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EXPOSURE TO SECOND-HAND SMOKE (SHS) AND ATTITUDE, PERCEPTION, AND ACCEPTANCE TOWARDS SMOKE-FREE POLICY IN OPEN-AIR EATERIES IN PENINSULAR MALAYSIA - A PROTOCOL

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ABSTRACT

Background: Second-hand-smoke (SHS) contributed significantly to the health problem in Malaysia.,and it is significantly high in open air eateries. However, no study been carried out to determine the objective measurement of SHS exposure, and, Attitude, perception and acceptance among Malaysian adult on smoke free policy in Malaysia. Thus, the present study proposes to fill the gap of the related issue.

Materials and Methods: A cross-sectional study design will be used to measure nicotine vapour in selected open-air eateries and Survey of customers, workers and owners attitude, perception and their acceptance on smoke-Free policy in the open-air eatery premises. Nicotine vapour will be measured using NIOSH standard method 2551, whereas standard validated questionnaire will be used to measure attitude, perception and acceptance of premises owner, workers, and customers. Descriptive, Chi Square, independent T-Test and Multiple Linear regression will be used for data analysis using SPSS software.

Expected Outcome: The findings from the present study are important to provide information on SHS exposure as well as the perception and acceptance of the customers, workers and owners of open-air eateries towards smoke-free policy in open-air eateries. Such information is particularly helpful in providing objective evidence to stakeholders and/or policy-makers on the formulation of suitable policies to address the problem of exposure to second-hand smoke among Malaysian population in public places since public acceptance and attitude are important pre-requisite elements in securing and enforcing effective smoke-free laws

Keywords: Second-hand smoke, open-air eatery premises, attitude, perception, smoke-free policy

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1.0 Introduction

Second-hand smoke (SHS) was comprised of mainstream smoke (the smoke exhaled by the smoker) and side stream smoke (the smoke released from the burning end of a cigarette). It contains over 40 00 chemicals, of which more than 50 are carcinogens and toxic substances (IARC 2004; USDHHS 2006) Increased exposure to SHS is associated with greater risk of childhood morbid such as, asthma exacerbation, respiratory symptoms and decreased lung function (USDHHS 2006). Furthermore, causal effects of cancer and Cardiovascular Diseases (CVD) with SHS exposure among adults had also been reported and there is no safe level of exposure (Samet et al., 2009; Oono et al, 2011). Global Burden of Disease study in 2004 estimated 603,000 deaths and the loss of 10.9 million disability-adjusted life years (DALYs) were caused by diseases related to SHS exposure. In which, Ischemic heart disease, lower respiratory infections in children and asthma in adults were contributed to the largest number of estimated deaths attributable to SHS (Oberg et al 2011).

From the behavioral aspect, SHS exposure increased the likelihood of susceptibility to smoking and smoking initiation among adolescents (Veeranki et al., 2009; Okoli et al., 2016). A systematic review by Chen et al. on 15 studies found an inverse relationship between neurodevelopment and SHS exposure, which led to unsatisfactory academy achievement. Similarly, a local study conducted by Abidin et al(2014) among 370 school-going adolescents aged 13-14 years from 18 selected secondary schools in Kula Lumpur and Negeri Sembilan had also demonstrated the same findings.

Smoke-free policies are one of the most important and effective strategies used in tobacco control to combat the disease burden associated with tobacco use and SHS exposure (Levy et al., 2018). Smoke-free policies are related to direct improvements in air quality (Connolly et al 2009, Shamo et al., 2015)) , and reduction in smoking-related behaviour (Hawkins 2016) . There is also evidence that indoor smoking bans are supported by employees (Chang et al.,2009), and elicit satisfaction among customers (Lim et al., 2019; Rashid et al., 2014). In addition, some studies suggested that more restrictive smoke-free policies, including outdoor bans, would support employees in attempts to reduce or quit smoking. (Gorini et al. 2008). Other benefits include protection of non-smokers against SHS as well as reduction of smoking opportunities among smokers. Moreover, the smoke-free policy is expected to promote a cleaner environment, reduce fire hazards, and increase productivity among staff (Epku and Brown, 2015).

