Pre- and post-intervention survey on lung cancer awareness among adults in selected communities in KwaZulu-Natal, South Africa: A quasi-experimental study

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Abstract

Background: Lung cancer remains the number one cause of cancer mortality estimated at 1.8 million deaths. There are limited studies in resource poor countries regarding knowledge, attitudes and practices towards lung cancer.

Objective: This study aimed to assess the effects of a lung cancer awareness intervention in selected communities in KwaZulu-Natal, South Africa.

Materials and Methods: A quasi-experimental study design was conducted in the selected communities in KwaZulu-Natal. A community intervention was administered in the communities after a baseline survey. The intervention effects were assessed a month after implementation.

Results: There were statistical differences in the mean age ($p<0.001$) and proportion of males and females ($p<0.001$) at baseline and post-intervention. There were no differences in terms of smoking status ($p=0.958$), however, there was a reduction in the number of cigarettes smoked per day ($p<0.001$) and the number of packs smoked per week ($p=0.026$). The mean knowledge score increased from 41.8% (95% CI 35.7 – 47.9) at baseline to 59.9 (95% CI 53.8 – 66.0) post-intervention ($p<0.001$). The proportion of participants who were aware that lung cancer can be detected early increased from 46.5% (95% CI 39.1 – 53.9) at baseline to 81.1% (95% CI 71.7 – 87.9) post-intervention ($p<0.001$). The intervention had a statistically significant effect (aOR 4.370, 95% CI 1.477-12.928) on the level of lung cancer knowledge in the selected communities ($p<0.001$).

Conclusions: Interventions increasing the recognition of signs and symptoms, focusing on the importance of early detection and health seeking behaviour (including screening), smoking cessation, and addressing the perceived health system barriers are required.

Introduction

Lung cancer continues to be the leading cause of mortality among cancer deaths worldwide.[1] In Low- and Middle-Income Countries (LMICs), it is uncommon to diagnose lung cancer early.[2-4] This late diagnosis is similar to other cancers', maybe due to numerous factors, such as lack of knowledge of its signs and symptoms, and poor health services.[3,5-7] The LMICs, currently, could be experiencing the greatest increase in cancer incidence, including lung cancer.[8] Therefore, interventions at different systemic levels are required to address this pertinent challenge. These

include prevention, screening and early detection, treatment and care, and health policy framework. Currently, South Africa does not have policy and guidelines on lung cancer prevention and screening, although a final draft has been submitted for approval. Thus, leading to late presentation and diagnosis for most lung cancer patients. Studies have indicated that greater awareness, recognition of the signs and symptoms, together with early diagnosis and access to appropriate treatment could lead to improved lung cancer outcomes.[9-11] Prevention strategies are pivotal towards reducing the burden of lung cancer.[9,12]

Studies on lung cancer awareness intervention have been conducted, largely, in High Income Countries (HICs) with varying degrees of success.[13-19] These studies focused on differing components of awareness including signs and symptoms, risk factors, prevention (smoking cessation), screening and early detection. However, to the best of the authors' knowledge, there is minimal to no studies conducted in LMICs pertaining to lung cancer awareness. The South African Ministry of Health has been addressing the prevention and health promotion interventions outlined in the national cancer strategic framework.[20] The prevention efforts include tobacco control legislation.[21] This legislation is applicable to many cancers, not specific to lung cancer.[20] The health promotion interventions include vaccination against hepatitis B virus and prevention and control of Human Papilloma Virus (HPV).[20] Nonetheless, the framework does not address specifics on lung cancer in terms of prevention and control. Also, there exists a lack of available literature on effectively increasing lung cancer awareness in South Africa. The research question for this study was, "What are the effects of a lung cancer awareness intervention in the selected communities of KwaZulu-Natal, South Africa? The intervention addressed knowledge about lung cancer, including its signs and symptoms, the importance of early detection and treatment, the effects of smoking and tips for quitting smoking. The intervention was administered from the month of October to mid-December 2020.

Materials and Methods

Study setting and design

This study was conducted in the selected communities in KwaZulu-Natal (KZN), South Africa. They included townships (Umlazi, Chatsworth, Lamontville, Imbali and Sobantu), and a suburb (Bluff). A township is a residential area where the previously disadvantaged communities were forced to reside during the apartheid era in South Africa. They are predominantly inhabited by Black South African people from varying socio-economic statuses[22]. The selected communities were visited at baseline (March and April 2019) and a month after the intervention (mid-January and February 2021) was concluded.

Study population, inclusion, and exclusion criteria

Adults of both genders from the age of 18 years and above, residing in one of the five selected communities were invited to participate. People with mental incapacity to understand the questions and those that do not meet the inclusion criteria.

Sample size and sampling method

A stratified random cluster sampling method was applied, across the selected representative communities. A total of 40 out of 879 clusters were selected using probability Proportional to Population Size (PPS) sampling. Twenty households were selected from each cluster based on maps of the selected communities. A minimum of 20 participants were randomly sampled within each cluster to allow a precision of ±5% assuming a design effect of two (2) with 95% confidence and assuming maximum variability (*i.e.*, p=0.5 or 50%). A total sample size of n=800 was estimated. The same clusters were visited before and after the intervention, not necessarily the same households.

Data collection tool

A standardised questionnaire was used that consisted of different sessions including participants' socio-demographic data, knowledge, attitudes, and practices (and health-seeking behaviour) about lung cancer. The socio-demographic variables were from the National Income Dynamics Study, Wave 3 questionnaire,[23] and the variables about lung cancer were included from the Cancer Research UK, Lung Cancer Awareness Measure Toolkit, Version 2.1. 2011.[24] The analysis of their responses determined whether the data collected met the objectives of the study. The variables that were collected included: gender, age, race/ethnicity, socioeconomic status, type of settlement, level of education, smoking behaviour, knowledge (*e.g.*, sign and symptoms, risk factors, and treatment of lung cancer), attitudes (what to do if coughing blood, persistently, or suspecting lung cancer), and health-seeking behaviour towards lung cancer. The questionnaire was in English and translated into isiZulu upon determining preference of the participants. The data was captured using REDCap[25] and stored in a password protected computer.

Data analysis

The data was analysed using STATA 15 and summarized and presented using tables and figures (where applicable). Cronbach's Alpha was calculated for the knowledge (0.94) and attitude (0.08) domains of the questionnaire to test for internal consistency. The knowledge score was calculated by summing all the knowledge variables, dividing the outcome by the number of the variables (34), and then multiplying the by hundred to get the percentage. Each correct response was assigned a value of one (1) and an incorrect one the value of zero (0). The participants' knowledge scores were grouped either as poor knowledge (<50%) or good knowledge (>50%). The differences between various constructs at baseline and post-intervention were measured. The effect of the intervention on knowledge was measured accounting for the differences at baseline and post-intervention.

