ORIGINAL ARTICLE

The Association of Urban Lifestyle With Respiratory Illness in Petaling District, Selangor, Malaysia

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ABSTRACT

Introduction: In recent years, increasing urbanization has led to a drastic rise in the prevalence of behavior-linked diseases among Malaysians. However, the statistical relationship between urban lifestyle and respiratory illnesses is yet to be identified. This study aims to identify the relationship between respiratory illnesses and daily urbanized lifestyle in the Petaling district, in the state of Selangor. **Methods:** A cross-sectional study was conducted from June to December 2020 on the residents in the Petaling district. Stratified random sampling of 200 respondents in the cities of Petaling Jaya, Subang Jaya and Shah Alam of the district were conducted through an electronic survey form. **Results:** The socio-demographic data reports that most respondents were young women (average age 32.9 ± 7.73 years, between 26 to 35 years), married, working in the public sector and had obtained tertiary education. A relationship was present between urban lifestyle and respiratory illnesses with a weak positive correlation coefficient (r=0.06, p>0.05). There were strong positive correlations between age (χ^2= 1073.02, p<0.05), travel to work (χ^2 =147.12, p<0.05) and the use of air purification (χ^2 = 40.05, p<0.05) with respiratory illnesses. **Conclusion:** It was evident that human lifestyle in urban areas did contribute to the rate of respiratory illnesses among the residents. It is suggested that urban residents improve their daily lifestyle. Practicing a healthy and active lifestyle would help this population to cope with respiratory illnesses.
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INTRODUCTION

A high population density carries a higher risk of pollution, infection and stress that can trigger a series of health problems in which respiratory infections are risks. The emergence of communicable diseases in urban areas, especially in poor housing areas, is due to increased population density. Increased density creates an environment where people live close to each other, while there is poor sanitation and hygiene, and unorganized waste disposal (1). Additionally, ageing, urbanization and unhealthy lifestyle are identified as risk factors for respiratory infections and illnesses (1, 2). In urban environments, airborne particles' originate from dusts, soil resuspension, waste incinerators, coal-burning and vehicle combustion. These particles provide an attachment site for viruses and bacteria that cause respiratory infection. Asthma and Chronic Obstructive Pulmonary Disease (COPD) are the major form of pulmonary diseases that urban residents usually experience (3).

In most instances, the increase in population density is unavoidable. This is due to the increase in several industrial activities and economic developments, which ultimately emit hazardous gases such as carbon monoxide (CO), nitrogen oxide (NO_2), and sulphur dioxide (SO_2) (3). These gases may create the risk of respiratory infections among urban residents. Apart from

air pollutants and biological agents, respiratory infection among urban residents are associated with lifestyle, socio-economic background and medical background. Examples of each additional factor are (4, 5):

- Lifestyle: Eating habits, physical activity, smoking, and the use of over-the-counter drugs, supplements, traditional medicine, herbal products
- Socio-economic background: Age, type of employment, income level, ethnic group
- Medical background: Chronic/non-communicable disease (NCD), history of family members with a chronic respiratory infection (RI)

Physical inactivity in particular, has been identified as the fourth leading risk factor for global mortality (6% of deaths globally) and increases the risk of non-communicable diseases (NCDs) (6). Recently, Malaysia saw a dramatic increase in the prevalence of behavior-linked diseases, including a 43% increase in hypertension, 88% increase in diabetes and 25% increase in obesity (6). However, the statistical relationship between urban lifestyle and respiratory illnesses is yet to be identified for Malaysia and the state of Selangor, which is one of the most urbanized regions.

Based on an observation of the COVID-19 cases in Malaysia, being one of the most recognized respiratory illnesses, most patients who succumbed to the disease, had a co-morbidity with chronic or non-communicable disease (7). This possibly indicates that patients with a chronic non-communicable disease have a higher risk of respiratory infection, including COVID-19. It is thus necessary to study the indirect relationship between a healthy lifestyle and respiratory infections.

