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Knowledge and Perception on Lung Cancer and Its Screening: A Study among Undergraduate Students of the International Islamic University Malaysia, Kuantan Campus

Abstract— Lung cancer is the second most common contributor to overall cancer-associated death in Malaysia after breast cancer. Many cases of late diagnosis are due to patient's failure in recognizing the signs and symptoms of this disease. **Objective:** The aim of this research was to evaluate the knowledge on lung cancer and perception on its screening among IIUM Kuantan students. **Method:** This was a cross-sectional study whereby convenient sampling was used as the sampling method strategy. A total of 186 students participated, whereby majority was female students, single, and aged between 21 to 29 years old. Knowledge and perception scores were analyzed using descriptive statistics by denoting it in terms of frequency and percentages. Independent *t*-test, as well as one-way ANOVA, Mann-Whitney and Pearson correlation tests was used to find the association of gender, faculty, marital status, age and year of study (respectively) with knowledge and perception of students. Association between knowledge of lung cancer with perception of its screening was also evaluated using Pearson correlation test. **Results:** Most of IIUM Kuantan students portrayed good level of knowledge and perception. Socio-demographic factors that were significantly associated with students' knowledge were age ($p=0.001$), year of study ($p<0.001$) and faculty ($p<0.001$). Whereas, only faculty was significantly associated with students' perception ($p=0.008$). Besides, students' level of knowledge was significantly associated with their perception ($p<0.001$, $r=0.326$). **Conclusion:** Overall, the general knowledge of students regarding lung cancer and their perception towards lung cancer screening was good. Students with greater knowledge expressed better perception towards lung cancer screening.

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1 INTRODUCTION

Lung cancer is the second most common contributor to overall cancer-associated death in Malaysia after breast cancer [1]. Smoking is the major contributing factor to lung cancer and smokers are mostly males. Hence, males are at higher risk of getting lung cancer. About 92% of male lung cancer patients in Malaysia smoke or had smoking history [2]. As much as 75% of lung cancer cases in Malaysia are diagnosed at late stages, whereas 12% of cases are diagnosed early and can be cured with surgical resection. Besides poor awareness of the nature of this disease, many cases of late diagnoses are due to the failure of patients recognizing the symptoms.

In a recent study by the National Lung Screening Trial (NLST), annual low-dose computed tomography (LD CT) yielded in a 20% decrease in lung cancer associated mortality in high risk individuals who are smokers [3].

Effective screening methods for lung cancer are available. However, it is crucial to educate the community on the possible barriers related to its implementation and evaluate people's beliefs and perception in the population [4]. This is important as the information could aid in improving the screening rates in high risk individuals and degrade disbeliefs towards screening.

There are studies that measured the knowledge on lung cancer among university students [5] and secondary school male teachers in Kudat, Sabah [6] in Malaysia. These studies aimed to fill in the gap in previous studies by assessing not only knowledge on lung cancer, but also to evaluate students' perception regarding lung cancer screening. Hence, we aimed to evaluate the knowledge of International Islamic University Malaysia, Kuantan Campus (IIUM Kuantan) students on lung cancer and their

perception on lung cancer screening. The specific objectives are to assess the level of knowledge of IIUM Kuantan students regarding lung cancer and their perception score on lung cancer screening, to determine the factors associated the students' knowledge regarding lung cancer and their perception on its screening, and to examine the relationship between the knowledge regarding lung cancer and perception on lung cancer screening.

2 METHODOLOGY

2.1 Study Area, Population and Study Design

The present cross-sectional study was designed whereby IIUM Kuantan campus was the target study area and the target group of this survey was the undergraduate students of IIUM Kuantan campus. The campus comprised of six faculties, which are the Faculty of Dentistry (FOD), Faculty of Science (FOS), Faculty of Pharmacy (FOP), Faculty of Allied Health Sciences (FAHS), and Faculty of Medicine (FOM) and also Faculty of Nursing (FON).

2.2 Sample Size and Sampling Method Strategy

Sample size calculation was performed using single proportion formula and thus the number of respondents estimated for this study was 165. Convenience sampling was used to carry out this study. The inclusion criteria were all undergraduate male and female students of IIUM Kuantan and the exclusion criteria were postgraduate students and staffs of IIUM Kuantan. All the respondents were studying in healthcare related faculties except respondents from Faculty of Science (FOS). Since most of the undergraduate students of IIUM Kuantan are engaged in healthcare related studies, they were assumed to have adequate exposure to the seriousness of this disease and express positive perception towards lung cancer screening. Thus, recruiting this group of subjects could provide information regarding their actual level of knowledge and perception, and whether their discipline of study affects their level of knowledge and perception.

