

UNIVERSITI TEKNOLOGI MARA

**ASSESSMENT OF INDOOR AIR
QUALITY AND SICK BUILDING
SYNDROME (SBS) IN SELECTED
LABORATORIES AT UITM
PUNCAK ALAM**

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In the name of Allah, The Most Gracious, The Most Merciful.

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ABSTRACT

This study was conducted to investigate the association between indoor air quality and the prevalence of Sick Building Syndrome (SBS) among the laboratory staff of UiTM Puncak Alam. A set of questionnaires were distributed to 80 laboratory staff with response rate of 100%. The level of temperature, relative humidity, carbon dioxide, carbon monoxide, respirable particulate matter, and volatile organic compounds, total fungal and bacterial count were being assessed in 40 laboratories. The prevalence of sick building syndrome also showed no significant differences. The most prevalence symptoms were “stuffy nose” (35%), “eye irritation (32.5%)” and “headache (25%)”. There were no significant differences of the physicochemical parameters between type of laboratories, buildings and departments. None of the physicochemical parameters exceeded the recommended range of Industrial Code of Practice of Indoor Air Quality. There were significant association of sick building syndrome with low temperature ($\chi^2 = 8.26, p = 0.012$), low humidity ($\chi^2 = 14.5, p < .001$) and high level of PM10 ($\chi^2 = 7.235, p = 0.018$). The highest reading of total fungal count were recorded at Histology laboratory from Department of Medical Lab Technology meanwhile the lowest total fungal count recorded were from laboratories from Optometry Department. Upon analyse using SPSS, there are significance difference between buildings and type of laboratories ($p = 0.022$ and $p = 0.03$) but, there is no significant difference between comparison of total fungal count with departments ($p = 0.057$). The analysis by SPSS also showed that there is no significant difference between SBS prevalence and total fungal count ($\chi^2 = 7.029, p = 0.219$). The range of all TBC readings were within the acceptable ICOP limit of 500 CFU/m³. No significant different of TBC reading were found between buildings, departments and types of laboratories. The Nutrition and Dietetic Department in FSK 1,5 recorded the highest mean of TBC reading (352.0 CFU/m³) while the lowest were obtained from Nursing Department (176.0 CFU/m³). In this study, the TBC of wet laboratories were found significantly higher compared to dry laboratories ($p < 0.010$). The wet laboratories had the TBC ranged from 57.5 to 488.5 CFU/m³ while in dry laboratories ranged from 57.5 CFU/m³ to 387.9 CFU/m³. The association of TBC with SBS prevalence were found statistically significant ($\chi^2 = 5.625, p = 0.018$) which indicate the bacterial contamination could cause the SBS among the laboratory’s workers.

CHAPTER ONE

INTRODUCTION

1.1 Background of study

Public health awareness on indoor air pollution has lagged behind that on outdoor air pollution. However, during the last decades, indoor air quality (IAQ) is recognized as one of the main health concerns as people spend a large part of their life in the building. Therefore, it is an essential determinant of healthy life and people's welfare (Branco et al., 2014; Di Giulio et al., 2010; Huang et al., 2018; Norhidayah et.al., 2013). According to Environmental Protection Agency (EPA), Indoor Air Quality (IAQ) refers to the air quality within and around buildings and structures, especially as it relates to the health and comfort of building occupants. Indoor air pollutants are not easy to dilute as outdoor air pollutants, thus making the exposure of indoor air pollutants higher (Mohd et al., 2014).

Industrial Code of Practice (ICOP) on Indoor Air Quality prepared by Department of Occupational Safety and Health (DOSH) highlighted the parameters and contaminants of indoor air quality into 3 groups, which are physical, chemical and biological. The failure to take action immediately and efficiently on the problem of poor IAQ could have the disastrous consequences on human health. Previous study conducted by EPA stated that indoor air pollution is among the top five environmental health risks. World Organization Health (WHO) reported that indoor air pollution also responsible for 2.7% of the global burden of disease (Norhidayah et al., 2013). One of the health risks is getting sick building syndrome (SBS).