This study was conducted to identify the factors that increase the risks of respiratory infection and the prevalence of respiratory infections in various urban lifestyles and environments. A three-part questionnaire (on socio-demographic, healthy lifestyle and respiratory infection) were used to survey residents in Petaling, Selangor. Hypothetically, areas with a high density of population, with lack of healthy lifestyle and also poor sanitation and hygienic environment, will pose a higher risk of respiratory infection.

MATERIALS AND METHODS

Criteria of Respondents

Inclusion criteria were residents who has been living within the Petaling district for at least 5 years to include the acute and chronic effects of urban long-term exposure and aged between 18 and 65 according to Wang et al (8). Respondents with chronic illnesses (e.g.: heart diseases, cancer etc.) were excluded. The sample size was determined using a Raosoft sample size calculator based on the formula in equation (1).

$$\chi = Z(^{c}/_{100})^{2}r(100-r)$$
$$N = {}^{N\chi}/_{((N-1)E^{2}+\chi)}$$
$$E = \mathrm{Sqrt}[{}^{(N-n)\chi}/_{n(N-1)}]$$

where N is the population size, *r* is the fraction of responses that we are are interested in, and Z(c/100) is the critical value for the confidence level *c*.

The study area was the district of Petaling with focus to Petaling Jaya, Subang Jaya and Shah Alam. These cities were selected due to their high development status, density, higher level of pollution and therefore a higher risk to medical conditions within the state of Selangor. This descriptive cross-sectional survey took place between September to December 2020 and used quantitative data analysis techniques. Descriptive methods are suitable for survey research methods because they can be expressed and described using questionnaires, to test an individual's attitude, beliefs, opinions, and behavior (8, 9).

Study Instrument

A self-administered questionnaire was used as the study instrument. Items in the questionnaire were developed based on past literature on urban lifestyle and respiratory infection (10, 11). The questionnaire (Appendix A) was distributed to respondents in bilingual (Malay and English). The questionnaire is divided into three parts: socio-demographics, daily urban lifestyle, and medical history and their association with respiratory infection. The survey was distributed through the stratified random sampling method, covering three areas within every city, i.e., high-cost housing, medium-cost housing and low cost (affordable) housing areas. A stratified random sampling favors the inclusion of residents from the different socioeconomic backgrounds. The population of Petaling Jaya, Subang Jaya and Shah Alam was estimated to be around 2,894,525 people. A total of 267 respondents were surveyed with a 95% confidence interval, using a response rate of 75% (200 questionnaires returned).

Reliability Test

The validity of the instrument is very important to maintain the accuracy of the questionnaire from being exposed to defects. The validity of the content of the questionnaire was adapted by the past studies where the daily urban lifestyle is referred to the studies conducted by (Lv et al., 2011) (12), while respiratory infection content is adapted from (WHO, 2005) (13) and (Kumar et al., 2018) (14) (12, 13, 14).

Ten respondents were selected from the three cities to interpret the questionnaire for confirmation of its reliability. The pilot study was conducted to provide feedback on the relevancy of the questions, level of understanding of the subject, language and duration to complete one questionnaire form. The pilot study's

internal consistency was tested using the Cronbach Alpha in the IBM Statistical Program for Social Sciences (SPSS) Statistics (Version 24). The questionnaire reported a Cronbach Alpha of 0.7, which favored its use for the collection and interpretation of data. An acceptable value of Cronbach Alpha is 0.6 to 0.7 to indicate reliability, while a value of 0.8 or greater indicates a good reliability (15).

Data analysis

Data was statistically analysed using IBM Statistical Program for Social Sciences (SPSS) Statistics (Version 24.0). Data on respiratory infection and urban lifestyle of the Petaling district residents were analyzed for mean, median, standard deviation, frequency and percentage of distribution (descriptive statistical analyses).