2.3 Data Collection

Data was collected from IIUM Kuantan students using close-ended questionnaires. Informed consent form was attached together with the questionnaire and participants were asked for their informed consent before answering the questions. Validity process such as content

validity and a pilot study were done before distribution of the questionnaire to the study participants. The questionnaire was distributed to students at their respective faculty via a representative and collected once the questions were completely answered by all the respondents who voluntarily took part in the survey.

The questionnaire consisted of three sections. In the first section, students were asked about the socio-demographic characteristics which are gender, age, faculty, number of year of study and marital status. The second part of the questionnaire was about students' knowledge on lung cancer whereby they were asked general questions about lung cancer. The variables included in the questions were basically adapted from a previous study by Al-Naggar (2012) [5]. The third section of the questionnaire was to assess students' perception on lung cancer screening whereby they were asked regarding awareness and intention for future screening. Some of the questions in this part was adapted from a study by Flynn, Peters and Morgan (2013) entitled "Attitudes towards Lung Cancer Screening in an Australian High-Risk Population" [7] and also from a study by Cataldo (2016) entitled "High-risk older smokers' perceptions, attitudes, and beliefs about lung cancer screening" [8].

2.4 Ethics Consideration

The approval of study protocol was obtained from the Kulliyah (Faculty) of Allied Health Sciences Postgraduate and Research Committee (KPGRC) and from the IIUM Research Ethics Committee (IREC 2017-009).

2.5 Statistical Analysis

Data collected from the questionnaires were compiled and analyzed using Statistical Package for Social Sciences (SPSS) version 12.0. Level of knowledge and perception of IIUM Kuantan students were evaluated using descriptive statistics and reported in terms of frequency and percentage. Tests such as independent *t*-test, one-way ANOVA, Mann-Whitney and Pearson correlation tests were used to find the association of gender, faculty, marital status as well as age and year of study (respectively) with knowledge and perception of students. The significant association between score of knowledge regarding lung cancer and perception on lung cancer screening was analyzed using Pearson correlation test.

3 RESULTS

3.1 Socio-Demographic Data of Respondents

The majority of the respondents were females (61.8%) and single (96.2%), with age ranging from 21 to 29 years old.

3.2 Respondents' Knowledge on Lung Cancer and Their Perception on Lung Cancer Screening

Based on Table I, majority of the students (94 or 50.5%) had good knowledge regarding lung cancer and most of them (146 or 78.5%) had good perception towards lung cancer screening.

Table I. Categories of Knowledge Scores About Lung Cancer, (N= 186)

Category	Frequency	Percentage (%)
Knowledge		
Poor (1%-33%)	6	3.2
Moderate (34%-66%)	86	46.2
Good (67%-100%)	94	50.5
Perception		
Poor (1%-33%)	0	0
Moderate (34%-66%)	40	21.5
Good (67%-100%)	146	78.5

3.3 Association of Demographic Factors with Knowledge on Lung Cancer and Perception on Lung Cancer Screening

3.3.1 Association of Gender with Students' Knowledge and Perception

There was no significant difference in terms of knowledge about lung cancer and perception on its screening between male and female students of IUM Kuantan.

3.3.2 Association of Age and Year of Study with Students' Knowledge and Perception

There was a linear correlation between knowledge about lung cancer with age and year of study with the p-value, 0.001 and <0.001 respectively. There was a fair correlation between year of study and knowledge of lung cancer with an r-value of 0.256, which indicated that as the year of study increased, students' knowledge might also increase.

3.3.3 Association of Faculty with Knowledge and Perception

There was a significant difference (p<0.001) in terms of knowledge between at least one pair of

faculty (Table II). In order to identify the significant pair, multiple comparison (post-hoc) test using Bonferroni was performed. Five pairs of faculty showed significant differences; FOM-FOP, FOM-FOS, FOD-FOS, FOP-FON and FON-FOS with p-values of 0.006, <0.001, 0.032, 0.002 and <0.001, respectively. As for the association of faculty with perception, the p-value obtained from the test is 0.008 (Table III), thus, the result was significant. In addition, FON-FOS showed significant difference, with p-value of 0.009.

