know/ Tidak Tahu

18. Do you think air quality will improve? *

Adakah anda rasa kualiti udara akan bertambah baik?

Mark only one oval.

- ◯ Yes/ Ya
- ◯ No/ Tidak

19. How long do you think it will take for air quality to improve? *

Berapa lama anda fikir kualiti udara akan bertambah baik?

Mark only one oval.

- ◯ In Short Term/ Dalam Jangka Masa Pendek
- ◯ Within 3 -5 Years/ Dalam 3 hingga 5 Tahun
- ◯ At least 10 Years/ Sekurang-kurangnya 10 Tahun

20. How do you access information about the air pollution and related protective measure? *

Bagaimana anda mengakses maklumat mengenai pencemaran udara dan langkah perlindungan yang berkaitan?

Tick all that apply.

- ☐ Television and Internet/ Televisyen dan Internet
- ☐ Books and newspaper/ Buku dan Surat Khabar
- ☐ Expert lecture and friends/ Ceramah Pakar dan Kawan Kawan
- ☐ Municipal Assembly/ Majlis Perbandaran
- ☐ Social media/ Media Sosial
- ☐ Internet
- ☐ I don't access the information/ Saya tidak mengakses maklumat

21. How do you protect yourself when there is pollution in the air? *

Bagaimana anda melindungi diri anda apabila terdapat pencemaran di udara?

Mark only one oval.

- ◯ I wear a face mask/ Saya Memakai Pelitup Muka
- ◯ Cover my nostril with a handkerchief/ Saya Menutup Hidung dan Mulut mengunakan sapu tangan
- ◯ I do nothing/ Saya tidak berbuat apa-apa

Part C : Self- Reported Respiratory Symptoms And Respiratory Protective Mask Used

Bahagian B : Gejala pernafasan yang dilaporkan sendiri dan topeng pelindung pernafasan digunakan

22. Have you experienced any of these symptoms when exposed to air pollution? *

Adakah anda mengalami gejala gelaja seperti berikut apabila terdedah dengan pencemaran udara?

Tick all that apply.

- ☐ Lower respiratory symptoms/ Gejala Penafasan Bahagian Bawah
- ☐ Cough/ Batuk
- ☐ Phlegm/ Kahak
- ☐ Chest Tighness/ Sesak Dada
- ☐ Short of Breath/ Sesak Nafas
- ☐ Upper respiratory symptoms/ Gejala Pennafasan Bahagian Atas
- ☐ Nasal Congestion/ Hidung Tersumbat
- ☐ Sore Throat/ Sakit Tekak
- ☐ Headache/ Sakit Kepala
- ☐ Fever/ Demam
- ☐ Eye irritation/ Iritasi Mata
- ☐ Dizziness/ Pening
- ☐ Fatigue/ Keletihan
- ☐ Lain Lain

23. How often do you wear respiratory personal protective equipment? *
Berapa kerapkah anda memakai alat pelindungan penafasan?

Mark only one oval.

- ◯ Always/ Sentiasa Memakai
- ◯ Often/ Kerap Memakai
- ◯ Sometimes/ Kadang Kala Memakai
- ◯ Rarely/ Jarang Memakai
- ◯ Never/ Tidak Pernah Memakai

24. What is the type of personal protective equipment that you wear? *
Apakah jenis alat pelindung penafasan yang anda gunakan?

Mark only one oval.

- ◯ Surgical Mask/ Topeng Pembedahan
- ◯ Anti-dust mask/ cotton material/ Topeng anti-debu / jenis topeng material kapas
- ◯ Carbon/charcoal mask/ chemical filtering type respirator/ Alat pernafasan jenis penapis karbon / arang / penapis kimia
- ◯ n-95 type Respirator/ Topeng penfasan jenis n-95