The test of normality (Kolmogorov-Smirnov, skewness value and kurtosis) revealed that the data were not normally distributed. Thus, the Spearman's rho test was used to evaluate the statistical inference of the data in addressing the study's objectives and hypothesis. The test was specifically used to determine the relationship between the respondents' daily lifestyle with past or current respiratory illnesses. Spearman's measures the strength of a monotonic relationship, which basically means that if one variable increases (or decreases), the other variable also increases (or decreases). Spearman's returns a value from -1 to 1, where: +1 = a perfect positive correlation between ranks. -1 = a perfect negative correlation between ranks and 0 = no correlation between ranks. The Chi-square test was used to determine the relationship between the socio-demographic characteristics and respondents' daily lifestyle with past or current respiratory symptoms.

RESULT

Socio-demographic profile of respondents

The socio-demographic profile of all respondents is shown in Table I.

Table I: Socio-demographic profile of respondents

Characteristic		n (N=200)	Percentage (%)
Age	18-25	56	28.0
	26-35	65	32.5
	36-45	32	16.0
	46-55	27	13.5
	56-65	20	10.0
Gender	Female	129	59.4
	Male	71	32.7
Educational Level	Primary school	0	0
	Secondary school	15	6.9
	University/College/ Institution	185	85.3
Employment Status	Student	32	14.7
	Housewife	8	3.7
	Self-employed	25	11.5
	Government sector	61	28.0
	Private sector	54	24.8
	Retiree	13	6.0
	Others	6	2.8
Marital Status	Single	85	39.0
	Married	113	52.1
	Others	2	1.0
Monthly Income	Less than RM4000	82	37.6
	RM4000 – RM8500	66	30.4
	More than RM8500	52	24.0
Travel to study/ work	By walking	4	1.8
	By public transport	12	5.5
	By motorcycle	30	13.8
	By private car	135	62.2
	By taxi or e-hailing services	5	2.3
	By driving to the station before taking public transport	3	1.4
	Others	10	5.1
Frequency of leaving the house	Daily	140	64.5
	Every one to two days	27	12.4
	Once a week	19	8.8
	Once in fortnight	6	2.8
	Once a month	3	1.4
	Others	4	2.0
Use of air purification devices	Yes	57	26.3
	No	143	65.9

Female respondents constituted 59.4% (n=129) of the responses while 32.7% (n=71) were males. Most of the respondents (32%) were aged between 26 and 35 years (n=65), while the least number of respondents were between 56 and 65 years old (10%, n=20). A total of 85.3% had completed their tertiary or higher education. Majority of respondents work in the government sector (28%), while a minority were retirees and housewives at 6% and 3.7%, respectively and (52.1%) were married. Respondents with a low, middle and high income were reported at 37.6%, 30.4% and 24%, respectively.

Of the 200 respondents, majority commuted to work using their car 62.2% and only 10 respondents 5.1% were working from home. In addition, 64.5% of the respondents left their home daily while a lesser fraction of 12.4% went out of their home every alternate or two

days. The main reason residents left their homes were to buy essential items (29%), followed by socializing with family and friends and dining (both at 22%). Furthermore, 35% of the residents live nearby a road with heavy traffic, followed by 22% near the residential area and 16% near industrial areas. It was also discovered that about 65.9% of the respondents do not use an air purification device in their home.

Most of the respondents prefer to exercise at public reserve parks near their residential area. About 44% of the respondents favor the open space provided for leisure activities at these parks. Another 28% of the residents prefer the paved roads around their residential area, while the rest of the residents preferred the indoors for their physical activities (home, gym and public halls).

Daily Urban Lifestyle

Table Ⅱ shows the respondents' lifestyle on exercise,

Table II: Daily Urban Lifestyle on exercise, diet intake and additional food intake.

