Reliability and Construct Validity of Knowledge, Attitude, and Practice of Medical Doctors on Smoking Cessation Guidelines.

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ABSTRACT

Introduction: Islam forbids any forms of tobacco smoking. Prevalence of active smokers in Malaysia is increasing despite availability of stop-smoking clinics. Thus, the practice of healthcare professionals involved in providing smoking cessation intervention needs to be assessed using validated assessment tool. *Objective:* This study aimed to develop and validate a questionnaire that assesses the knowledge, attitude, and practice of medical doctors based on the national smoking cessation guideline. In addition, we aimed to evaluate factors that contribute to the score. *Methods*: The 26 items consists of mixture of true/false choice questions and Likert scaling response based on domain of 5A's (ask, assess, advice, assist, arrange) and 5R's (relevant, risks, rewards, roadblocks, repetitions) of the national stop-smoking guideline. The questionnaire was distributed to 141 medical doctors. Reliability was determined using Cronbach's alpha for internal consistency while construct validity was assessed using factor analysis. *Results*: A high degree of internal consistency was observed for this 26 items (Cronbach's alpha= 0.824) and for practice subscale (Cronbach's alpha 0.83). Subsequently, three items were removed due to poor inter item correlation. Factor analysis extracted seven meaningful components from this remaining 23 items, in which three components with least items were deleted due to overlapping subscale with other components, leaving four meaningful components which consist of (1) practice of ask, advice and assess components and practice of 5R's (total of 10 items); (2) practice of assist components for those willing to quit (two items); (3) knowledge (two items) and (4) attitude (three items).These final 17 items still demonstrate high internal consistency with Cronbach's alpha of 0.832. *Conclusion:* This study indicates that this questionnaire is a reliable and valid tool to assess the knowledge, attitude, and practice of healthcare professionals on stop smoking guidelines.

KEYWORDS: smoking, tobacco, reliability and validity, questionnaire

INTRODUCTION

Prevalence of smoking is increasing in trend globally, especially among adolescents. This leads to the recent World Health Organization (WHO) action to enforce ban on tobacco advertisement, promotion and sponsorship.[1,2] Tobacco smoking is generally five times higher among men than women; however the gender gap declines in younger age.[3-5] Number of smokers and number of cigarettes smoked worldwide has increased tremendously.[3] This trend is comparable in Malaysia where the prevalence of current smoker is increasing in trend from 21.5% in 2006 to 24.7 % in 2011, despite reducing trend initially from 1996 to 2006.[6,7]

Cigarette smoking is one of the modifiable risk factors for chronic illnesses and mortality.[8-10]

Smoking reduces the quality of life and increases the risk of developing non-communicable diseases including chronic obstructive pulmonary disease.[9-11] Smoking also increases the risk to develop cancer of the lung, oropharynx, larynx and pancreas.[9-11] Furthermore, pregnant mothers who are active smokers have higher chance to deliver low birth weight infant compared to non smokers.[12] Moreover, tobacco use increases the economic and financial burden of the public and its country.[8,9] It causes more than half a trillion dollars of economic damage per year worldwide.[1-2,4]

Stop-smoking cessation practice guidelines universally incorporate the 5A's and 5R's components.[9, 13] These components are important in initiating stop smoking among smokers and maintaining their abstinence. It can be delivered not only by physician or medical officer, but by any medical personnel who have already acquired the knowledge formally by attending training programs. It is useful in daily busy outpatient clinic setting.[9,10,13] The 5A's components consist of 'ask', 'advice', 'assess', 'assist' and 'arrange' components.[9,1

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In the 'ask' component, medical practitioner will take the opportunity to ask all his or her patients' smoking status during their visit to the clinic, especially during their first visit. In the 'advice' component, medical practitioner will firmly advise his or her patients who are active smokers to start quitting from smoking. 'Assess' refers to identifying patients' decision and willingness to stop smoking. For those who are willing to quit, medical practitioners will proceed to the 'assist' component i.e. to provide quitting plans and materials including nicotine replacement therapy, if indicated. In the 'arrange' component, medical personnel will provide further follow up at the stop smoking clinic session to review their progress and continuity of the quit smoking care.[9,13]