1.2: Problem Statement

The Ministry of Health, Malaysia have taken several initiatives such as health promotion activities and introduction of smoke-free areas in various public areas to reduce the SHS exposure, in which, the reduction of SHS had been stipulated as one of the target goals in the National anti-smoking strategic plan (MOH 2015). Various measures had been initiated and implemented to achieve the goal namely, the healthy lifestyle campaign since 1990 and gazettement of smoke-free areas which had been expanded through the provision and amendment of Control of Tobacco Product Regulation 2004 (Government of Malaysia 2005; the government of Malaysia 2017; Lim et al., 2019). Smoke-free city concept have also been introduced to prohibit smoking at particular public areas, in which Malacca smoke-free areas had been gazetted on 15 June 2011 was the first initiative by Malacca state government,

(MBAR) and Ministry of Health. Currently, 38 public areas had been gazetted as smoke-free areas (Lim et al., 2019).However, The Global Adult Tobacco Survey (GATS) 2011 (IPH 2012) revealed that the exposure to SHS was significantly high among Malaysian adult in open air restaurant (71%) and 84.9% in cafes/coffee shops/bistros, Smoke free Melaka city evaluation report reveal the MBAR has resulted in positive impact on perception, attitude and behavior of smoking on people who live or visiting the Melaka city, reduction of smoking in front of children and other non-smokers in public places and low level concentration of PM 2.5 in gazette indoor areas for smoking compared to concentration of PM 2.5 in public areas without such restriction (USM 2014) Therefore, the MOH intended to established more smoke free areas especially in non-air conditioned eateries restaurants which had been shown to have higher SHS exposure among Malaysian adults.

A concrete evidence-based will assist the implementation of such policies by convincing the related stake-holder and community. However, the objective measurement of SHS in open air food eateries has never been determined and previous SHS exposure was only a subjective examination based on interview which might be under or over-reported due to recall bias. In addition, public acceptance and attitude are important pre-requisite elements in securing and enforcing effective smoke-free laws [IARC, 2009]. It was especially true in democratic nations like Malaysian, where by public opinion, acceptance and support are necessary for the legislation of comprehensive smoke-free policies for successful enforcement and good compliance, even in controversial areas such as mamak stalls and open-air eateries (Chapman, 2007; Lim et al., 2019). Therefore, the present study is greatly warranted in order to provide an evidence-based findings to policy-makers and/or stakeholders for planning, formulation and implementation of smoke-free policy via the following objectives:

1.3: Significant of the study

The findings from the present study will provide the objective measurement information on SHS exposure as well as the perception and acceptance of the customers, workers and owners of open-air eateries towards smoke-free policy in open-air eateries. Such information is particularly helpful in providing objective evidence to stakeholders and/or policy-makers on the formulation of suitable policies to address the problem of exposure to second-hand smoke among Malaysian population in public places, since public acceptance and attitude are important pre-requisite elements in securing and enforcing effective smoke-free laws.

1.4 Research Questions

i) What is the concentration of atmospheric vapour nicotine at open air eateries?

ii)What is the attitude, perception and acceptance of open air eateries owner, workers and customers toward smoke free initiative in open air eateries.

2.0 Study Objectives

2.1 Objective of the Study

To determine SHS exposure through airborne marker in open-air eateries, and to exemplify attitude, perception and acceptance of smoke-free policy in open-air eateries among customers, workers and owners in selected states in Peninsular Malaysia.

2.2 Specific Objectives of the Study

i) To objectively measure the atmospheric marker (vapor nicotine concentration) at selected open-air eateries in Peninsular Malaysia.
ii) To determine the pattern of exposure to secondhand smoke among customers/customers, workers and owners of selected open-air eateries in Peninsular Malaysia.

iii) To determine attitude, acceptance and perception towards smoke-free policy in open-air eateries among customers, workers and owners of selected open-air eateries in Peninsular Malaysia.