Ethics approval and consent to participate

Ethics approval from the University of KwaZulu-Natal Biomedical Research Ethics Committee was obtained (BREC) (BF585/18). A team of trained field workers were employed to administer the questionnaires after the informed consent process. The participants gave a written informed consent after the field workers explained the study aim, objectives and methods to potential participants before participating in the study. The participants' confidentiality was protected through administering the survey in an environment comfortable and in the privacy of the participants' homes using tablets. The tablets were password protected, and the survey was only accessible through login credentials only made accessible to the study team. The downloaded data was kept in a password protected computer.

Results

Socio-demographic differences

A total of 1516 participants (baseline = 760, and post-intervention = 756) were included in the analysis. There were statistical

Table 1. Comparison of sociodemographic factors of study participants regarding lung cancer awareness at baseline and post-intervention in the selected KZN communities.

Characteristics	Baseline (% (95% CI))	Posi-intervention (% (95% CI))	p-value
Age (yr), mean	52.53 (50.57 – 54.49)	42.39 (40.64 – 44.13)	<0.001
Gender			
Male	51.6 (45.6 – 57.5)	38.1 (33.4 – 43.1)	<0.001
Female	48.4 (42.5 – 54.4)	61.9 (56.9 – 66.6)	
Race			
African	70.3 (54.0 – 82.8)	69.3 (52.5 – 82.2)	0.437
Coloured	7.8 (3.0 – 18.5)	7.7 (3.0 – 18.3)	
Asian/Indian	20.5 (10.8 – 35.6)	21.2 (10.7 – 37.7)	
White	1.1 (0.2 – 6.2)	1.9 (0.5 – 7.0)	
Preferred language			
IsiZulu	67.5 (51.4 – 80.3)	66.2 (50.3 – 79.1)	0.259
English	30.8 (18.0 – 47.3)	30,6 (17.7 – 47.4)	
Afrikaans	0 (0 - 0)	0.2 (0.0 – 1.1)	
isiXhosa	1.1 (0.5 – 2.5)	2.2 (1.1 – 4.1)	
Sesotho	0.7 (0.2 – 2.2)	0.9 (0.3 – 2.7)	
Highest level of education			
Lower Primary	3.6 (2.2 – 5.6)	1.5 (0.6 – 3.5)	<0.001
Higher Primary	11.1 (8.3 – 14.8)	3.4 (1.4 – 7.8)	
Up to grade 10	15.3 (11.6 – 19.9)	7.4 (4.8 – 11.1)	
Up to grade 12	50.3 (44.5 – 56.1)	38.4 (31.4 – 45.9)	
Tertiary	19.8 (14.7 – 26.0)	49.4 (40.5 – 58.3)	
Currently smoke cigarettes			
Yes	18.2 (15.0 – 21.9)	18.3 (14.3 – 23.2)	0.958
No	81.8 (78.1 – 85.0)	81.7 (76.8 – 85.7)	
Cigarettes smoked per day, mean	7.0 (5.9 – 8.2)	6.3 (3.7 – 9.0)	<0.001
Packs smoked per week, mean	5.5 (2.6 – 8.4)	2.0 (1.2 – 2.8)	0.026
Household income*			
More or less than $50	9.1 (5.8 – 13.9)	6.7 (3.9 – 11.1)	<0.001
More or less than $100	30.4 (24.6 – 36.8)	19.7 (14.5 – 26.3)	
More or less than $200	25.5 (20.8 – 30.9)	22.9 (17.1 – 30.1)	
More or less than $400	13.3 (9.9 – 17.6)	11.3 (7.8 – 16.2)	
More or less than $733	5.0 (2.6 – 9.5)	5.2 (3.0 – 8.8)	
More or less than $1800	2.7 (1.5 – 4.9)	2.9 (1.6 – 5.2)	
Paying for services at the health facility			
Yes	20.4 (14.1 - 28,5)	18.0 (13.4 – 23.6)	0.757
No	78.2 (70.2 – 84.6)	79.9 (73.8 – 84.8)	
Average paid for health services/visit in $	17.2 (8.7 – 25.6)	13.1 (6.9 – 19.3)	0.384
Participant distribution by area			
Chatsworth	23.2 (12.0 – 40.0)	23.8 (12.5 – 40.7)	0.835
South Durban	18.6 (8.8 – 35.0)	18.0 (8.5 – 34.2)	
Umlazi	25.8 (14.0 – 42.6)	26.5 (14.4 – 43.5)	
Imbali	22.1 (11.1 – 39.2)	21.2 (10.3 – 38.6)	
Sobantu	10.4 (3.8 – 25.6)	10.6 (3.8 – 26.3)	
Ever worked in the mines			
Yes	1.9 (1.2 – 2.9)	0.8 (0.3 – 1.9)	0.277
No	95.4 (93.2 – 96.9)	97.7 (94.5 – 99.0)	
Years worked in the mines, mean	3.6 (0.9 – 6.3)	1.3 (0.1 – 2.4)	0.112
Ever worked in the chemicals industry			
Yes	12.0 (8.7 – 16.3)	7.8 (4.5 – 13.1)	0.202
No	85.6 (81.1 – 89.1)	91.0 (85.6 – 94.5)	
Years worked in the chemicals industry, mean	6.7 (4.9 – 8.5)	4.1 (1.5 – 6.7)	0.084

*Dollar to Rand conversion is $1=R15

differences in the mean age (p<0.001) and proportion of males and females (p<0.001) at baseline and post-intervention (Table 1). The participants at post-intervention tended to be younger (42.39 years; 95% CI 40.64 – 44.13) than those at baseline (52.53 years; 95% CI 50.57 – 54.49). More males (51.6%; 95% CI 45.6 – 57.5) participated in the baseline survey than at post-intervention (38.1%; 95% CI 33.4 – 43.1). There were no statistically significant differences in terms of race (p=0.437) and language spoken at home (p=0.259) at baseline and post-intervention. However, there were observed differences in the level of education between the two time points (p<0.001). At post-intervention, more participants (49.4; 95% CI 40.5 – 58.3) reported acquiring tertiary level education than at baseline (19.8; 95% CI 14.7 – 26.0). There were no differences in terms of smoking status (p=0.958), however there was a reduction in the number of cigarettes smoked per day (p<0.001) and the number of packs smoked per week (p=0.026). In terms of reported household income, there seemed to be a reduction in the proportion of participants earning $400 and less at baseline and post-intervention (p<0.001). There were no other statistically significant differences regarding geographic distribution of participants (p=0.835), paying for health services (p=0.757), history of working in the mines (p=0.277) and chemicals industry (p=0.202) at baseline and post-intervention.