The 5R's components consist of 'relevant', 'risks', 'rewards','roadblocks'and'repetitions'components.[9,13] In the 'relevant' component, medical practitioner will encourage smokers to identify why quitting is personally relevant or good for them. In the 'risks' component,medical practitioner will encourage smokers to identify negative risks or bad consequences if they continue smoking. 'Reward' component will be used to encourage smokers to identify potential rewards or benefits if they stop smoking. 'Roadblocks' is used to help smokers identify barriers or limitations for them in successfully stop smoking. Lastly, in the 'repetition' component, medical practitioner will keep on repeatedly motivate unmotivated patients to stop smoking during each clinic visit.[9,13]

Primary care doctors are well known for their multitasking job scopes, having to deal with large variety of medical cases. In comparison to other clinical fields, they have the highest chance of contact with all levels of community, ranging from newborn baby to geriatric patients. They are also among the front liners to screen walk-in patients and refer them to tertiary centres in our country's health system. Thus, they are the most suitable personnel to counsel patients about stop smoking compared to the other specialties.[10]

Among significant factors that contributes to awareness and practices of smoking cessation among medical personnel include age, gender, profession, practice location, smoking status and history of attending formal stop smoking training.[4,14] Nevertheless, having attended a smoking cessation-training program is the significant predictor of a good practice score compared to other factors.[15,16] Indeed, formal training is the best way to overcome barriers in providing stop smoking advice.[17-19]

In Malaysia, for the past 40 years, studies that had been done so far were only limited to the smoking behaviour, attitude and opinions towards smoking habit and competency of giving stop smoking advice, rather than on the awareness and practices of both 5A's and 5R's framework itself.[20-22] These studies were also mainly conducted among medical students.[23,24] Previous studies on the practice of smoking cessation counselling were limited to dentists and nurses, none in medical doctors.[25,26]

The common tool that had been done in previous studies worldwide on assessment of knowledge, attitude and practice on stop smoking measure is mainly self administered questionnaire conducted in a cross sectional study design.[27-29] Despite lack of validated questionnaire in our country, H. Ibrahim and colleague in 2008 had conducted a study on attitudes and practices among dentists in Kelantan using a self administered questionnaire.[25] It covered background data of the respondents, their attitude on smoking cessation, 5A's practices in smoking cessation and their barriers in poor smoking cessation practices.[26] However, the questionnaire did not assess the knowledge components of the universal smoking cessation guideline. Moreover, the 5Rs components are left behind. The socioeconomic components were inadequate in which it did not include smoking status and background training of the respondents. Moreover, the questionnaire was not validated.

Similar study had been conducted in our country by Rathna and colleagues in 2012 utilizing a self administered questionnaire that had been developed and validated by two Dental Public Health specialists and pre-tested on a sample of 10 dental lecturers from the University of Malaya.[26] However, the questionnaire did not assess the knowledge of the dentists on 5A's and 5R's components in stop smoking measures and did not include the 5R's practices. Worldwide, previous questionnaires lack scoring system in terms of assessing the cumulative points for whole domains combining the knowledge, attitude and practices (KAP) of the stop smoking guidelines.[27]Further limitation is that the studies reported the result in term of frequency rather than conclusive value of high or low KAP except in the study done by Hebatallah in 2013.[30]

Even though these 5A's and 5R's components are simple and useful in stop smoking practices, lack of its awareness and implementation is the major culprit that contribute to increasing numbers of unmotivated smokers to stop smoking. Valid questionnaire or tool should be made available in our country, in order to perform the assessment. Hence, this study is aimed to validate the newly created questionnaire that assessed the knowledge, attitude and practice of primary care doctors on the 5A's and 5R's components of stop smoking guidelines.

METHODOLOGY
Questionnaire Development:

In developing the questionnaire, literature review and discussion with smoking cessation experts and family medicine specialists had been done to identify the main domains of the questionnaire. Five main domains were identified which include knowledge, attitude, practice, 5As and 5Rs of smoking cessation guideline frameworks. Overall,

the last three components are among the most important components identified.

The 26 items were later constructed, and this consists of a mixture of:

true / false choice statements;
strongly agree / agree / don't know / disagree / and strongly disagree questions;
always / frequent / seldom / never response

All these items were created based on the domain of 5A's (ask, assess, advice, assist, arrange) and 5R's (relevant, risks, rewards, roadblocks, repetitions) of the national stop smoking guideline.[9,13] This questionnaire uses English language as medium as it is a widely used language among doctors in Malaysia. Since our target population is medical doctors, Malay translation is not required. Demographic data were identified based on literature review and discussion with experts. Identified associated factors includes demographic data of the medical doctors: age, gender, ethnicity, religion, undergraduate training, status of the profession, number of years of practice, smoking status, number of smokers seen per week and history of attending smoking cessation program. While demographic data of the clinic includes the clinic location and presence of specialist in the clinic.[4,14-19]

Refer to Figure 1 for the conceptual framework of the questionnaires and Table 1 for data dictionary.