3.0 Literature Review

3.1: Framework convention on Tobacco Control

The framework convention on tobacco control (FCTC) was the first global treaty initiated by the World Health Organization to address the health problem due to tobacco consumption. There are 39 articles in FCTC and Article 8 that encourage countries to "protect citizens from exposure to tobacco smoke in the workplaces, public transport and indoor public places. Globally, as of 2010, 174 nations had signed the FCTC and partially stimulated by it, 87 parties (50%) had implemented a policy to protect citizens from SHS exposure in indoor workplaces. 55 countries had comprehensive smoke-free laws, including 28 with laws that cover 100% of all bars, restaurants and non-hospitality workplaces (WHO 2003) Similarly, Malaysia which ratified the FCTC in 2005. , introduced the prohibition in selected public areas such as health care facilities, shopping center etc through the provision under The control of tobacco regulation 2004 (MOH 2005) .

3.2. Effects of smoke-free policy on Air Quality.

3.2.1. Hospitality venues

•Multitude studies in hospitality venues showed increased of indoor air quality after the implementation of the smoke-free policy, In the research on 20 hospitality venues in New York, the investigators reported of 84% reduction after the 2003 New York State law on smoke-free workplaces introduced. In addition (Travers et al., 2004) . Semple and colleague who studied the effect of smoke-free legislation on occupational exposure of bar workers to secondhand smoke. By collecting the salivary cotinine from 2371 workers from 72 bars

revealed in three Scottish cities (Aberdeen, Glasgow, and Edinburgh) and two rural regions (Borders and Aberdeenshire), Revealed that the salivary cotinine levels recorded for non-smokers fell from a geometric mean of 2.94 ng/ml prior to introduction of the legislation to 0.41 ng/ml at the 1-year follow-up and the duration of workplace exposure to secondhand smoke within the last 7 days fell from 28.5 to 0.83 hours. In addition, SHS exposure in 15 Ontario municipalities. Naiman et al. 2011 found that secondhand smoke exposure in public places decreased by 4.7%, and workplace exposure decreased by 2.3% following the introduction of public smoking bans.

3.2.2. Public places, industrial service sector, and office workplaces

Various studies conducted revealed that the exposure to SHS was reduced and indoor air quality improve significantly after the implementation of the smoke-free policy. In Montevideo, Uruguay, 100 indoor air samples were collected before and after the implementation of the smoke-free policy. The study found that median air nicotine concentration reduce from 0.75 µg / m3 (prior to introduction of smoke free policy) to 0.07 µg / m3 (after the implementation of smoke free policy (Blanco-Marquizo et al. 2010) . The similar finding was also reported in eight private working areas in Finland,in which the)investigator reported the medium nicotine concentrate in air reduce from 0.9 µg / m3 0.1 µg / m3 after the implementation of smoke free policy (Heloma and Jaakola 2004) . In addition, Yong et and colleague who conducted the in Ahmedabad, revealed that median nicotine concentration at the baseline (2008) (0.06 µg/m3 Interquartile range (IQR): 0.02-0.22) to that of follow-up (2010) (0.03 µg/m3 IQR: 0.00-0.13), reflects a significant decline (% decline = 39.7, P = 0.012) in exposure to second-hand smoke (SHS), and the most significant decrease occurred in hospitals, from 0.04 µg/m3 at baseline to concentrations under the limit of detection at follow-up (%decline = 100, $p < 0.001$).

3.3: Attitude, perception, and acceptance of the smoke-free policy.

The studies on attitude toward SFI's support level revealed that average support level was high (more than two-thirds of respondents usually support the SFI initiative, In which the support was high among non-smokers, higher education attainment, woman and living in the smoke-free environment (Lim et al., 2019). Wang et al in their study on attitude towards smoke-free public housing among US adult revealed that Favorability was 44.3% among current cigarette smokers, 73.2% among former smokers, and 80.4% among never smokers. Favorability was lower among adults with a high school education or less compared with those with a college degree, adults with annual household income <$15,000 than those with income ≥$60,000, The gap between smokers and nonsmokers of was also found among Minnesota parents in their support for smoke-free outdoor places such as parks, storefronts, parking lots" (Alesci et al., 2003) Systematically review studies of support and effectiveness of, university campuses' smoke-free policies of 18 from the United States and 1 from the United Kingdom. Reported 58.94% (95% confidence interval [CI] [52.35%, 65.53%]) of students (12 studies) and 68.39% (95% CI [65.12%, 71.67%]) of faculty (7 studies) supported smoke-free policies (Lupton and Townsend 2015).