Knowledge differences at baseline and post-intervention

Table 2 presents the differences regarding the knowledge constructs measured among the participants at baseline and post-intervention. Significantly more participants (90.0%; 95% CI 85.2 – 93.3) reported hearing about lung cancer post-intervention than at baseline (59.8%; 95% CI 51.9 – 67.2) (p<0.001). Oral communication (p<0.001), newspaper (p=0.010), NGOs (p<0.001), and home visits (p<0.001) had increases in the proportions of participants reporting these as their sources of information about lung cancer. There was an overall increase in the recognition of lung cancer related signs and symptoms. Similarly, the mean knowledge score increased from 41.8% (95% CI 35.7 – 47.9) at baseline to 59.9 (95% CI 53.8 – 66.0) post-intervention (p<0.001). Regarding the situations that would increase risk of developing lung cancer, only second-hand smoking indicated statistically significant differences at baseline (49.2%; 95% CI 40.1 – 58.3) and post-intervention (62.4%; 95% CI 51.4 – 72.3) (p=0.022). However, the recognition of smoking as a risk lung cancer remained high (76.4%; 95% CI 67.8 – 83.2) even post-intervention (p=0.326).

Although there were increases in the recognition of other risk factors (*i.e.*, exposure to harmful mineral dust in the mines, exposure to inhaling harmful chemicals, history of lung cancer in the family, and exposure to asbestos), they were not statistically significant (p=0.503, p=0.299, p=0.208, and p=0.329, respectively). Statistically significant differences were observed about treatment options for lung cancer. There were statistically significant increases on the recognition on what to do to reduce the risk of lung cancer. The largest increase was on chemotherapy, which had about a 15% difference between baseline (52.2%; 95% CI 42.6 – 61.7) and post-intervention (67.5%; 95% CI 58.4 – 75.4) (p<0.001). Participants who had heard of lung cancer screening increased from 17.8% (95% CI 13.5 – 23.0) at baseline to 57.3% (95% CI 47.4 – 66.6) post-intervention (p<0.001). Similarly, there was an increase in the proportion of participants who were aware that lung cancer can be detected early from 46.5% (95% CI 39.1 – 53.9) at baseline to 81.1% (95% CI 71.7 – 87.9) post-intervention (p<0.001).

Attitudes towards lung cancer at baseline and post-intervention

There were no observed statistically significant differences at baseline and post-intervention regarding what the participants would do should they cough blood (p=0.2831) (Table 3). Likewise, no significant differences were observed regarding what they would do if they coughed persistently for two weeks or more (p=0.2204). Concerning how soon they would contact their doctor if they had a symptom that they thought might be a sign of lung cancer, there were statistically significant differences between baseline and post-intervention responses (p=0.035). Post-intervention, most participants (98.1%) indicated that they would consult their doctor within a week of recognising lung cancer symptoms. None of the participants suggested that they would wait for three months or more to consult with their doctor, compared to 0.42% at baseline.

When questioned about how soon they would contact their traditional healer if they presented with a symptom they thought might be a sign of lung cancer, 76.2% (95% CI 68.0 – 82.8) at baseline it was noted that they did not consult a traditional healer compared to 80.1% (95% CI 63.1 – 90.5) post-intervention (p<0.001). There were no baseline and post-intervention statistical differences in terms of their willingness to screen for lung cancer (p=0.846). However, the proportion of participants willing to screen for lung cancer remained high post-intervention (97.5; 95% CI 95.5 – 98.6). The desire for a national screening programme was high both at baseline (98.7%; 95% CI 97.6 – 99.4) and post-intervention (98.8%; 95% CI 97.1 – 99.5) (p=0.909). Approximately 13% increase in the proportion of participants that were willing to pay for the screening test post-intervention was noted (45.7%; 95% CI 36.8 – 54.9) than at baseline (32.1%; 95% CI 25.7 – 39.3) (p=0.005).

Effects of the intervention on lung cancer awareness

Unadjusted and adjusted model

The effects of the intervention on the level of knowledge about lung cancer (Table 5) were statistically significant in the unadjusted regression model (uOR 5.123, 95% CI 4.217-6.222) (p<0.001). The statistical significance was sustained in the adjusted model (aOR 4.370, 95% CI 1.477-12.928) (p=0.008). Similarly, the effects at post-intervention among the different age groups, genders, education levels, smoking status, household income, area of residence, history of working in the chemicals industry, having heard of lung cancer, health-seeking behaviour, and willingness to pay for a lung cancer screening test trended favourably and were statistically significant. In the adjusted model, age groups (30-39 years (aOR 6.753, 95% CI 2.122-21.493), 40-49 years (aOR 4.711, 95% CI 1.542-14.393), 50-59 years (aOR 3.704, 95% CI 1.173-11.697), 60-69 years (aOR 6.707, 95% CI 1.576-28.554) and 70+ years (aOR 19.647, 95% CI 1.586-243.355)) had a statistically significant effect on knowledge (p=0.001, p=0.007, p=0.026, p=0.010, p=0.020, respectively).

Gender's effect was no longer significant in the adjusted model (p=0.325). Participants that reached higher primary or up to grade 10 seemed to have lower level of lung cancer knowledge in the adjusted model (aOR 0.078, 95% CI 0.008-0.781 (p=0.030), and aOR 0.071, 95% CI 0.009-0.556 (p=0.012), respectively). The rest of the educational levels did not have a significant effect in the adjusted model. Similarly, the smoking behaviour did not have a significant effect, neither did household income. Residing in South

Table 2. Comparison of knowledge constructs regarding lung cancer among adults in five selected KZN communities at baseline and post-intervention.