Statement (n=200)		Number of responses (%)				
		Never	Rarely	Occasionally	Often	Nearly always
Exercise	1. I do light exercise such as light housework (dusting, sweeping, vacuuming) and leisurely walking.	0.5	0.5	14.5	31.0	**53.5**
	2. I do moderate exercise like brisk walk, cycling, dancing or any moderate exercise classes.	6.0	13.0	**35.5**	27.5	18.0
	3. I participate in vigorous exercise such as running, hiking, lap swimming, playing soccer or any other league sports.	27.0	26.5	**28.0**	9.0	9.5

CONTINUE

Table II: Daily Urban Lifestyle on exercise, diet intake and additional food intake.(CONT.)

Statement (n=200)		Number of responses (%)				
		Never	Rarely	Occasionally	Often	Nearly always
Diet Intake	4. I take a lot of salads or vegetables in my plate.	3.5	9.5	21.5	**39.00**	27.5
	5. I consume fresh fruits/ fresh fruit juice.	4.0	13.5	22.5	29.5	**30.5**
	6. I eat at late hours.	13.0	**34.0**	30.0	13.0	10.0
	7. I take fast food such as instant noodles and fast food 2-3 times a week (e.g.: KFC, McDonalds, etc)	13.5	**43.0**	22.0	16.0	5.5
	8. I practice intermittent tasting, Atkins, keto or any other diets	**31.5**	22.5	23.5	11.5	11.0
	9. I fast at least once a week.	**34.0**	27.5	20.0	8.5	10.0
Additional Intake	10. I take additional supplement such as vitamin C, multivitamin and calcium to complement my nutritional value.	23.0	14.0	13.5	14.0	**35.5**
	11. I consume natural product such as ginger, date, honey, gingko, ginseng and etc. for my health.	**24.5**	22.0	18.0	16.0	19.5
	12. I consume product such as detox tea, whitening product, collagen, bird's nest, slimming herbs etc. for beauty and health.	**58.5**	22.0	7.5	7.5	4.5
	13. I do massage, acupuncture, sauna and cupping etc. to treat my limbs.	**47.0**	17.0	19.5	8.0	8.0

* Responses in bold show the highest score on daily lifestyles practices by the residents.

diet intake and additional intake.
Most respondents (53.5%) very regularly do light housework, while 28% vigorously exercise. About 39% of the respondents consumed vegetables daily, while 30.5% almost always have fresh fruits or fresh fruit juices. Also on a healthier note, high percentages of respondents rarely ate late in the night (34%), and another 43% rarely consumed fast foods. Additionally, these urban dwellers practiced intermittent fasting (31.5%) or fasting once a week (34%). It was encouraging to discover that most respondents consumed supplements daily (35%). Moreover, 58.1 to 88.9% did not smoke or consumed alcohol, while being a second-hand smoker was higher due to smoking habits of family members.

Past or Current Illnesses Regarding Respiratory Infection
Table III shows the answer trend on past or current illnesses associated with respiratory infection among the sampled urban dwellers.
The findings show that most respondents had experienced common respiratory illnesses including the common flu (46.5%), cough (37.8%) and sinusitis (26.3%) within the past 12 months. Much lower numbers of residents had illnesses linked to infectious agents such as pneumonia (0.9%) and COVID-19, bronchitis and pulmonary tuberculosis (all at 0.5%). The residents strongly disagreed that they experienced any respiratory problems in the past 12 months (40.5 to 75.5%).

Table III: Survey on common respiratory problems in daily life of the respondents.

Research statement on respiratory problems	Number of responses (n=200) (%)				
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. I usually sneeze / cough first thing in the morning.	**47.5**	21.0	16.0	8.5	7.0
2. In the past 12 months, I have experienced a period of flu, cough and phlegm that lasted for three days	**43.0**	20.0	12.5	13.5	11.0
3. I am overweight and it is affecting my breathing while doing routine work (such as walking, climbing the stairs etc.)	**40.5**	20.0	16.5	13.0	10.0
4. I always stop for breath when walking at moderate pace on level ground.	**49.5**	24.5	15.5	7.5	3.0
5. In the last 12 months, I had breathing shortness or whistling in my chest.	**75.5**	12.5	6.5	3.0	2.5
6. In the last 12 months, I have experienced attacks of shortness of breath and gasping for air.	**73.5**	15.0	6.0	2.5	3.0
7. In the last 12 months, I have been woken up at night by an attack of shortness of breath.	**74.0**	15.0	4.5	4.0	2.5

* Responses in bold show the highest score on respiratory problems experienced by residents.