3.4: Measurement of Specific Atmospheric Markers

There are two commonly method used to measure SHS in the air, mainly through measurement of PM 2.5 and airborne nicotine. Among the two methods, Airborne nicotine is the precise methods compared to PM2.5. However, the method incurs higher cost more complex technique, equipment, and skilled manpower to carry out the analysis. SHS component in the atmospheric can be measured using either active or passive sampling. Active sampling uses a pump to draw air into the sample collection device, usually, a filter or adsorbent tube, depending on the constituent of interest. Passive monitoring relies on diffusion to a collection surface. Both approaches allow investigators to measure an integrated time-weighted average (TWA) concentration over the sampling period. (Prignot 2011)

4.0 Methodology

4.1: Study Design and Study Locality

A cross sectional study design will be employed in the study.

The study consists of two components, namely:-
(a) Collection and analysis of environmental sample (Measurement of nicotine-phase vapor in open-air eatery premises)
(b) Survey of customers, workers and owners of the open-air eatery premises

4.2: Collection of Environmental Sample

4.2.1: Location and number of food premises required for measurement of nicotine-phase vapour

A two-stage cluster sample will be utilised to select the localities for the study. The first stage will be stratification of states in Malaysia into four zones, namely Northern zone (Perlis, Kedah, Penang and Perak), Eastern zone (Kelantan, Terengganu, Pahang), Southern Zone (Johor, Negeri Sembilan and Melaka) and Central Zone (Selangor, Wilayah Persekutuan Kuala Lumpur and Putrajaya). A simple random sampling will be utilised to select one state from each zone and the selected states are: 1) Perak (2) Negeri Sembilan (3) Kelantan and (4) Kuala Lumpur and Purtajaya.

The number of food premises required is calculated using the mean and standard deviation obtained from an Austria study in open air restaurants. (Moshammer et al.,2004)

$$n = \left(\frac{Z\sigma}{E}\right)^2$$

Confidence interval (95%) = 1.96
Standard deviation = 6.1
E =1.1
n = [1.96 x 6.1/1.1]2
n = [11.956/1.1]2

n = [10.869]2
= 118.1
= 119 food premises

Based on a design effect of of 2.3 , The number of required open air eateries is 273.7 (274).

We anticipated a non-response rate of 25%
= 274 x 1.25
= 342.5 premises
= 343 premises.

Therefore, the optimum number of open-air eateries is 343.

Subsequently, the number of open air food premises (categorized by type of premises) for each selected state will be determined via a proportionate-to-size method.

4.2.2: Open Air Food Premises

All selected food premises will be initially contacted via written letter outlining the proposed study and requesting co-operation on a voluntary basis. Premises where the manager/owner agreed to take part in the study will be visited by the research team members to discuss the study in further details. Consent will be obtained from the managers/owners to carry out the study in their premises.

4.2.2:1 Sampling Point (open air food premises).

Two active samplers will be installed at each selected open air food premises court for a consecutive 3 days, to ensure the optimum concentration of SHS will be captured. The NIOSH method 2551 will be adopted for the analysis of nicotine. Two field blank and lab blank will be prepared for quality assurance purposes. The sampling and sample preparation methods are as below:-

Sampling:

Nicotine in the ambient air will be sampled following standard methods NIOSH 2551 by trapping the aerosol on sorbent tubes specially designed for nicotine compound. A sampling pump will be connected to the sorbent tube where the pump will be used to draw air across the sampler tube. Each personal sampling pump will be calibrated with a representative sampler in line. Before sampling, the end of each sampling tube will be broken open prior to attaching the sampler to personal sampling pump with flexible tubing. Ambient air will be sampled at 1.0 L/min flow rate to obtain the recommended sample volume of 60 to 400 L. The sampled tubes will be capped with plastic (not rubber) caps immediately following sampling and secured for shipment. The nicotine content will be analysed using gas chromatography (GC) with a nitrogen/phosphorus detector (NPD), coupled to mass spectrometer (MS).