Characteristic (knowledge)	Baseline (% (95% CI))	Post-Intervention (% (95% CI))	p-value
Ever heard of lung cancer?			
Yes	59.8 (51.9 – 67.2)	90.0 (85,2 – 93.3)	**<0.001**
No	39.7 (32.2 – 47.7)	9.6 (6,3 – 14.3)	
How did you hear about lung cancer?			
Oral communication	14.7 (11.3 – 19.0)	57.8 (47.3 – 67.5)	**<0.001**
Newspaper	24.9 (18.8 – 32.2)	38.8 (29.8 – 48.7)	**0.010**
Radio	34.7 (28.9 – 41.1)	38.2 (28.2 – 49.1)	0.537
Television	27.5 (22.2 – 33.5)	24.8 (16.8 – 35.0)	0.526
Conference	2.1 (1.3 – 3.5)	4.9 (2.8 – 8.4)	**0.004**
Medical doctor or hospital	16.1 (11.9 – 21.3)	14.4 (9.0 – 22.4)	0.650
Church	2.9 (1.5 – 5.6)	5.0 (3.2 – 7.8)	0.137
School	5.1 (3.5 – 7.6)	5.3 (2.8 – 10.0)	0.921
Non-Governmental Organisation	6.0 (2.7 – 12.6)	19.8 (11.7 – 31.5)	**<0.001**
Home Visit	0 (0 – 0)	12.2 (5.4 – 25.1)	**0.001***
Knowledge Score, mean	41.8 (35.7 – 47.9)	59.9 (53.8 – 66.0)	**<0.001**
Symptoms of lung cancer			
Coughing blood	60.9 (52.1 – 69.1)	82.5 (76.6 – 87.4)	**<0.001**
Recurring chest infections	33.7 (24.9 – 43.7)	52.4 (42.3 – 62.3)	**<0.001**
Shortness of breath (persistent)	49.1 (39.5 – 58.7)	64.1 (54.0 – 73.1)	**0.005**
Loss of appetite	38.6 (29.6 – 48.4)	55.3 (44.9 – 65.3)	**<0.001**
Chest pain (persistent)	50.1 (41.2 – 59.0)	65.1 (55.4 – 73.6)	**0.005**
Fatigue or feeling weak	30.4 (22.3 – 40.0)	43.2 (34.2 – 52.6)	**0.003**
Hoarseness of the voice	25.8 (17.9 – 35.7)	47.3 (37.4 – 57.4)	**0.001**
Unexplained weight loss	27.2 (19.3 – 37.0)	49.5 (39.0 – 60.1)	**<0.001**
Cough that does not go away for 2 to 3 weeks	40.8 (32.3 – 50.0)	60.4 (51.0 – 69.2)	**<0.001**
Persistent shoulder pain	14.9 (8.9 – 23.8)	35.7 (26.8 – 45.8)	**<0.001**
Ache or pain when breathing	24.2 (17.0 – 33.2)	47.3 (37.4 – 57.4)	**<0.001**
Painful cough	33.3 (26.2 – 41.2)	59.9 (50.0 – 69.1)	**<0.001**
Changes in the shape of the fingers or nails	13.3 (8.4 – 20.4)	35.6 (26.5 – 45.8)	**<0.001**
Unexplained loud, high-pitched sound when breathing	12.0 (7.7 – 18.3)	41.8 (31.5 – 52.9)	**<0.001**
Worsening or change in existing cough	12.5 (7.7 – 19.6)	44.9 (34.6 – 55.6)	**<0.001**
Situations that would increase chances of			

To be continued

developing lung cancer			
None	0.4 (0.1 – 1.2)	0,1 (0 – 1.0)	0.335
Smoking	81.2 (72.8 – 87.4)	76.4 (67.8 – 83.2)	0.326
Exposure to harmful mineral dust in the mines	56.2 (45.4 – 66.4)	59.9 (48.6 – 70.2)	0.503
Exposure to inhaling harmful chemicals	54.6 (44.9 – 64.0)	60.4 (50.4 – 69.6)	0.299
History of lung cancer in the family	39.2 (30.0 – 49.2)	46,5 (36,7 – 56.6)	0.208
Second-hand cigarette/tobacco smoke	49.2 (40.1 – 58.3)	62,4 (51,4 – 72.3)	**0.022**
Exposure to asbestos	46.8 (37.0 – 57.0)	52,5 (41,3 – 63.4)	0.329
Know someone diagnosed with lung cancer			
Yes	9.1 (6.8 – 12.0)	9.2 (6.1 – 13.6)	0.994
No	83.9 (80.3 – 87.0)	83.5 (77.8 – 87.9)	
Treatment options for lung cancer			
Surgery	32.5 (25.3 – 40.6)	44.0 (33.5 – 55.0)	**0.041**
Radiation	29.5 (22.4 – 37.7)	37.7 (27.5 – 49.2)	0.185
Chemotherapy	52.2 (42.6 – 61.7)	67.5 (58.4 – 75.4)	**0.001**
Supportive care (e.g., palliative care)	19.1 (13.2 – 26.8)	31.3 (23.6 – 40.3)	**0.028**
Quitting smoking (if smoker)	40.1 (31.3 – 49.7)	50.2 (39.1 – 61.3)	**0.030**
Reducing the risk of lung cancer			
Avoiding smoking	77.4 (69.2 – 83.9)	85.1 (79.8 – 89.3)	**0.009**
Avoid second-hand smoke	56.6 (47.6 – 65.1)	75.3 (66.0 – 82.7)	**<0.001**
Using protective equipment when working in the mines & chemicals industry	52.8 (43.0 – 62.3)	66.3 (55.9 – 75.3)	**0.002**
Eating fruit and vegetables, and reducing sugar and starch	30.5 (23.1 – 39.1)	45.2 (34.8 – 56.0)	**0.004**
Exercising	30.8 (23.2 – 39.6)	47.5 (36.6 – 58.7)	**<0.001**
Ever heard about lung cancer screening?	17.8 (13.5 – 23.0)	57.3 (47.4 – 66.6)	**<0.001**
Did you know that lung cancer can be detected early?	46.5 (39.1 – 53.9)	81.1 (71.7 – 87.9)	**<0.001**
In the next year, who is most likely to develop lung cancer?			
A 30-year-old	14.9 (9.9 – 22.0)	11.6 (7.1 – 18.4)	**0.031**
A 50-year-old	16.3 (11.8 – 22.2)	13.5 (8.4 – 21.2)	
A 70-year-old	14.4 (10.0 – 20.4)	26.5 (18.3 – 36.6)	
Lung cancer is unrelated to age	54.3 (44.0 – 64.4)	48.4 (36.5 – 60.5)	
The following may put you at risk of lung cancer: mean			
Exposure to another person's cigarette smoke[†]	3.9 (3.8 – 4.0)	4.4 (4.3 – 4.6)	**<0.001**