Expert Evaluation & Face Validation of The Items:

The questionnaire and statements were reviewed by a group of expert, consists of smoking cessation experts, experienced questionnaire creators, statisticians and family medicine specialists. After correction, face validation was later carried out among eight primary care doctors. The primary care doctors were given ample time to go through the items individually and they were encouraged to express freely their doubts and thoughts on the items.

Validation Study:

The 26 items questionnaire (refer appendix) was completed by 141 government primary care doctors in the district of Kuantan, Pekan and Kemaman. These medical doctors volunteered to enrol in this study and informed consent was taken. Proper instructions were given to person in charge at each clinic before administrating the scale. Participants were asked to respond to all statements and no time limit was imposed. The study was informed formally to the District Health Office of each district and permission was obtained from the family medicine specialist and in charge doctors of each clinic. The study has been approved by IIUM Research Ethics Committee (IREC) and Medical Research and Ethics Committee (MREC).

Study Period and Design

It took almost seven months to develop the questionnaire, starting from literature review to final editing after experts review. The questionnaire were later distributed to the above districts starting from September 2015 (started in Kuantan) and completed in March 2016 (completed in Kemaman). A cross sectional study was chosen since it is the best method for this validation study.

Selection of Clinics and Respondents

The required number for validating the created questionnaire is about five persons per question.[31-34] As this newly created questionnaire consists of 26 questions, the required sample size is about 26x5 = 130. In this validation study, we manage to get 141 respondents. Universal sampling is used in view of big sample size requirement. Sampling was done in the three districts which include Kuantan, Pekan and Kemaman in view of small number of government primary care doctors in each district (around 20 to 60 in each district). Health clinic in this study is defined as community health clinic in the respective district, including Klinik 1 Malaysia run by medical doctors. All medical officers, family medicine registrars and family medicine specialists who work in the government health clinics are included in this study.

Statistical Analysis – Reliability and Construct Validity

Data was analyzed using SPSS version 15.0. Reliability analysis was done using the Cronbach's alpha coefficient to determine the internal consistency of the items. Items with 'Cronbach's alpha value if item-deleted' could determine which statement highly contributed to the alpha value. If the 'Cronbach's alpha value for those items-deleted' decreased, it indicated that the items highly contributed to alpha value. In contrast, if the 'Cronbach's alpha value for those items-deleted' increased, it indicated that the items poorly contributed to the Cronbach's alpha value. The items of this questionnaire were considered to represent a measure of high internal consistency if the Cronbach's alpha value was more than 0.7. Items with low Corrected Item-Total Correlation will be removed.[31]

Construct validity was done to measure the factor analysis and identify the similar components represent by the items. The best items represent each components were identified. The Kaiser-Meyer-Olkin value of more than 0.7 and significant value of the Bartlett's test of sphericity (p value < 0.001) is needed in providing significant components in the factor analysis.[32]

Refer to figure 2 for overview of the overall process of this validation study.

RESULTS

A total of 141 (92.8%) out of 152 government primary care doctors responded. One hundred and three (73%) were female, 127 (90.1%) were Malay and Muslim, 135 (95.7%) were non-smokers, and 15.6% were of the age of 29. Most had worked for at least 3 years (96.5%), 124 (87.9%) were medical officers and 73 (51.8%) graduated from local government universities.

Reliability Analysis

The Cronbach's alpha value of the 26 items was 0.824, in which if divided into its subscales, gave the value of 0.615 for knowledge, 0.601 for attitude and 0.826 for practice. Table 1, table 2 and table 3 showed the corrected item-total correction for each subscale, shown most of more than 0.3. Those with poor score need to be deleted which include Q1 in Knowledge subscale, giving Cronbach's alpha value of new Knowledge subscale of 0.800 after deletion, and Q16 andQ25 in Practice subscale, giving Cronbach's alpha value of Practice subscale of 0.821 after deletion.(Refer to table 2 and table 3 for the reliability analysis of Knowledge, Attitude and Practice components).

Reliability Analysis for Each Subscale (After Deleting Items Q1, Q16 And Q25):

The latest Cronbach alpha value for knowledge subscale was 0.800, for attitude subscale was 0.601 while for practice subscale was 0.821.

