Assessment of Air Quality and Ventilation in Kuala Lumpur, Malaysia: A community based study

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ABSTRACT

Background: Objective of this study was to determine public perception of outdoor air problems, to collect data that will improve air quality campaigns and marketing efforts, to assess public participation or actions in activities that minimize air pollution and to determine if the public social life may have a direct impact on the air. This was a pilot study which was conducted on specific community living in one condominium. Since few years back, Malaysia facing an issue with low visibility during haze which have direct impact on people life and their outdoor activities. We have conducted this study to understand people perception on air quality in Kuala Lumpur, Malaysia. Study was conducted using questionnaire prepared by researchers. After survey awareness was initiated with the help of informative flyers and talk in the community.

INTRODUCTION

The continuous incidence of smog and haze over the past five years has compromised the air quality around the west coast of Malaysia [1]. As per the Department of Environment, the air quality in an area of central Perak state was "unhealthy," and it downgraded air quality in 32 other areas nationwide, including Kuala Lumpur, from "good" to "moderate"[1]. It was observed that the haze in March 2014 was caused by sources such as industries, motor vehicles, open burning, power generation and open burning in Sumatra [2]. This accounts for the higher Air Pollution Index (API), recorded at 116, reaching an unhealthy level as of the first week of March 2014 [2]. A study was conducted to understand the impact of air quality on residential area located in a populous city. Objectives of conducted study were to determine public perception on outdoor air problems, to collect data that will improve air quality campaigns and marketing efforts, to assess public participation or actions in activities that minimize air pollution and to determine if the public social life may have a direct impact on the air quality.

Methods:

A questionnaire was used as a study instrument to cover both indoor and outdoor air quality, as well as ventilation issues occurring due to architectural design of the targeted residential area in 2014. The residential area chosen was one of the Condominium located in Bukit Jail, Kuala Lumpur. The study was conducted after taking approval from management office from thirteen to eighteenth floor of the condominium.

Results:

The total correspondent received was thirty eight residents. Female residents were higher than males. Among them, the Chinese population is highest, followed by Malays and Indians respectively. The number of occupants ranged from one to eight people per unit, with most houses had four people per unit. The general period of residence ranges from two months up to five years. Most of residents replied on previous health issues before moving into their current units, that they had bad cough, sneezing, headache, asthma and throat irritation. Others included dizziness, nausea and fatigue as well. However, a total of the respondent replied that air quality
was linked to their health related problems. Improvement of air ventilation can be done using an air conditioner to stabilize quality of air used as shown in Figure 1.

![Graphical presentation of data on health issues/symptoms before moving into the condominium.](image1)

A total of 86.84% of respondent stated having air conditioner and running the appliance at an average of six to ten hours daily and at least half agreed that it does improve the air quality as shown in Figure 2.

![Residence perception on role of air conditioner in air quality and ventilation.](image2)

However, the use of pesticides was rampant, although the occurrence of usage was limited to once a month rather than on a weekly basis. Thus, use of pesticides does not really affect the surrounding air due to the amount of usage per month. In terms of ventilation in the kitchen, respondents do have attached kitchen hood or
other forms of ventilation as shown in Figure 3. Ventilation may prevent the growth of mold and odours due to cooking activities.

![Graphical data on ventilation in kitchen](image)

**Fig. 3:** Graphical data on ventilation in kitchen.

As per respondents, air quality was not affected by internal factors as smoking was confined to balconies. Usage of dehumidifiers was rather low and the exchange rate was practiced monthly. The condition of indoor air quality was mostly dusty, with hot temperature followed by dry air respectively. These factors further aggravates the conclusion that the air quality was affected by external sources. Overall rating of indoor air quality was average as shown in Figure 4. However, most respondents mentioned that the problem was not due to climate change or not sure of the cause. The rest of the respondent had different view and associate the cause due to dry season. Both reasons can be accepted as monsoon season just ended, followed by the recent haze situation [2] happening around Klang Valley. In terms of climate change, there was an increase of carbon dioxide around the city from 2001 – 2005 [3]. Hence, dusty air may be the result of hot temperatures, which heat up wetlands producing dust.

![Response rate on the indoor air quality](image)

**Fig. 4:** Response rate on the indoor air quality.

Outdoor air quality was rated average because of transport buses as the major contributing factor, followed by gasoline vehicles and industrial work in the area. It was reported that construction work was also noticeable around the condominium. Approximately 50% respondent stated that they had taken steps to improve the outdoor air condition as shown in Figure 5. Growing plants was the favorable choice for such action and had subsequent positive impact on the air quality. It was reported that respondents preferred outdoor ventilation. It was observed during field survey that each condominium blocks do not hide each other buildings, which gave
good ventilation area from one side to another. Due to outdoor air quality, most respondent fall sick with respiratory issues. This was seen as a paradox as outdoor ventilation may result in respiratory problems.

![Graph showing solutions made to improve air quality](image)

**Fig. 5**: Response rate on steps taken by community for improvement of air quality.

However, most of respondent did not change their outdoor activities in the past twelve months but only a handful of residents did change their outdoor activities as shown in Figure 6. The unwillingness to change routine can be a contributing factor as well. Health wise, sneezing was the symptom with the highest respondent value (46.88%) followed by sinus and dry/sore throat.

![Graph showing change in outdoor activities](image)

**Fig. 6**: Response rate on change in outdoor activities.

These symptoms were in line for respiratory stress[4]. Other symptoms ranges from eye irritation, difficulty in concentrating and others. About half of the respondent do not have their symptoms clear up after leaving the condominium but most recovered overnight or during the weekends. Hence, such symptoms are mostly moderate as it takes longer time for healing [4]. However, only half of respondent followed medical treatment for their symptoms for relieves.
Conclusion:

The condition of condominium in terms of air quality was mildly severe as most of the respondents were get affected. Initiative steps should be taken by the authorities; for example, to reduce the number of industrial activities in nearby residential area. Preventive measures may include regular health screening and counter-preventive measures in maintaining good air quality. In terms of ventilation, the architecture of the residence was good in allowing proper ventilation into each room available per unit.

REFERENCES