To be continued

Having had treatment of any cancer in the past[†]	3.2 (3.0 – 3.4)	3.9 (3.7 – 4.0)	**<0.001**
Having a close relative with lung cancer[†]	3.2 (3.1 – 3.3)	3.9 (3.7 – 4.1)	**<0.001**
Exposure to chemicals (i.e., asbestos) [†]	3.8 (3.7 – 3.9)	4.5 (4.3 – 4.6)	**<0.001**
Having previous history of cancer, such as head and neck cancer[†]	3.3 (3.2 – 3.5)	3.8 (3.6 – 4.0)	**<0.001**
Air pollution[†]	3.9 (3.8 – 4.0)	4.6 (4.4 – 4.7)	**<0.001**
Being a smoker[†]	4.0 (3.9 – 4.2)	4.6 (4.5 – 4.7)	**<0.001**
Having previous history of lung disease, such as chronic obstructive pulmonary disease (COPD) [†]	3.4 (3.3 – 3.5)	3.8 (3.6 – 4.0)	**<0.001**
How confident are you that you would notice a symptom of lung cancer? [‡]	1.5 (1.3 – 1.8)	2.4 (2.3 – 2.6)	**<0.001**

[*] Fisher's exact test
[†] Coding for 1-10 (1 Strongly disagree, 2 Disagree, 3 Not sure, 4 Agree, 5 Strongly agree)
[‡] Coding for 11 (0 Not at all confident, 1 Not yet confident, 2 Fairly confident, 3 Very confident)

Durban (aOR 0.067, 95% CI 0.014-0.312 (p=0.001)) and Imbali (aOR 0.178, 95% CI 0.036-0.890 (p=0.036) had an opposite effect on the level of lung cancer knowledge. Having a history of working in the chemicals industry had a negative effect on the level of knowledge post-intervention. Those who had heard of lung cancer were at least seven times more likely to have good knowledge on lung cancer post-intervention (aOR 7.806, 95% CI 2.393-25.467) (p=0.001). Consulting a doctor (aOR 14.184, 95% CI 1.368-147.105 (p=0.026)) and going to a health facility (aOR 10.961, 95% CI 1.098-109.462 (p=0.041)) when coughing persistently had a positive effect on lung cancer knowledge. However, the confidence intervals were wide, and the results should, therefore, be interpreted with caution.

The desire to pay for a lung cancer screening test did not have a statistically significant effect on the knowledge of lung cancer (aOR 1.111, 95% CI 0.468-2.637 (p=0.812)). Likewise, contacting a doctor and seeking help from a traditional healer in case of experiencing lung cancer-like symptoms did not influence lung cancer knowledge.

Discussion

This study demonstrated gains in awareness on lung cancer at community level. On average, an overall improvement of the mean knowledge score of 18% (p<0.001) was observed among the communities participating in the study. Studies on lung cancer awareness intervention at community level seem to be limited, particularly in LMICs. This study contributes to this body of knowledge especially within a resource-limited health environment. Since this study was conducted at community level rather than at an individual level, there were observed statistically significant socio-demographic differences in the samples at baseline and post-intervention. However, the effects of the intervention remained significant despite these differences. Most of the intervention studies reported in the literature were conducted an individual level.[13,26-31]

In the current study, more males participated in the baseline than post-intervention. The mean age of the participants post-intervention was younger than at baseline. In addition, here were differences in the level of education. More participants reported higher levels of education post-intervention than baseline. Although there was no difference in the proportion of smokers in the sample at baseline compared to post-intervention (p=0.958), there was a decrease in the average number of cigarettes smoked per day (p<0.001) and packs smoked per week (p=0.026). The proportion of smokers in this study (18.3%) was comparable to the findings of other local and international studies (17.6% and 15.5%),[32,33] although lower than those published by the World Bank (23.8%).[34] These results allude to the difficulty of quitting smoking. The intervention in the current study addressed quitting smoking, yet no change was observed. Other studies have documented smoking cessation efforts by smokers utilising various models.[35-40]

Significantly, more people heard of lung cancer post-intervention than at baseline. Similarly, there were significant increases in the recognition of symptoms of lung cancer post-intervention than at baseline. The most recognised symptom was coughing blood (82.5%, 95% CI 76.2-87.4), followed by persistent chest pain (65.1%, 95% CI 55.4-73.6) and shortness of breath (64.1%, 95% CI 53.9-73.1). An increase in the recognition of worsening or change in existing cough, as a lung cancer symptom, was observed from 12.5% (95% CI 7.7-19.6) to 44.9% (95% CI 34.6-55.6). Comparably, an England study demonstrated increases in the public's recognition of persistent cough as a symptom of lung cancer, together with prompt referrals of suspected lung cancer patients by General Practitioners (GPs), and lung cancer diagnoses.[13] The referral pathways in the South African public health system do not allow for direct referral from the primary health care (PHC) facilities to tertiary health facilities. This context highlights the inherent differences between the South African public health system and that of England's National Health System (NHS),[41] which could have implications in the delays in lung cancer diagnosis.

The current study was conducted during the oncology crisis in KwaZulu-Natal, especially in Durban where most of the targeted communities are located.[42] Participants were encouraged to visit their nearest health facilities if they experienced lung cancer related symptoms. Nevertheless, the intervention increased the proportion of community members that were knowledgeable of early detection of lung cancer (from 46.5%, 95% CI 39.1 – 53.9 to

Table 3. Baseline and post-intervention comparisons of attitudes towards lung cancer among adults in the selected KZN communities.