Median score of respondents' daily urban lifestyle and the past or current illnesses related to respiratory infection
Due to the not normally distributed data between the respondents' urban lifestyle and respiratory illness scores, median was used to further analyze the data. The respondents' lifestyle was categorized as good due to a minimum score of 29% and the median value (44.5±7.20). Respiratory illnesses reported a minimum score of 22% and a median value of (29.0±4.57).

However, the maximum score for both parameters did not achieve 100%. The data had a maximum score of 65% with a median score of less than 50%. This range is indicative of moderate scores for urban lifestyle. Meanwhile, the maximum score and median score for respiratory illnesses were lower than the value recorded by urban lifestyle. This is indicative of a weak exposure to respiratory illnesses.

The relationship between the scores of respondents' urban lifestyle and respiratory infection in the Petaling district
The Spearman's rho test was used to assess the relationship between the score of respondents' urban lifestyle and respiratory illnesses. A positive and significant relationship was demonstrated. The strength values of the coefficients, r, generated in SPSS are as shown in Table IV.

Table IV: Association between scores of respondents' daily urban lifestyle and past or current respiratory illnesses

Parameter	Value p	Value r
Urban lifestyle and respiratory infection	0.066	0.354
* Spearman's rho test with value of p<0.05, N = 200		

The Spearman's rho is computed on ranks and depicts a monotonic relationship. The Spearman's correlation coefficient, r, can take values from +1 to -1. A r value of +1 indicates perfect rank association and a value of zero indicates no correlation between the ranks, while r of -1 indicates perfect association of negative ranks. The closer the r is to zero, the weaker the relationship between the ranks. A Spearman's rank-order correlation analysis determined the relationship between the

lifestyle's scores and respiratory illnesses within the district. A weak positive correlation was revealed between urban lifestyle and respiratory illnesses within the three cities (r=0.06, p > 0.05).

Relationship between socio-demographic characteristics and daily urban lifestyle and past or current respiratory illnesses

The Chi-square test was used to study the association between socio-demographic characteristics, lifestyle and past or current respiratory symptoms. The specific variables tested for association were age, gender, educational level, employment status, marital status, household's income, travelling to work, frequency of leaving the home and use of air purification devices as shown in Table V.

Table V: The χ^2 and p values of each variable.

Variables	Daily urban lifestyle		Respiratory infection	
	χ^2	P value	χ^2	P value
Age	1506.13	0.05	1073.02	0.00
Gender	41.24	0.15	15.15	0.76
Educational Level	43.53	0.10	19.15	0.51
Employment Status	243.06	0.02	132.71	0.20
Marital Status	36.61	0.99	40.20	0.46
Household Income	75.39	0.20	33.83	0.74
Travel to work	216.29	0.17	147.12	0.05
Frequency of going outside the house	240.36	0.02	107.48	0.78
Air purification devices	38.15	0.24	40.05	0.01

It was demonstrated that age had no significant association with daily urban lifestyle (χ^2 = 1506.12, p<0.05), but had a significant association with respiratory illnesses (χ^2= 1073.02, p<0.00). Both males and females had no significant association between daily urban lifestyle (χ^2 = 41.24, p>0.05) and also respiratory illnesses (χ^2 = 15.15, p>0.05).