Table II. Comparing Respondents' Knowledge Scores About Lung Cancer Between Different Faculties Using One Way ANOVA, (N=186)

Faculty	N	Knowledge score mean (SD)	F-statistics (df)	p-value
FOM ^a	31	73.06 (11.081)	7.367 (5, 180)	<0.001
FOD ^b	31	68.23 (14.694)		
FOP ^c	31	59.84 (16.607)		
FAHS ^d	31	63.39 (17.146)		
FON ^e	31	74.03 (10.281)		
FOS ^f	31	56.77 (15.628)		

a= Faculty of Medicine
 b= Faculty of Dentistry
 c= Faculty of Pharmacy
 d= Faculty of Allied Health Science
 e= Faculty of Nursing
 f = Faculty of Science

Table III. Comparing Respondents' Perception on Lung Cancer Screening Between Different Faculties Using One Way ANOVA, (N=186)

Faculty	N	Knowledge score mean (SD)	F-statistics (df)	p-value
FOM ^a	31	76.87(9.694)	3.240 (5, 180)	0.008
FOD ^b	31	75.58 (12.309)		
FOP ^c	31	77.42 (9.535)		
FAHS ^d	31	72.65 (10.926)		
FON ^e	31	79.16 (11.903)		
FOS ^f	31	68.71 (15.179)		

3.3.4 Association of Marital Status with Knowledge and Perception

There was no significant difference in terms of knowledge on lung cancer as well as perception on its screening between single and married respondents.

3.4 Association between Knowledge on Lung Cancer and Perception on Its Screening

There was a fair correlation between the knowledge and perception among respondents with an r-value of 0.326. Thus, as knowledge on lung cancer increased, respondents' perception on lung cancer screening became better.

4 DISCUSSION

4.1 Knowledge Regarding Lung Cancer

In this study, majority of the participants had good knowledge regarding lung cancer (50.5%). According to participants' responses in the questionnaire, it was found that most of the students know that not only males are affected by lung cancer (92.5%) and it was not transmitted from person to person (86%) which proved that their knowledge was correct. Both genders may be exposed to and can experience its risk factors which include passive smoking, genetic changes, heredity and environmental factors. Lung cancer is not a transmittable disease because generally, cancer develops upon uncontrolled cell proliferation following DNA mutation caused by several bodily mechanisms and pathogenesis in respond to any particular risk factors. Most of them also knew that lung cancer is the leading cause of death in Malaysia. Lung cancer is also accountable for the eighth most frequent cause of death among all other diseases [2]. Only 43.5% of IIUM Kuantan students knew that exercise or physical activities may reduce the risk of getting lung cancer. Exercise, as a matter of fact, has a positive impact on cancer patients. It enhances fitness of body, improves life quality and self-esteem and therefore, could give benefits in terms of cancer survival [9]. Unfortunately, not many students were aware of this fact. This might be due to the limited studies on the link between exercise and prolonged survival of cancer patients [9], or simply due to limited public education program on this matter. This is contrary to the study by Al-Naggar, whereby majority (83%) of the university students knew that exercise could reduce the risk factors of lung cancer [5].

Most of IIUM Kuantan students answered correctly for common lung cancer risk factors such as smoking (96.8%), air pollution (87.6%), occupational exposure (85.2%) and passive smoking (88.2%), which indicated that their knowledge on lung cancer risk factors was good. This was similar with the study by Al-Naggar who also reported that students' knowledge on the

before-mentioned risk factors was good [5]. A study by Kofahi and Haddad also reported that most of their university students (90%) were aware that air pollution is one of the risk factor [10]. Moreover, another study among medical students in Kathmandu reported that majority of the participants expressed good knowledge on the risk factors and all the participants knew that smoking is the major risk factor of lung cancer [11]. A study among the general population of Middle-Belt, Nigeria found that risk factors of lung cancer were poorly identified except for smoking and air pollution [12]. In contrast, only 53.2% of students in this study knew that those with family history of lung cancer were at high risk for lung cancer, and only 36% of them knew that alcohol too could lead to the development of lung cancer. This was quite low comparing to the previous study, where most of the students knew that alcohol consumption can increase the risk of lung cancer [5]. The study by Freudenheim et al. [13] proved that alcohol establishes risk to generate lung carcinogenesis. To note, all the participants in this current study are practicing Muslims and, most probably, it is rational to suggest that they were less aware of the effect of alcohol on the development of lung cancer.

