UNIVERSITI TEKNOLOGI MARA

INDOOR AIR QUALITY AND HEALTH RISK ASSESSMENT IN GENERAL HOSPITAL WARDS, KUALA LUMPUR

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Project submitted in fulfillment of the requirements for
the degree of
Bachelor in Environmental Health and Safety
(Hons.)

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DECLARATION BY STUDENT

Project entitled "Indoor Air Quality and Health Risk Assessment in General Hospital Wards, Kuala Lumpur" is a presentation of my original research work. Wherever contributions of others are involved, every effort is made to indicate this clearly, with due reference to the literature, and acknowledgement of collaborative research and discussions. The project was done under the guidance of Mr Nasaruddin Abd Rahman as Project Supervisor. It has been submitted to the Faculty of Health Sciences in partial fulfillment of the requirement for the Degree of Bachelor in Environmental Health and Safety (Hons).

Student's Signature:

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ABSTRACT

Indoor air quality in hospital and other health care facilities is vital especially to the occupants such as staff and patients that making them directly influenced by the quality of air in the building. The main objectives of this study is to identify level of indoor air quality parameters, which are temperature, humidity, PM_{10}, CO_2 and VOCs as well as evaluating exposure of these parameters towards human. Sources that is identified as indoor air pollution are photocopy, paint, detergent, medicine, antiseptic and automobile exhaust from outside. The cross-sectional study used involving observation and analysing air quality data collected from each wards at a specific point in time using EVM-7 and Anemometer. The result obtained for six parameters were analysed using SPSS and Health Risk Assessment calculation equation. Maximum temperature at 14 wards is 32.3°C and lowest temperature is 29.1°C while ICOP recommend for 23°C to 26°C. Air movement shows 0.5 m/s as the highest and 0.1 m/s as the lowest average and only one ward is out of the range set by ICOP for air movement category. Rate of humidity is under range and only one ward for PM_{10} that exceeded allowable limit for ICOP. Both CO_2 and VOCs concentration is far below maximum limit. Correlation p-value for carbon dioxide and temperature is 0.257 while carbon dioxide and humidity is -0.331. 3 parameters which are PM_{10}, CO_2 and VOCs is calculated its exposure concentration and hazard quotient and all of the wards shows less than 1 hazard quotient where it is unlikely to pose any health adverse effect. Indoor air quality need to be maintained properly or else it will create health risk to the occupants. One of the illness that could be a threat and related to poor indoor air quality is sick building syndrome. Sick building syndrome is symptoms which appear in specific room, nevertheless the symptoms would disappear after leaving the room. By managing good indoor air quality it will increase productivity and bring comfort to the occupants. Nosocomial infection related to indoor air quality can be avoided by managing indoor air at source. Job rotation for staff or reducing the total time of occupants expose to certain pollutant can be done to minimize direct exposure of worker to the contaminant. In short, despite all of these wards are still using natural ventilated system, the result analysed shows that there is no significant in posing health threat.

Keywords: *Indoor air quality, Hospital wards, Health risk assessment, Natural ventilation*