Construct Validity

Factor analysis of the remaining 23 items showed high value of Kaiser-Meyer-Olkin measure of sampling adequacy (0.765) and significant Bartlett's Test of Sphericity (< 0.001), which give rise to seven components. The first component consists of practice of 'ask, advice and assess' during the initial visit, and practice of 5Rs (Risk, Relevance, Reward, Repetition, Roadblocks). The second component consists of practice of assist and arrange for those willing to quit. The third component consists of assess and assist part of practice domain. The fourth component consists of knowledge domain, the fifth consists of reward and roadblock item of practice domain. The sixth component consists of attitude domain and finally, the seventh consists of ask item. In view of overlapping, components with least similar item were deleted which include the third, fifth and seventh component as they were already be represented in the other components (practice domain). (Refer to table 4 for components extracted from principal component analysis.)

Final Items Questionnaire Analysis:

The final item for questionnaire consist of 17 items questionnaire with the following remaining four components based on factor analysis, which includes:

1.practice ask, advice, assess (four items) and practice 5R's (six items),
2.practice of assist and arrange for those willing to quit (two items),
3.knowledge (two items) and
4.attitude (three items).

The final 17 items still demonstrate high internal consistency with Cronbach's alpha of 0.832.

1.Each component had acceptable and high internal consistency, hence is therefore reliable:
2.practice ask, advice, assess and practice 5R's (Cronbach's alpha 0.846)
3.practice assist and arrange (Cronbach's alpha 0.749)
4.knowledge (Cronbach's alpha 0.800)
5.attitude (Cronbach's alpha 0.601)

17 Final Items Questionnaire:

1.'Assess' is the first component under 5A's of stop smoking clinical practice guidelines.

☐ True   ☐ False

2.'Assign' is one of the components under 5A's of stop smoking clinical practices.

☐ True   ☐ False

3. I feel that my effort in helping smokers to quit is not well rewarded.

☐ Strongly agree   ☐ Agree
☐ Don't know   ☐ Disagree
☐ Strongly disagree

4. Clinical practice guidelines are not relevant in improving patient smoking cessation.

☐ Strongly agree   ☐ Agree
☐ Don't know   ☐ Disagree
☐ Strongly disagree

5. Repetition in giving advice on quit smoking to patients is beneficial.

☐ Strongly agree   ☐ Agree
☐ Don't know   ☐ Disagree
☐ Strongly disagree

6. I will check when is the last time that my patient smoked.

☐ Always   ☐ Frequent
☐ Seldom   ☐ Never

7. I advise the smokers to quit.

☐ Always   ☐ Frequent
☐ Seldom   ☐ Never

8. I advise the smokers to reduce amount of ciga-
   rettes per day.

   ☐ Always   ☐ Frequent
   ☐ Seldom   ☐ Never

9. I inquire the smoker's willingness to quit.

   ☐ Always   ☐ Frequent
   ☐ Seldom   ☐ Never

10. I provide the smokers with practical counseling.

   ☐ Always   ☐ Frequent
   ☐ Seldom   ☐ Never

11. I give further follow-ups for smokers quitting.

   ☐ Always   ☐ Frequent
   ☐ Seldom   ☐ Never

12. I encourage the smokers to indicate why quitting
is personally important.

   ☐ Always   ☐ Frequent
   ☐ Seldom   ☐ Never

13. I ask the smokers to identify any potential harm
   to self from smoking.

   ☐ Always   ☐ Frequent
   ☐ Seldom   ☐ Never

14. I ask the smokers to identify negative conse-
   quences of continuing smoking.

   ☐ Always   ☐ Frequent
   ☐ Seldom   ☐ Never

15. I ask the smokers to identify advantages of quit
   smoking to their family.

   ☐ Always   ☐ Frequent
   ☐ Seldom   ☐ Never

16. ask smokers why quitting is impossible.

   ☐ Always   ☐ Frequent
   ☐ Seldom   ☐ Never

17. I continuously inform the smoker's benefits of
   quit smoking.

   ☐ Always   ☐ Frequent
   ☐ Seldom   ☐ Never

DISCUSSION

Self administered questionnaire is one of the tools to measure knowledge, attitude and practice of professionals regarding job scope and expectations.[35] Prevalence of smokers is increasing in Malaysia, with the latest prevalence of 22.8% (5 million) among those aged 15 years and above in 2015. Sadly, there is also significant increment in the prevalence of smokeless tobacco from 0.7% in 2011 to 10.9% in 2015.[36]Therefore, correct advices and education to the public regarding correct quit smoking methods should be emphasized. This roles of quit smoking practices given by the medical professionals should be assessed in order to identify possible causes of such worrying phenomena in our country.