Level of education showed no significant association with urban lifestyle and also respiratory illnesses (χ^2 = 43.53, p>0.05) (χ^2= 19.15, p>0.05). Meanwhile, employment status had significant association with urban lifestyle (χ^2= 243.06, p<0.05), without significant association between respiratory illnesses (χ^2= 132.71, p>0.05). Household income, travel to work and frequency of leaving the house had no significant association with urban lifestyle (χ^2=75.39, p>0.05) (χ^2= 216.29, p>0.05), but had a significant association with respiratory infection where χ^2= 240.36 and p<0.05. No significant association was found for respiratory illnesses to household income, travel to work and frequency of leaving the home and between the use of air purification devices and the urban lifestyle. Availability of air purification devices had a significant association with respiratory infection (χ^2 = 40.05, p<0.05).

Statistical analysis did not show any association between the socio-demographic data. Thus, the null hypothesis for these socio-demographic variables were accepted. On the contrary, there was significant association between socio-demographic data on employment status and frequency of leaving the house. These socio-demographic variables displayed significant relationship between urban lifestyle and respiratory illnesses. Hence, the null hypothesis was rejected. Therefore, it can be concluded that an association between employment status, frequency of leaving home with urban lifestyle is present. The use of air purification devices was also associated with the respondent's age and respiratory illnesses.

DISCUSSION

Socio-demographic profile of respondents

The majority of respondents were women, married, working in the public sector and obtained higher education. This data corresponds to a Malaysian statistic, in which majority (69.6%) of the population were citizens between the ages of 15-64 years and working (17). (3). A quarter of the respondents live close to the main road or highway. Vehicles are the main contributors to population (18). Therefore, exposure to air pollution is higher for this group of urbanites and this would most likely trigger health problems in selected individuals. In addition to the concentration of pollutant in the environment, the amount of time a person is exposed to the air pollutant within a specific distance would be a more accurate representation of the individual's exposure (19). Hence, these findings only elaborate on the daily activity routine commonly conducted by urban residents without significantly showing the respondents' inhaled pollutants.

According to Bedimo-Rung et al. (2005) (20), a park's physical environment seems to be related to how people visit the park and conduct their physical activity. The finding in this survey indicates that a facility's availability is positively associated with physical activity levels (21). A previous study discovered that adolescents in urban areas are more likely to be involved in regular physical activities when they have access to parks (22, 23).

The quality of air in a household is also crucial in the respiratory health of respondents. One way to maintain good indoor air quality is with the use of an air purifying device that helps to filter the air (24). This study finds that most (65.9%) of the respondents do not use air purification devices. Filtering the air can indeed help to remove harmful particles from indoor spaces, particularly allergens, smoke, and mold but could be

costly for ownership and maintenance. Nevertheless, air purifiers cannot work alone to increase indoor air quality but works well with proper filtration and home cleaning (25).

Daily Urban Lifestyle

The emergence of COVID-19 affected the daily lifestyle of urbanites due to enforcement of movement control orders for long durations. As a result of the restricted movement, in addition to preferred lifestyle, the current study found that the respondents were mostly living a sedentary lifestyle. Data from previous studies supported this finding, which reported that urban residents are inactive and living a sedentary lifestyle (4, 26). It was found that most respondents had increased physical activities due to more available time during the lockdown periods (27). However, the data is not to be generalized due to the uniqueness and subjectiveness of human behavior when spending their free time.

Data of the current study reports a healthy eating habit by the respondents, which may be also caused by the pandemic. Another study found that the respondents have increased their fresh fruit and vegetables intake after the COVID-19 lockdown (26, 28). However, a study done in Denmark and Germany during the lockdown contradicted with the findings on fresh fruit or fresh juice consumption. The respondents of both studies had reduced visits to shops during the lockdown and focused on getting longer shelf-life foods (ie; canned food), rather than fruits (29).