Characteristic (attitudes)	Baseline (% (95% CI))	Post-Intervention (% (95% CI))	p-value
What would you do in case of coughing blood?			
Nothing	1.5 (0.9 – 2.5)	0.7 (0.3 – 1.7)	0.110*
Consult a medical doctor	25.2 (18.1 – 33.9)	21.8 (15.6 – 29.7)	
Go to a health centre/clinic	73.2 (64.4 – 80.4)	77.4 (69.4 – 83.9)	
Go to a traditional healer	0.1 (0.0 – 1.1)	0 (0 - 0)	
What would you do in case of coughing persistently?			
Nothing	1.9 (1.1 – 3.4)	0.7 (0.3 – 1.8)	0.072
Consult a medical doctor	21.9 (15.5 – 29.9)	21.4 (15.2 – 29.2)	
Go to a health centre/clinic	75.8 (67.4 – 82.6)	77.9 (69.8 – 84.3)	
Go to a traditional healer	0.4 (0.1 – 1.3)	0 (0 - 0)	
If you had a symptom that you thought might be a sign of lung cancer, how soon would you contact your doctor?			
None	1.7 (0.9 – 3.1)	0 (0 - 0)	**<0,001***
1-3 days	71.7 (63.3 – 78.8)	76.6 (66.2 – 84.6)	
4-6 days	9.3 (6.6 – 13.0)	11.7 (7.3 – 18.2)	
1 week	10.0 (7.1 – 13.9)	9.8 (6.2 – 15.2)	
2 weeks	5.6 (2.6 – 11.5)	1.8 (0.7 – 4.7)	
1 month	1.4 (0.7 – 3.0)	0.2 (0.0 – 1.1)	
3 months	0.1 (0.0 – 1.1)	0 (0 - 0)	
6 months	0.1 (0.0 – 1.1)	0 (0 - 0)	
>=12 months	0.1 (0.0 – 1.1)	0 (0 - 0)	
If you had a symptom that you thought might be a sign of lung cancer, how soon would you seek help from a traditional healer?			
None	76.2 (68.0 – 82.8)	80.1 (63.1 – 90.5)	**<0.001***
1-3 days	15.6 (11.3 – 21.3)	1.3 (0.3 – 4.7)	
4-6 days	2.4 (1.2 – 4.7)	9.0 (3.8 – 19.8)	
1 week	1.8 (0.8 – 4.1)	3.9 (1.2 – 12.0)	
2 weeks	3.2 (1.3 – 7.7)	3.9 (1.3 – 10.6)	
1 month	0.5 (0.2 – 1.4)	1.3 (0.3 – 5.7)	
3 months	0 (0 - 0)	0.6 (0.1 – 5.2)	
6 months	0 (0 - 0)	0 (0 - 0)	

To be continued

>=12 months	0.3 (0.1 – 1.2)	0 (0 - 0)	
Are you willing to get a lung cancer screening test?			
Yes	97.3 (95.2 – 98.5)	97.5 (95.5 – 98.6)	0.846
No	2.7 (1.5 – 4.8)	2.5 (1.4 – 4.5)	
Would you want a national screening program made available in the future?			
Yes	98.7 (97.6 – 99.4)	98.8 (97.1 – 99.5)	0.909
No	1.3 (0.6 – 2.5)	1.2 (0.5 – 2.9)	
Are you willing to pay for a lung cancer screening test?			
Yes	32.1 (25.7 – 39.3)	45.7 (36.8 – 54.9)	0.005
No	67.9 (60.7 – 74.3)	54.3 (45.1 – 63.2)	

*Fisher's exact test

81.1%, 95% CI 71.7 – 87.9), and those that had heard of lung cancer screening (from 17.8%, 95% CI 13.5-23.0 to 57.3%, 95% CI 47.4-66.6). Similarly, a study promoting awareness of lung cancer screening among disparate populations demonstrated an increase in screening test knowledge from 25.3% to 79.8%.[30] There was also an increase in the proportion of individuals that were willing to pay for a lung cancer screening test (from 32.1%, 95% CI 25.7 – 39.3 to 45.7%, 95% CI 36.8 – 54.9). This is confirmed by a Malaysian study conducted among smokers and non-smokers that demonstrated their willingness to be screened, if they were knowledgeable about their susceptibility to lung cancer.[11]

There were no statistical differences between baseline and post-intervention in terms of seeking medical attention when coughing blood and coughing persistently. Perhaps, the cause was because of the already high proportion of participants already reporting to seek medical attention at baseline. Nonetheless, there was statistically significant increase (76.6%, 95% CI 66.2-84.6 *vs* 71.7%, 95% CI 63.3-82.6) in the proportion of participants that would consult with the doctor within three days, if they thought they had a lung cancer symptom (p=0.035). There was a reduction in the proportion of participants that would consult traditional healers, if they thought they had a lung cancer symptom. These changes indicate the participants' understanding of early presentation to the health facilities and early detection. The findings of this current study concur with a study conducted in the United Kingdom (UK), which reported that those that did not recognise the persistent cough as a warning sign for lung cancer were likely to wait for over two weeks to seek medical help (OR=1.30, 95% CI 1.17 – 1.46).[43] However, an Australian study demonstrated mixed responses on whether participants would seek medical assistance from a (GP) if they had a persistent cough.[27] Some of these mixed responses explained whether the participants trusted their doctor or not. Those that reported high levels of trust expressed more willingness to consult their doctors. Another pertinent study in the UK revealed that the decision to consult a health care professional and seek medical help was prompted, largely, by patient and disease factors, and the healthcare factors had a lesser role to play.[29] This study also demonstrated the simplicity of being appropriately diagnosed in the region. On the contrary, in South Africa a patient might wait for a protracted period before receiving a diagnosis because of health system related factors.[44-46] These factors may influence patients negatively in terms of seeking medical health early.

Close to half of the participants were willing to pay for a lung cancer screening test post-intervention (45.7%, 95% CI 36.8-54.9) compared to baseline (32.1, 95% CI 25.7-39.3) (p=0.005). Nevertheless, there were no differences at baseline and post-intervention regarding the willingness to screen for lung cancer and the desire for a national lung cancer screening programme being available in the country. These were already highly subscribed at baseline. This concept has not been explored in other studies and lung cancer screening in LMICs is uncommon.[47]

Conclusions

The public health implication from these results suggests the importance addressing the following issues in the community response strategy on lung cancer prevention: i) increase the recognition of signs and symptoms, ii) focus on the importance of early detection and health seeking behaviour (including screening), iii) smoking cessation, and iv) addressing the perceived health system barriers. This study also demonstrated the participants' willingness to be screened and even paying for the services. The introduction of a lung cancer screening programme and streamlining the referral pathway for lung cancer patients by health policy makers is recommended. This has a potential to encourage patients to utilise the health services as observed in the England and UK studies.[13,29] However, increasing awareness and lung cancer suspicion index among healthcare workers at Primary Health Care level should be deliberately addressed for optimum results.[44-47]

Table 4. Knowledge outcomes of a lung cancer awareness intervention among adults in the selected KZN communities.