Majority of IIUM Kuantan students knew about the signs and symptoms of lung cancer such as shortness of breath (90.9%), wheezing (64.5%), haemoptysis (81.7%), chest pain (84.4%), repeated respiratory infection (78%) and fatigue (79.6%). A similar study done among school teachers by Al-Naggar and Kadir concluded that teachers' knowledge on the sign and symptom was good {6}. Another study also reported that the majority (58%) of their participants had good knowledge on the signs and symptoms [11]. However, a study carried out among general population of UK showed that they had low awareness on symptoms and lung cancer risk factors [14].

According to a review by Siang and John, the mean age of diagnosis among lung cancer patient in Malaysia range between 60 to 70 years old [2]. Moreover, the incidence of diagnosis below the age of 40 is significantly low. Data obtained from this study showed that not many students (45.2%) knew the fact regarding the mean age of lung cancer diagnosis in Malaysia.

4.2 Perception of Lung Cancer Screening

Participants' response to questions representing perception of lung cancer screening extrapolate that most students (78.5%) of IIUM Kuantan had good perception. This was obviously due to their

recognition of the purpose of screening where 86.6% of them answered that they knew the purpose of screening. Nevertheless, many of them (80.6%) did not know the fact that LD CT is the screening method that specifically detects signs of lung carcinogenesis. In relation to a previous study by Flynn et al., participants who were former and current cigarette smokers also showed willingness to undergo LD CT lung screening [7]. Another study carried out among smokers too reported that most of them had the intention to screen for lung tumor if recommended by their doctors [4].

A study by Cataldo stated four determiners for willingness to screening which are, early detection result in good prognosis, high risk individual, do not fear CT scanning and having had a CT screen will vanish their worry about possibility to develop lung cancer [8]. To conclude on participants' responses in this study, many of them had no family history of lung cancer (52.7%) and some of them were not passive smokers yet portrayed the intention to get screened for lung cancer. Many of them agreed (38.2%) that they believed the incidence of lung cancer in Malaysia was high and strongly agreed (44.6%) that early detection of lung cancer will result in a good prognosis.

Most of the students in this study had considered barriers to screening such as screening convenience, risk of disease, screening accuracy and screening cost as important factors in deciding whether or not to have a low dose computed tomography (LD CT) scan. This finding was similar to previous study by Cataldo whereby most of the participants regarded all the barriers as important factors to consider in deciding whether or not to have a low dose computed tomography (LD CT) scan [8]. Meanwhile, the factor that had the highest frequency of response to be regarded as 'not important' was the screening cost. A previous study by Jonnalagadda et al. reported that screening cost was the reason for hesitation towards screening, in other words; it was the barrier against agreement to lung cancer screening [4].

4.3 Factors Associated with Knowledge of Lung Cancer and Perception of Its Screening

Socio-demographic factors that had significantly influenced students' knowledge were age, year of study and faculty with $p= 0.001$, $p= <0.001$ and $p= <0.001$ respectively. Students from the Faculty of Medicine (FOM) and Faculty of Nursing (FON) depicted greater knowledge regarding lung

cancer. Likewise, study by Al-Naggar reported that factors such as type of faculty, marital status and year of study significantly influenced the students' knowledge on lung cancer [5]. Medical students were the most knowledgeable compared to students from other faculties. This might be due to their academic syllabus which mostly comprised health related information and practice.

Students from Faculty of Medicine (FOM), Faculty of Dentistry (FOD), Faculty of Pharmacy (FOP) and Faculty of Nursing (FON) scored high for perception of lung cancer screening. This positive perception might be contributed attributed to their educational background which has led them to better understand the purpose of screening compared to their peers and increased their awareness on health management.

4.4 Significant association between knowledge and perception

There was a significant association of students' knowledge concerning lung cancer with their perception towards its screening. Thereby, the level of knowledge on lung cancer could influence the perception of lung cancer screening. Based on the results and findings of this study, higher knowledge concerning lung cancer might predict greater or positive perception towards lung cancer screening.

5 CONCLUSION

The current study concluded that the overall general knowledge of students regarding lung cancer and their perception towards lung cancer screening were good. Factors that portrayed significant association with knowledge were age, year of study and faculty, whereas, the only factor that was significantly associated with students' perception was faculty. It was also clear that high level of knowledge on lung cancer resulted in positive perception on its screening.

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CONFLICTS OF INTEREST

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

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