Determining the perception of a lung cancer screening programme among high-risk patients in a tertiary referral centre, Kuala Lumpur

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Abstract

Background: Lung cancer is the second most common cause of cancer-related death and the third most common cancer in Malaysia. The rising prevalence of lung cancer suggests the need to consider disease screening for early detection, especially in the high-risk population, as it offers the best chance of cure.

Objectives: The study aims to determine the willingness of high-risk respondents to participate in a lung cancer screening programme if made available to them, and to determine their attitude towards lung cancer screening and explore factors that might affect participation in a screening programme.

Method: This is a cross-sectional, descriptive study over 6 months conducted in adult patients attending medical clinics in Universiti Kebangsaan Malaysia Medical Centre (UKMMC) using face-to-face administered questionnaires.

Results: In total 180 respondents were analysed. There were 177 (98.3%) males. Mean age was 59.8 ± 9.1 years. Of the respondents, 138 (76.7%) had poor knowledge about cancer screening. Former smokers comprised 119 (66.1%) of the participants, and 61 (33.9%) were current smokers. In total, 141 (78.3%) respondents indicated willingness to participate in a lung cancer screening programme. Out of this group, 68 (48.2%) respondents were unwilling to pay for the procedure. Only 18 (12.8%) were unwilling to undergo lung cancer treatment if detected early.

Conclusions: Awareness about general cancer screening is low. Our study showed that when informed of their high-risk status, respondents were willing to participate in lung cancer screening. There should be more health programmes to promote and raise awareness about lung cancer.

Keywords
Lung, cancer, awareness, screening, smoking, willingness

Introduction

Lung cancer is the leading cause of cancer-related deaths worldwide.¹ In Malaysia, lung cancer is the second most common cause of cancer death and the eighth most common cause of death from all causes.² Patients with lung cancer have one of the lowest 5-year survival rates,¹ and up to 88% of lung cancer cases are diagnosed at stage III or IV.³ Only a minority of cases present early and are eligible for curative surgical resection.² In the past, surveillance with sputum cytology and chest radiograph have been used as lung cancer screening tools but they have failed to show survival benefit.⁴⁻⁶ Hence new strategies were explored to screen lung cancer.

One promising strategy is to screen for early stage disease in high-risk smokers and ex-smokers using low-dose computed tomography (LDCT). The US National Lung Screening Trial reported a 20% reduction in lung cancer mortality following screening with LDCT.⁷ Currently, screening using LDCT for lung cancer screening is the standard of care in the United States.⁸ In Europe and Canada⁹⁻¹⁰ LDCT is also recommended as the tool for lung cancer screening for
high-risk groups, but this is not the case in Australia. In Malaysia, a trial is ongoing to assess the effectiveness of CT lung screening for high-risk groups. To date, there is no published data in Malaysia on knowledge of lung cancer and willingness to participate in a lung cancer screening programme among the high-risk population. This study aims to explore the attitudes and perceptions of high-risk groups towards lung cancer screening.

Methods

This is a cross-sectional, descriptive study conducted from June to December 2018 on adult patients attending medical clinics of Universiti Kebangsaan Malaysia Medical Centre (UKMMC), mostly from respiratory and cardiology outpatient clinics. Patients were invited to participate in the survey and were given the option of self-completion of the questionnaire or completion by face-to-face interview-administered questionnaires. These questionnaires were printed in the English language; however, they were not validated. We included patients who are at high risk of lung cancer. These include patients aged 40–70 years, with no history of lung cancer who were current or ex-smokers with a smoking history of at least 30 pack-years. Those who were current or ex-smokers with a smoking history of 20 pack-years or more with one additional risk factor were also included in the study. Verification was made by looking at the patient’s medical records for patients who self-reported that they have chronic lung disease. We excluded people who were unable to understand or consent for the questionnaires. Informed consent was obtained and confidentiality and anonymity were preserved throughout the study.