The purpose of the present study is to determine the reliability and construct validity of the newly develop questionnaires on knowledge, attitude and practice of medical personnel on smoking cessation guidelines. Reliability is defined as consistency or reproducibility of measurement over time or occasions, whereas validity is defined as to what extent the measurement measures what it should measure.[33] Cronbach's alpha value is commonly used by researchers to determine the internal consistency of an instrument, while factor analysis is one of the methods used to evaluate the construct validity. No other similar study had been done before in terms of smoking cessation guidelines.

This questionnaire is developed based on five main domains which include knowledge,attitude, practice of the 5A's and 5R's smoking cessation domain. It was constructed via literature review and input from the smoking cessation experts and family medicine specialists. As the 5A's and 5R's components relates more with practice of medical practitioners, practice items therefore made major contribution in this questionnaire, in order to include all the 10 components of the 5A's and 5R's smoking cessation practices.[9,13]

The population in this study represents almost similar backgrounds of primary care doctors as in the other districts, mainly of female medical doctors of middle age group with at least three years of working experiences. The uniqueness of this study is that it involves districts from two cities i.e.Pahang and Terengganu encompassing those in urban and non urban regions.

The initial item of this questionnaire consists of 26 items with high Cronbach's alpha value of 0.84 for reliability analysis.Three items (one from knowledge domain and two from practice domain) with corrected-item total correlation value of less than 0.29 were removed from the questionnaire as shown in table 1 and 3 due to the lower correlation score. Factor analysis of the remaining 23 items showed high value of Kaiser-Meyer-Olkin measure of sampling adequacy (0.765) and significant Bartlett's Test of Sphericity (< 0.001). Seven components were extracted from factor analyses which later end up with four final components.

The first component consists of practice of 3As (ask, advice and assess)(four items); andpractice of 5Rs(Risk,Relevance,Reward,Repetition,Roadblocks) (six items). These 10 items in this first component

are actually the backbone of 5A's and 5R's items that need to be practiced by medical personnel in counselling smokers in their daily practice. Ask, advice and assess items (3As) should be included in the initial encounter with smokers at the clinic. This later should be followed by practicing the 5R's items on those who are not ready to quit after assessing their willingness to quit (assess item). These five items need to be emphasized by medical personnel during subsequent visits to the health facilities until the smokers are finally ready to quit.[9,13]

The second component consists of practice of assist and arrange for those who are willing to quit. These last two items of the 5A's component need to be practiced by medical personnel when encountering smokers who are willing to quit.[9,13] It is a continuation step after practicing 3As in which patient will be given either non-pharmacological therapy or combination with pharmacological therapy. The third and fourth components basically represent the domain of knowledge and attitude towards the smoking cessation guidelines. The items are less compared to the practice component as the main domain is contributed by practicing 5As and 5Rs framework as stated in guidelines.[9,13]

Removals of the other minor components are made in view of the small number of items which overlapped with the practice component that are already represented by the first and second components (Practice 3As, practice 5Rs and Practice Final 2As). There is no point of assessing the same components repeatedly. Removal of these minor components does not disrupt the main domains of the smoking cessation frameworks.[9,13]

Findings from reliability analysis of the final 17 items questionnaire (consists of four significant components) demonstrate high overall Cronbach's alpha value of 0.832. Each of the four components of this 17 items also demonstrate acceptable Cronbach's alpha, in which three components show Cronbach's alpha of more than 0.7 as follow: (1) Backbone Practice components (Items 6-9, Items 11-17) 0.846), (2) Knowledge component (Item 1-2) (0.800), (3) Attitude component (Item 3-5) (0.601) and lastly Practice of assist and arrange component (Items 10-11)(0.749). These findings were evidence to support and suggest that the 17 items questionnaire of knowledge, attitude and practice of medical personnel on smoking cessation guidelines is a reliable instrument that can be used in the future.

CONCLUSION AND RECOMMENDATIONS

This study showed that this newly developed 17 items questionnaire is a valid and reliable tool to assess knowledge, attitude and practice of medical personnel in smoking cessation guidelines. It can be used in future studies for medical officers in the primary or tertiary centre.It can also be used to assess other support medical staffs such as paramedics and pharmacists who have been trained in stop-smoking training programme.

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