Characteristic	Knowledge Median Score (IQR)			p-value
	Baseline	Post-Intervention	Median change in score	
Time	42.4 (22.7,59.2)	63.5 (40.1,80.5)	+21.1 (17.4,21.3)	**<0.001**
Age group				
20-29 years	36.1 (18.5,65.3)	60.5 (40.1,76.1)	+24.4 (10.8,21.6)	**<0.001**
30-39 years	42.5 (25.0,56.5)	65.9 (43.0,83.3)	+23.5 (18.0,26.8)	0.825
40-49 years	42.2 (16.3,56.9)	63.1 (38.0,80.5)	+20.9 (21.7,23.6)	**0.005**
50-59 years	39.9 (19.5,59.5)	68.8 (40.1,85.7)	+28.9 (20.6,26.2)	**0.001**
60-69 years	45.2 (25.6,59.4)	66.1 (33.1,80.5)	+20.9 (7.5,21.1)	**<0.001**
70+ years	45.4 (24.9,62.4)	66.2 (60.0,83.1)	+20.8 (20.7,35.1)	**<0.001**
Gender				
Male	42.5 (27.9,59.5)	65.9 (40.1,80.5)	+23.4 (12.2,21.0)	
Female	42.4 (18.3,59.3)	63.4 (40.2,83.1)	+21.0 (21.9,23.8)	0.188
Highest level of education				
Lower Primary	48.3 (31.3,64.9)	66.2 (57.6,88.7)	+17.9 (26.3,23.8)	
Higher Primary	48.3 (36.9,62.4)	80.3 (34.4,88.7)	+32.0 (-2.5,26.3)	0.527
Up to grade 10	36.8 (16.2,56.5)	62.9 (17.6,80.5)	+26.1 (1.4,24.0)	0.659
Up to grade 12	36.9 (19.4,53.9)	63.4 (37.5,80.4)	+26.5 (18.1,26.5)	0.626
Tertiary	51.1 (36.6,65.1)	65.8 (43.1,80.5)	+14.7 (6.5,15.4)	**<0.001**
Household income				
None	37.1 (25.3,76.5)	43.3 (31.6,71.6)	+6.2 (6.3,-4.9)	
More/less R1500	44.5 (25.4,59.2)	70.4 (57.6,86.1)	+25.9 (26.9,32.2)	0.623
More/less R3000	38.4 (16.9,59.8)	68.8 (54.7,82.9)	+30.4 (23.1,37.8)	0.663
More/less R6000	45.1 (28.1,54.3)	66.1 (40.1,80.5)	+21.0 (12.0,26.2)	**0.013**
Participant distribution by area				
Chatsworth	47.5 (19.4,66.6)	63.3 (20.1,74.8)	+15.8 (0.7,8.2)	
South Durban	39.9 (31.0,54.0)	38.9 (29.0,57.3)	-1.0 (-2.0,3.3)	0.804
Umlazi	49.8 (34.0,59.7)	77.6 (54.8,86.2)	+27.8 (20.8,26.5)	0.067
Imbali	14.2 (5.7,53.5)	77.3 (40.1,94.4)	+63.1 (34.4,40.9)	0.373
Sobantu	39.8 (31.4,45.4)	66.2 (60.3,74.5)	+26.4 (28.9,29.1)	0.634
Ever worked in the chemicals industry				
No	41.7 (21.8,56.8)	65.9 (40.2,82.9)	+24.2 (18.4,26.1)	
Yes	51.0 (35.8,62.4)	45.9 (34.8,70.5)	-5.1 (-1.0,8.1)	0.662
Ever heard of lung cancer				
No	35.6 (8.5,62.4)	43.1 (6.3,77.6)	+7.5 (-2.2,15.2)	
Yes	42.8 (32.2,56.8)	65.9 (43.1,82.9)	+23.1 (10.9,26.1)	**<0.001**
What would you do in case of coughing persistently?				
Nothing	45.3 (36.0,56.5)	40.0 (37.4,51.6)	-5.3 (1.4 -4.9)	
Consult a medical doctor	39.9 (29.5,53.9)	46.1 (34.4,66.2)	+6.2 (4.9,12.3)	0.817
Go to a health centre/clinic	42.6 (21.9,59.8)	68.8 (48.7,83.3)	+26.2 (26.8,23.5)	0.401
Go to a traditional healer	13.5 (8.5,59.6)	0 (0)	-13.5 (-8.5 -59.6)	0.756
Are you willing to pay for a lung cancer screening test?				
No	41.4 (19.7,56.9)	66.2 (43.3,80.5)	+24.8 (23.6,23.6)	
Yes	45.7 (28.5,62.7)	63.4 (43.0,83.2)	+17.7 (14.5,20.5)	**<0.001**
If you had a symptom that you thought might be a sign of lung cancer, how soon would you contact your doctor?				

To be continued

None	48.1 (41.8,76.9)	0(0)	-48.1 (-41.8 -76.9)	
1-3 days	42.8 (27.6,59.5)	66.2 (43.6,83.0)	+23.4 (16.0,23.5)	0.509
4-6 days	26.9 (8.4,45.3)	68.8 (40.2,86.2)	+41.9 (31.8,40.9)	0.538
1 week	42.3 (27.9,63.9)	54.7 (34.7,66.2)	+12.4 (6.8,2.3)	0.668
2 weeks	48.3 (19.3,69.5)	27.7 (13.3,47.2)	-20.6 (-6.0-22.3)	0.582
1 month or more	42.2 (16.2,62.4)	46.3 (46.3,46.3)	+4.1 (30.1-16.1)	0.666
If you had a symptom that you thought might be a sign of lung cancer, how soon would you seek help from a traditional healer?				
None	42.4 (25.0,56.9)	66.2 (43.4,83.3)	+23.8 (18.4,26.40	
1-3 days	42.6 (24.3,62.8)	57.3 (30.2,80.1)	+14.7 (5.9,17.3)	0.155
4-6 days	38.2 (14.2,36.8)	45.7 (14.3,77.2)	+7.5 (0.1,40.4)	**0.023**
1 week	46.7 (16.3,76.9)	18.9 (14.5,40.2)	-27.8 (-1.8-36.7)	0.229
2 weeks	53.8 (18.2,73.7)	28.8 (14.5,68.8)	-25.0 (-3.7-4.9)	0.402
1 month or more	53.6 (48.4,59.6)	43.0 (28.7,54.3)	-10.6 (-19.7-5.3)	0.802

Table 5. Knowledge outcomes of a lung cancer awareness intervention among adults in the selected KZN communities.