Sample size calculation was based on a study by Flynn et al. involving 102 subjects with 95% willing to participate in a lung cancer screening test. Using PS version 3.0 with alpha 0.05 and power 0.8, the sample size required was 98 patients. In order to study the attitudes of the high-risk patients towards lung cancer screening, a written questionnaire was developed. The first section of questionnaire recorded demographic data of the respondents. The second section evaluated the smoking history, including self-reported smoking status, age started daily smoking and maximum number of cigarettes smoked daily (to calculate pack-year history), age of quitting, quit confidence and quit importance (on a scale of 0 to 10). The third section assessed respondent attitude and perception about lung cancer screening. Eleven out of 12 questions in this part were adapted with permission from a study by Flynn et al. entitled ‘Attitudes towards lung cancer screening in an Australian high-risk population’.

All the responses recorded were entered into Statistical Package for Social Science version 22.0 (IBM, Armonk, NY, USA). Demographic characteristics of respondents were presented using descriptive analyses. Normality was assessed and the associations between study variables were tested for statistical significance using Chi-square test, Fisher’s exact test, independent t-test and logistic regression as appropriate. Statistical significance was determined at p < 0.05. This study was approved by Hospital Universiti Kebangsaan Malaysia Human Ethics Committee.

Results

A total of 189 respondents were recruited (Table 1). Six responses were incomplete and three respondents were excluded because of a prior diagnosis of lung cancer. Of the remaining 180 respondents, 177 were men (98.3%). The mean age was 59.8 ± 9.1 years. The majority were in the age group of 60–70 years (62.2%). There were 99 (55%) Malays, 73 (40.6%) Chinese and eight (4.4%) Indians. Almost half of the respondents were secondary school leavers, 60 (33.3%) completed Malaysian Certificate of Education (Form 5 graduates) and 31 (17.2%) completed Lower Secondary Evaluation (Form 3 graduates). Some 21.7% (n = 39) of subjects had at least a tertiary education (n = 12, 6.7% postgraduates, n = 27, 15% diploma/degree graduates); 27.8% (n = 50) subjects either completed primary school or did not complete the schooling programme. In this sample 63.9% (n = 115) of the respondents were retired.

Former smokers comprised 119 (66.1%) of the respondents, and 61 (33.9%) were current smokers (Table 2). On average, current and former smokers began smoking in their mid-teens (mean: 17.9, standard deviation: 4.2), stopped smoking in their mid-fifties (mean: 54, standard deviation: 9.5) and had a high pack-year history (mean: 43, range: 20–144). However, only 30 (49.8%) of the current smokers were keen to be referred to smoking cessation clinic. These respondents were aware of the health benefit from smoking cessation (mean rating of 6 out of 10; standard deviation: 2.4). They were confident in their ability to quit smoking (mean rating of 7.2 out of 10; standard deviation: 2.3).

More than one-fifth (n = 42, 23.3%) of the respondents reported that they had experience of cancer through a close family member (Table 3). Awareness towards cancer screening was poor; only 21.2% (n = 38) respondents had undergone a cancer screening test. Fifty-four (30%) respondents believed that the early detection of cancer was life-saving. One-third of the respondents believed that early detection of cancer leads to a more effective treatment, hence a higher chance of survival. One-fifth of the respondents believed that early detection of lung cancer would lead a better chance of surviving.

Half of the respondents believed that they are at risk of lung cancer (n = 91, 50.6%) and 47 (26.1%) were able to recall being informed that they were at high risk of lung cancer by healthcare officers (Table 4). Eighty percent of the respondents agreed that it was necessary for high-risk populations to undergo LDCT scan for lung cancer screening. This included four respondents who were unwilling to participate in LDCT screening. There was a willingness among the respondents (n = 141, 78.3%) to participate in screening if they were informed that they were at high risk of developing lung cancer. The majority of the respondents (n = 140, 99.3%) would still consider the screening despite being informed that the accuracy of LDCT ranged from 70 to 90%. Unfortunately, cost was a major barrier as 48.2% (n = 68) respondents were unwilling to pay Malaysian Ringgit (MYR) 500 for the screening test. The
majority of the respondents ($n = 123, 87.2\%$) who agreed for screening were keen for lung cancer surgery or chemotherapy if indicated.

