AN ASSESSMENT OF MORTALITY FROM EXPOSURE TO SECOND-HAND SMOKE(SHS) AMONG MALAYSIA POPULATION.- A STUDY PROTOCOL

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ABSTRACT

Background: Second-hand smoke (SHS) exposure substantially affect the health of the population, and reduce the SHS exposure is one of the public health measure to address the problem. Local information on mortality due to SHS exposure will assist the policy makers to formulated the suitable policies and measures to address the SHS exposure among Malaysian population.

Materials and Methods: The secondary data analysis of National Health and Morbidity Survey (NHMS) 2006 and mortality data from 2007 until the year 2019 will be merged based on the identifier (Identification card number of respondents). The identifier will be deleted once the merging of data completed, and the completed data set can only be accesses by research team members. The Hazard ratio of mortality rate due to SHS exposure will be determine using the Multiple Cox Regression(MCR) after adjusted for possible confounding factors. The assumption of MCR will be checked to ensure the fit of the model.

Expected Outcome: The findings from the present study are important to provide information on mortality due to SHS exposure among the local residents. . Such information is particularly helpful in providing the real health problems due to second-hand smoke among Malaysian population ,the information will also the health promotion activities to reduce the SHS exposure among Malaysian population.

Keywords: Mortality, second-hand smoke, Malaysian adults, Hazard Ratio, NHMS

1.0 Introduction

Second-hand smoke (SHS) constitutes of side stream smoke (the smoke released from the burning end of a cigarette) and exhaled mainstream smoke (the smoke exhaled by the smoker) (World Health Organization,2004). It consists of a variety of chemicals and contains at least 250 toxic chemicals,including 50 of which have been identified as carcinogenic chemicals (eg., benzene) (World Health Organization, 2004) . Ample epidemiology studies have shown that exposure to SHS will increase the risk of lung cancer by 20-30% , and risk of stroke by 15-56% (Samet et al., 2009; Fischer& Kraemer, 2015),   depending on the intensity of exposure . The first global study on the effects of SHS exposure in 192 countries revealed that 603,000 deaths and lost of 10.9 million of Disability-Adjusted Life-Years (a measure of overall disease burden, expressed as the number of years lost due to ill-health, disability or early death) was due to SHS (Oberg et al., 2011) .   More than 600,000 deaths were caused by secondhand smoke exposure (SHSe) in 2004, corresponding to 1.0% of all deaths worldwide in that year (Oberg et al., 2011). Malaysia is among the country with higher prevalence of smokers in the world, with almost 5.0 million adults currently smoking (including 43.0% of men and 1.3% of women) and 25.9% nonsmoking adults exposed to SHS inside the home , and 30.9% exposed to indoor working areas in 2015 (Institute of Public Health(IPH), 2015).

Malaysia ratified the World Health Organization's Framework Convention on Tobacco Control (WHO FCTC) in 2005. Ministry of Health, Malaysia have been working hard to implement the Convention and have made considerable progress. For example, the smoking restricted areas had been expanded from seven public areas in 1993 to 27 in 2017. Several states, such as Melaka, Penang, Johor, and Kelantan have also revised their local legislations to prohibit or restrict smoking in more public places (Lim et al., 2018) and the Malaysia, Ministry of Health revised and tightened the rules of restricting smoking in all indoor public places including indoor working areas with centralised air-conditioning system and restaurants and bars in 2010 (Lim et al., 2018); national legislation has been updated to regulate cigarette packaging and labeling and to adjust the consumption tax of tobacco products (Heng et al., 2020) .

Another major challenge for tobacco control in Malaysia is that SHSe is prevalent in various microenvironments (IPH 2012; IPH 2015; Lim et al., 2018), although the related hazardous health effects are recognized by more than 85% of the population (IPH, 2012; Cheah et al., 2017). This might due to health effect of exposure to SHS is not obvious in the short term , Thus, information about the magnitude of the health risks and disease burden due to SHS is particularly important for policy makers to plan preventive strategies and for the general population to understand its right of enjoying smoke-free air.

2.0   Research Question/ Gap of Knowledge

Although there have been studies investigating the effect of SHS exposure on mortality , it has never been determined locally, either by local or foreign researchers. In view of the unchanging smoking prevalence in the past two decades, information about the magnitude of the health risks and disease burden (mortality) due to SHS exposure is particularly important

for policy makers to plan preventive strategies and for the general population to recognize the premature death due to smoking in Malaysia population.

2.1 Objective;

To assess the association between SHS and mortality among Malaysian adults participants of the NHMS III 2006 study.

3.0 Materials and Methods

3.1   Study Sample of the Third National Health and Morbidity Survey 2006 (NHMS III)

The NHMS II in 2006 is a nationally representative health survey conducted among all non-institutionalized individuals age 18 years and above, and residing in Malaysia for at least 2 weeks prior to data collection. Institutional population such as those staying in hotel, hostels and hospitals, army camp were excluded from the surveys.