Residents of the three cities in Petaling Jaya also smoked less. Apart from the fact that most respondents sampled were females, the pandemic may have been a contributor of improved smoking habits. A study had reported that smoking habits were reduced during the lockdown period and after the announcement of the COVID-19 outbreak (27, 30). However, Sokolovsky et al., 2021 (31) stated that smokers among college students reduce their frequency of smoking in a day but does not reduce the tobacco consumption at a time, while Kalkhoran et al., 2021 (32) finds that most (~40%) of their respondents does not change their tobacco intake and only 21% of their respondents reduce their tobacco intake and 33% remained respondents increase their tobacco intake.

Past or Current Respiratory Illnesses

Khanna & Gharpure, 2013 found that urbanites are more prone to allergy and sinusitis (33). This was mainly because of higher occupational hazards and pollutants from industries in the cities. The same study estimated about 134 million people suffer from sinusitis or allergy, the symptoms of allergy include debilitating headaches, fever and nasal congestion (common flu). A study by Sciaraffa et al., 2017 (34) also believe that urban dwellers have a higher frequency of asthma exacerbation and respiratory infection than rural dwellers. This was correlated to another study conducted in China, which found that the elevation of traffic and industrial activities positively influenced airflow direction (35). The direction of the air would influence the movement of pollutants inhaled by residents of urban areas. The presence of pollutants in the air may affect the past or current respiratory illnesses. However, the respiratory symptoms developed in the residents were not chronic or severe.

The relationship between the scores of respondents' urban lifestyle and respiratory illness in Petaling district

There is a limited number of published studies examining the association between daily urban lifestyle and respiratory illness. However, a study showed significant positive correlation between daily urban lifestyle and respiratory infection among children in United Kingdom (36). It is also believed that urbanized area has a higher rate of respiratory infection based on another study conducted in Kuala Lumpur. The paper reported that "The relationship between population, land uses, trip generated, trip attracted and green area, and health indicators suggested a high rate of respiratory illness (ARI and asthma) in the more urbanized areas with less green areas and a low rate in the least urbanized areas with more green areas" (37).

Relationship between socio-demographic characteristics with respondents' daily urban lifestyle and past or current respiratory illnesses

There is a relationship between urban daily lifestyle with respiratory illness with a weak positive correlation coefficient ($r=0.06$, $p>0.05$). Thus, human lifestyle in urban areas did affect the respiratory health among the residents. It is suggested that urban residents improve their daily lifestyle by practicing a healthy and active lifestyle to cope with respiratory illness. Meanwhile, strong positive correlations between the socio-demographic data between the employment status and frequency of leaving the home was noted with chi-square value, ($\chi^2 = 243.06$, $p<0.05$), ($\chi^2 = 240.36$, $p<0.05$). Based on the analyzed data, correlations were noted from the Chi-Square test. Significant relationships were found between age and purification devices where the values were ($\chi^2 = 1073.02$, $p<0.05$), ($\chi^2 = 40.05$, $p<0.05$). In another study, smoking and historical respiratory infection are significant factors to a respiratory disease with a <0.001 p value, where chronic obstructive pulmonary disease (COPD) was used as the indicator (38). Another study conducted in Beijing on young adults also revealed the significance of air purification device usage in achieving better indoor air quality (39). However, bad indoor air quality could be contributed by low of air ventilation and activities done in the house such as cooking, cleaning and smoking (40). In summary, the strong positive correlation between age, employment status, frequency of going outside the house and air purification devices are shown. This correlation indicates that from the response from respondents, an employed person who frequently goes outside the house

to travel to work would install air purification devices to maintain a healthy indoor air quality and reduce the risks related to respiratory illness in their household.

CONCLUSION

This study justifies that urbanization does influence in respiratory illness of the dwellers. This is evident as urbanization was found to affect daily lifestyle, such as diet, nutrition intake and physical activities. This study believes that a healthy food consumption, adequate exercise and better indoor air quality by using an air purifying device, could prevent and reduce the possibilities of experiencing respiratory illnesses among urban dwellers in the Petaling district.

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