Using Chi-square analyses, there were three variables (Malay ethnicity, history of chronic lung disease and occupational exposure to dust) with a significant association with the willingness to do LDCT screening. Following logistic regression analyses, respondents having history of chronic lung disease had significant association towards willingness to undergo LDCT screening (Table 5).
To our knowledge, this is the first study exploring the attitude and perception towards lung cancer screening in a high-risk population in Malaysia. We found a low awareness of cancer among the respondents about cancer screening tests. This finding is similar to a study conducted in the northern region of peninsular Malaysia in 2014. Public awareness campaigns should be promoted to educate the importance of early detection, as it increases survival through access to more effective treatments.

The majority of respondents had a positive attitude towards lung cancer screening, believing that there was benefit in terms of lung cancer outcomes and survival, which is consistent with earlier studies. In the UK, the perceived risk of lung cancer was found to be related to the respondent's decision on lung cancer screening. This was not what we found in our study, where 50% of the respondents did not perceive themselves as high risk and yet 78% were willing for participation once they gained more knowledge on their risk status. This shows a lack of both awareness and knowledge of lung cancer in our country.

This lack of awareness and knowledge is shown by a 78% receptivity to screening in our population compared with 95% in previous studies among Americans and Australian high-risk populations. Accuracy of the scan does not affect decision on lung cancer screening, as overall receptivity of the respondents to LDCT with 70–90% accuracy is high. Lung cancer awareness month programmes in the UK or Australia help greatly to create awareness among the public regarding lung cancer. Recent action by our health minister to implement and enforce comprehensive smoke-free air policies since early 2019 can help to reduce the smoking prevalence and hence lung cancer prevalence.

Previous studies found that the cost of the LDCT was a barrier to willingness to be scanned in the US prior to insurance coverage and this was demonstrated in our study, where 78% respondents reported an intention to undergo screening if recommended but this dropped to 41% if they had to pay for the CT scan. Public healthcare in Malaysia is a two-tier public health system for the public and private healthcare system. Public healthcare is funded from the Malaysian government resources and there are limitations as resources are limited. Cancer screening is currently not included as part of the services to the citizen. There should be an initiative to incorporate cancer screening into our healthcare system.

Almost half of the current smokers agreed to enrol in a smoking cessation clinic. This is less compared with the US, where nearly 7 out of every 10 (68.0%) reported in 2015 that they wanted to quit completely. Evidence showed that

### Table 3. Attitude and beliefs about cancer.

| Experience with cancer | n=180 | % |
|------------------------|-------|---|
| Yes (1st degree relatives) | 42 | 23.3 |
| No | 138 | 76.7 |

| Screening test for cancers | |
|---------------------------|--|
| Male: ≥ 2 tests | 10 | 5.6 |
| Male: one test | 26 | 14.4 |
| Male: none | 141 | 78.2 |
| Female: ≥ 2 tests | 1 | 0.6 |
| Female: one test | 1 | 0.6 |
| Female: none | 1 | 0.6 |

### Table 4. Perceptions towards lung cancer screening.

| Perceived risk | n=180 | % |
|----------------|-------|---|
| Subjects believing that they are at risk for lung cancer | Yes | 91 | 50.6 |
| No | 89 | 49.4 |

| Healthcare officers informing that you are high risk for lung cancer | |
|---------------------------------------------------------------|--|
| Yes | 47 | 26.1 |
| No | 133 | 73.9 |

| Would subject consider LDCT scan to determine the presence of lung cancer | |
|----------------------------------------------------------------------------|--|
| Yes | 141 | 78.3 |
| No | 39 | 21.7 |

| If the scan is 90% accurate, would they still proceed | |
|-------------------------------------------------------|--|
| Yes | 140 | 99.3 |
| No | 1 | 0.7 |

| If the scan is 70% accurate, would they still proceed | |
|-------------------------------------------------------|--|
| Yes | 122 | 87 |
| No | 19 | 13 |