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4.3 Survey of customers/owners/workers in the selected open air eateries

4.3.1: Survey (For customer)

(a) Sample size of customers were determined using the formula:

Z α/2 =1.96 (95% CI)
σ =0.245 (standard deviation of perception of healthy lifestyle among Malaysian population 2002) (The Malaysian National Healthy Lifestyle study 2002).

E = 0.011
n = [1.96 x 0.245/0.0125]2
n = [0.4802/0.0.01]2
n = [48.02]2
= 2305.9
= 2306 respondents

4.3.2: Survey (For owners/workers)
(a) All owners and workers from the selected open air eateries will be invited to participate in the study

4.3.3: Measures

4.3.3.1: Instruments

A set of two questionnaires specific for each target population, (a) customers and (b) workers and owner of open air eateries premises will be developed. The validity and reliability of instrument will be established prior to use.

4.3.3.1.1: Validity

A set of questionnaires for data collection will be developed based on the literature review on attitude, perception, and acceptance of customers. Workers and open-air eateries. Several validity will be established.

a) Content validity

The questionnaire developed will be sent to several subject experts to determine the content of the tools, The content validity index (CVI) and the content validity ratio (CVR) will be measured based on the feedback of the reviewers.

b)Face validity

The tools will be distributed to 15 adults, there were asked to evaluate each item of the scale and to indicate if they felt difficulty or ambiguity of each item. The pretested questionnaire was analysis to determine the impact score (Frequency x level of important) for each item.

All items score more than 1.5 (which indicated it was appropriate will be included in the questionnaire)

c) Construct validity

A construct validity was carried out through a convenient sample. The sample size will be estimated based on the number of items in the scale multiplied by 10 with the additional of 15% to cater for non-completion of items in the questionnaire. Explanatory and confirmatory factor analysis er will be used to determine the construct validity for the instruments.

4.3.3.1.2: reliability of the instrument

The internal consistency will be used to establish the reliability of the instrument, Sample size required will be based power of 0.80 (Power = 1 – β), probability of type I error (α) was set at 0.05, the number of items in the questionnaire and Cronbach's alpha value at 0.7.

4.3.3. 2: Interview session

An intercept survey approach through face-to-face interview co-ordinated by a team of trained interviewers will be adopted. Every third person passing by the interview station will be approached to participate in the survey, if found to be eligible for the study purpose. If the selected person did not fulfill the criteria or refused to participate, the following person passing the station will be selected instead.

Inclusion Criteria:
1) Malaysia citizens
2) Adults aged 18 years and above
3) Able to understand Bahasa Malaysia or English

Exclusion Criteria
1) Foreigner
2) Do not understand Bahasa Malaysia or English.
3) Disabled person.

4.4: Other measurements

In addition to interview and vapour-phase nicotine measurement, the number of patrons present during the days of study, number of burning cigarettes and cigars, description of the interior of the venue, ambient temperature and relative humidity will be acquired. Total patrons in the venue and total number of cigarettes/cigars smoked will be counted during the visit (using the checklist which will be developed).

4.5: Data management and analysis

Data will be cleaned prior to analysis. Descriptive statistic will be performed to describe the characteristic of the respondents and atmospheric biomarker, Chi square analysis will be performed to determine the association between proportion of smoking, SHS exposure socio demographic variables whilst Independent T test will be employed to determine the difference

of mean score of perception towards smoke-free initiative between socio demographic and smoking status.

All analysis will be performed using SPSS statistical software version 16.0.

4.6: Ethical Considerations

The ethical approval will be obtained from The Medical Research and Ethics Committee, Ministry of Health Malaysia and written inform consent will obtained from the selected respondents, No personal information of studied patients will be disclosed and can be identified in any part of the study.All patients will be informed that participation in this study is voluntary, anonymous and confidential,

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Declaration

No conflict of interest is 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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