	Unadjusted OR (95% CI)				Multivariable Model	
Characteristic	**Baseline**	**p-value**	**Post-Intervention**	**p-value**	**Adjusted OR (95% CI)**	**p-value**
Time	Ref		5.123 (4.217-6.222)	<0.001	4.370 (1.477-12.928)	**0.008**
Age group						
20-29 years	Ref		3.338 (1.719-6.484)	<0.001	Ref	
30-39 years	0.832 (0.422-1.640)	0.596	4.638 (2.419-8.893)	<0.001	6.753 (2.122-21.493)	**0.001**
40-49 years	0.662 (0.347-1.263)	0.211	3.812 (1.990-7.301)	<0.001	4.711 (1.542-14.393)	**0.007**
50-59 years	0.935 (0.494-1.770)	0.836	3.281 (1.650-6.525)	0.001	3.704 (1.173-11.697)	**0.026**
60-69 years	0.878 (0.448-1.722)	0.705	3.098 (1.407-6.825)	0.005	6.707 (1.576-28.554)	**0.010**
70+ years	0.777 (0.390-1.549)	0.473	3.735 (1.493-9.342)	0.005	19.647 (1.586-243.355)	**0.020**
Gender						
Male	Ref		4.235 (3.152-5.690)	<0.001	Ref	
Female	0.900 (0.693-1.693)	0.431	4.361 (3.347-5.683)	<0.001	1.429 (0.720-2.906)	0.325
Highest level of education						
Lower Primary	Ref		2.380 (0.620-9.135)	0.207	Ref	
Higher Primary	0.959 (0.423-2.171)	0.919	1.273 (0.434-3.731)	0.661	0.078 (0.008-0.781)	**0.030**
Up to grade 10	0.731 (0.330-1.621)	0.441	2.654 (1.126-6.250)	0.026	0.071 (0.009-0.556)	**0.012**
Up to grade 12	0.791 (0.377-1.661)	0.536	3.579 (1.681-7.617)	0.001	0.162 (0.021-1.239)	0.079
Tertiary	1.266 (0.577-2.781)	0.556	7.305 (3.429-15.564)	<0.001	0.349 (0.046-2.626)	0.307
Cigarettes smoked per day, **mean**	Ref		0.924 (0.880-0.970)	0.001	0.956 (0.873-1.046)	0.325

To be continued

Packs smoked per week, **mean**	Ref		0.916 (0.855-0.981)	0.012	0.938 (0.829-1.061)	0.312
Household income						
None	Ref		1.482 (0.938-2.342)	0.092	Ref	
More/less R1500	0.603 (0.383-0.948)	0.028	8.580 (5.149-14.295)	<0.001	0.624 (0.196-1.985)	0.424
More/less R3000	0.722 (0.449-1.160)	0.178	5.205 (3.136-8.638)	<0.001	0.387 (0.117-1.284)	0.121
More/less R6000	1.228 (0.766-1.969)	0.394	4.599 (2.803-7.544)	<0.001	0.555 (0.217-1.419)	0.219
Participant distribution by area						
Chatsworth	Ref		2.087 (1.463-2.977)	<0.001	Ref	
South Durban	0.996 (0.243-4.087)	0.996	1.436 (0.348-5.933)	0.667	0.067 (0.014-0.3120	**0.001**
Umlazi	1.852 (0.510-6.719)	0.349	12.305 (3.357-45.110)	<0.001	1.974 (0.431-9.043)	0.381
Imbali	0.159 (0.041-0.623)	<0.001	10.782 (2.683-43.333)	0.001	0.178 (0.036-0.890)	**0.036**
Sobantu	0.740 (0.138-3.965)	0.725	5.315 (0.996-28.367)	0.051	0.761 (0.106-5.465)	0.786
Ever worked in the chemicals industry						
No	Ref		5.469 (4.386-6.819)	<0.001	Ref	
Yes	1.562 (1.053-2.317)	0.027	3.396 (2.022-5.704)	<0.001	0.212 (0.011-0.733)	**0.014**
Ever heard of lung cancer						
No	Ref		1.254 (0.702-2.240)	0.444	Ref	
Yes	2.056 (1.545-2.734)	<0.001	9.084 (6.832-12.078)	<0.001	7.806 (2.393-25.467)	**0.001**
What would you do in case of coughing persistently?						
Nothing	Ref		5.327 (0.803-35.326)	0.083	Ref	
Consult a medical doctor	1.009 (0.407-2.501)	0.985	2.530 (1.012-6.325)	0.047	14.184 (1.368-147.105)	**0.026**
Go to a health centre/clinic	0.918 (0.381-2.215)	0.850	5.640 (2.326-13.674)	<0.001	10.961 (1.098-109.462)	**0.041**

To be continued

Go to a traditional healer	0.884 (0.107-7.301)	0.909	1		20.326 (0.257-1609.006)	0.177
Are you willing to pay for a lung cancer screening test?						
No	Ref		5.459 (4.168-7.150)	<0.001	Ref	
Yes	1.907 (1.416-2.568)	<0.001	7.758 (5.806-10.366)	<0.001	1.111 (0.468-2.637)	0.812
If you had a symptom that you thought might be a sign of lung cancer, how soon would you contact your doctor?						
None	Ref		1		Ref	
1-3 days	0.603(0.200-1.822)	0.370	3.180 (1.055-9.591)	0.040	0.175 (0.004-7.963)	0.371
4-6 days	0.278 (0.084-0.914)	0.035	4.518 (1.379-14.805)	0.013	0.114 (0.002-7.285)	0.306
1 week	0.777 (0.239-2.523)	0.675	1.554 (0.479-5.039)	0.463	0.039 (0.001-2.329)	0.120
2 weeks	0.529 (0.154-1.811)	0.310	1.375 (0.300-6.298)	0.682	0.084 (0.001-12.096)	0.329
1 month or more	0.607 (0.145-2.547)	0.495	3.467 (0.157-76.372)	0.431	0.097 (0.000-19.100)	0.386
If you had a symptom that you thought might be a sign of lung cancer, how soon would you seek help from a traditional healer?						
None	Ref		5.824 (4.670-7.264)	<0.001	Ref	
1-3 days	0.826 (0.570-1.197)	0.312	3.521 (2.402-5.160)	<0.001	0.416 (0.127-1.368)	0.149
4-6 days	0.580 (0.230-1.465)	0.249	4.538 (0.498-41.383)	0.180	0.809 (0.017-38.833)	0.914
1 week	1.191 (0.410-3.458)	0.748	1.652 (0.684-3.990)	0.265	1	
2 weeks	1.424 (0.643-3.156)	0.384	2.822 (0.750-10.616)	0.125	1	
1 month or more	1.156 (0.263-5.078)	0.848	2.226 (0.675-7.338)	0.189	0.208 (0.008-5.736)	0.354

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