| Would subject consider to pay MYR 500 for the LDCT scan | |
|--------------------------------------------------------|--|
| Yes | 73 | 51.7 |
| No | 68 | 48.3 |

| Would subject consider surgery/chemo for treatment? (subjects who agreed for scan) | |
|-----------------------------------------------------------------------------------|--|
| Yes | 123 | 87.2 |
| No | 18 | 12.8 |

| Is it necessary for high-risk population to do LDCT scan to detect early lung cancer? | |
|---------------------------------------------------------------------------------------|--|
| Yes | 145 | 80.5 |
| No | 35 | 19.5 |

n = total number of respondents.
the provision of smoking cessation treatment in conjunction with annual lung cancer screening had the potential to be a cost-effective way to reduce tobacco use rates and promote higher rates of cessation among screening trial participants.\textsuperscript{23,24} We found no association between smoking status and willingness to scan. This is similar to a US study,\textsuperscript{25} where smokers’ awareness of their increased risk was not associated with screening interest. We need to explore what motivates smokers to quit and what factors prevent them from attending the smoking cessation clinic.

There was a significant association between respondents having chronic lung disease to willingness to scan (Table 5). In our study, chronic lung disease predominantly comprised chronic obstructive pulmonary disease (COPD). Respondents having lung symptoms may realise their poor health condition may predispose them to lung cancer, and hence there may be higher awareness among them to participate in lung cancer screening for early detection and treatment. This similar to a study done in Ireland that concluded that urban Irish smokers with COPD who would be eligible for LDCT screening are almost universally in favour of being screened and treated for screening-detected lung cancers.\textsuperscript{26}

There are several limitations of our study. The sample study had a wide range of age groups. Moreover, the results were collected from an urban population and may not be representative of the general population of Malaysia. Hence, the questionnaires should also be conducted in the high-risk population from rural areas. There is the possibility of respondent bias, in that those who agreed to participate may have been more interested in lung cancer screening, thereby contributing to the reported high percentage of those willing to be screened.

**Conclusion**

The majority of the respondents hold a positive attitude towards cancer screening, but general awareness towards cancer screening was poor. The respondents had poor perceived susceptibility towards lung cancer, but a significant number of respondents would be willing to undergo lung cancer screening if told they are at high risk. We propose the implementation of a regular public health programme to create awareness towards lung cancer. We acknowledge the difficulty in funding a nationwide lung cancer screening programme.

**Table 5.** Factors affecting decision to undergo lung cancer screening.

| Factor                                | Simple Logistic Regression | Multiple Logistic Regression*  |
|---------------------------------------|---------------------------|-------------------------------|
| B Crude OR (95% CI)                   | p-value                   | B Adjusted OR (95% CI)        | p-value          |
| Ethnicity                             | 0.511                     | 1.391 (0.305, 6.335)          | 0.027            |
| Tertiary education                    | 0.77                       | 2.161 (0.783, 5.962)          | 0.137            |
| Chronic lung disease                  | 1.177                      | 0.208 (0.142, 0.668)          | 0.003            |
| Occupational exposure to dust         | 0.772                     | 0.462 (0.234, 0.952)          | 0.036            |
| Believes that they are at high risk for lung cancer | 0.491                     | 1.634 (0.796, 3.352)          | 0.181            |

B – This is the coefficient for the constant in the null model.
*Significant at p < 0.005 on multivariate analysis.
**Forward Wald multiple logistic regression method applied.

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**Authors’ contributions**

Kok WH, Faisal AH, Andrea YLB and Shamsul AS were involved in literature review, study proposal submission to the institutional review board, data collection, data analysis and paper write-up.

**Availability of data and materials**

The datasheets generated and analysed during the study are available from Dr Kok Wei Hao.

**Conflicts of interest**

The authors declare that there is no conflict of interest.

**Ethical approval**

Ethical approval to report these cases was obtained from the Research Ethics Committee of Universiti Kebangsaan Malaysia. (Reference number: FF-2018-222).

**Informed consent**

Written informed consent was obtained from all participants before the study.

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