Data will be extracted from a cross-sectional multi-ethnic population-based study, the 2006 NHMS, which was conducted from April to July 2006, across 13 states and 2 Federal Territory in Malaysia. The NHMS III samples were selected using a two-stage stratified sampling method, by which the first stage stratification was performed by states and the second stage stratification was performed by urban/rural localities. The urban area is defined as a gazetted area with adjoining built-up areas of more than 10,000 people while a gazetted area of less than 10,000 people is defined as a rural area. The Malaysian Department of Statistics (DOS) provided the Primary Sampling Units (PSUs) or Enumeration Blocks (EBs) for first stage sampling and Secondary Sampling Units (SSUs) or Living Quarters (LQs) for second stage sampling.

A total of 2,150 EBs (1,424 urban and 726 rural EBs) were systematically selected from all EBs in Malaysia via a probability-proportional-to-size sampling technique. Subsequently, 12 Living Quarters (LQs) or Secondary Sampling Units (SSUs) were randomly selected from each EB. Finally, all households and eligible household members within the 15,519 selected LQs were included in the sample. Details of the sampling method and calculation of sample size have been described elsewhere. For the present study, data from a total of 23,608 eligible respondents (aged 30 to 70 year-old) with written consent for participation will be analyzed.

3.2   Sample size calculation of NHMS III (2006)

The sample size for NHMS III was calculated using Sample Size Calculation Formula for a prevalence study. The sample size was calculated separately for each module using a single proportion formula for estimation of prevalence based on the variance of proportion of the variable of interest, a margin of error of 1.2, a design effect of 2.0 and a confidence interval of 95%. Subsequently, the allocation of sample by state, urban and rural locality was performed proportionally to the population size. For instance, a larger number of samples were allocated

to states house more residents such as Selangor, Johor and Sabah whilst a smaller number of samples were allocated to states with less residents such as Perlis, Melaka and Putrajaya.

3.3   Data collection

3.3.1 Extraction of Data from NHMS III

The present study will be extracting data from the NHMS III. In NHMS III, the data collection was conducted from April 2006 to July 2006 by trained interviewers via face-to-face interviews using a standardized and validated, bi-lingual (Bahasa Melayu and English) survey modules to acquire information pertaining to socio-demography, health service utilization, oral health care, outpatient care, health care cost for appliance, promotional and preventive care, health problems, general health, personal risk factors, health-seeking behavior, nutritional status, physical activity, tobacco use, alcohol consumption, hypertension, hypercholesterolemia, diabetes mellitus, mental health in adults and children and home injury; whilst clinical assessment, which included anthropometry, blood pressure, fasting blood glucose and cholesterol and hemoglobin was performed by trained staff nurses.

Besides the face-to-face interviews, eligible respondents were asked to answer also the hard copied, quadrilingual (Bahasa Melayu, English, Mandarin, Tamil) self-administered questionnaires which encompassed alcohol module (13 year-old and above), mental health module for children (5 to below 16 year-old) and mental health module for adults (16 year-old and above). To ensure a higher response rate, only selected respondents who were not at home after at least 3 attempted visits were excluded from the survey.

3.3.2 Collection of Data from Registries

All-cause mortality and cancer incidence from January 2007 to December 2019 will be obtained from the Department of Statistic (DOS) Malaysia and Malaysian Cancer Registry, respectively. The Identification (IC) Number of the respondents in NHMS III will be matched with those in the mortality database and Cancer Registry. Subsequently, matched mortality and cancer cases will be assigned the ICD-10 (i.e. the 10th revision of the International Statistical Classification of Diseases and Related Health Problems) codes and validated by certified ICD-10 coders. The ICD-10 is a medical classification list by the World Health Organization (WHO). It contains codes for diseases, signs and symptoms, abnormal findings, complaints, social circumstances, and external causes of injury or diseases (WHO 2010).

3.4   SHS Exposure

Respondents will be classified as exposed to SHS if they answered "Yes" to the question "*Have you ever exposed to other people cigarette smoke at least 15 minutes during the last 7 days*"

3.5: Statistical Methods

Descriptive analyses will be employed to depict the socio-demographic profile, Subsequently, proportional hazard regression (for mortality) will be performed to elucidate the association of SHS exposure, SHS exposure intensity and year/s of SHS exposure with all-cause mortality),

after controlling for other potential confounder(s) such as locality, age, ethnicity, educational level, household monthly income, employment, marital status, non-communicable disease such as smoking, alcohol consumption, obesity, high blood pressure, high blood glucose, and high cholesterol.

4.0 Ethical Considerations

All identifier such as name and Identification number will be remove from the data set once the NHMS III and mortality are Merged. The data-set can only be accessed by research team members.

5.0 Expected Outcome

The findings generated from this study will provide empirical evidence that would be valuable for the Tobacco Control and Framework Convention on Tobacco Control Unit of the Ministry of Health in formulating policies on smoke-free initiatives in Malaysia by expanding more smoke free public areas, and promotion of tobacco products, and the Health Education Division , Ministry of Health, Malaysia, in integrating the findings for their smoking education and health promotion activities. In addition, the finding can be used as a platform for future studies on the similar topic.

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Declaration

No conflict of interest declared.

Authors contribution

Author 1: Literature review and written the final version of manuscript.
Author 2: contributed to the idea for the study, and revised the manuscript.
Author 3: Design the study and revised the manuscript.
Author 4: Literature review, and revised the manuscript.
Author 5: Study design, statistical analysis and revised the manuscript.

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