

Lung cancer awareness and palliative care interventions implemented in Africa: A systematic scoping review'

Ugochinyere Ijeoma Nwagbara (✉ ugochinyereijeoma@gmail.com)

University of KwaZulu-Natal College of Health Sciences <https://orcid.org/0000-0003-1771-0570>

Themba G Ginindza

University of KwaZulu-Natal College of Health Sciences

Khumbulani W Hlongwana

University of KwaZulu-Natal College of Health Sciences

Research article

Keywords: Lung cancer, Awareness, Palliative care, Interventions

Posted Date: March 2nd, 2020

DOI: <https://doi.org/10.21203/rs.3.rs-15666/v1>

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Version of Record: A version of this preprint was published on September 29th, 2020. See the published version at <https://doi.org/10.1186/s12889-020-09561-0>.

Abstract

Background: Lung cancer is the most common cancer and cause of cancer-related deaths, responsible for nearly one in five deaths across the globe. In low and middle-income countries (LMICs), lung cancer is often diagnosed at a late stage due to poor public knowledge and awareness of the signs and symptoms of lung cancer. It is believed that increasing the awareness about lung cancer is key to reducing the diagnosis and treatment delays. Early implementation of palliative care has also been reported to improve a patient's quality of life, symptom burden, and even survival. The aim of this paper was to map evidence on lung cancer awareness and palliative care interventions implemented in Africa.

Methods: A scoping review was performed following the method of Arksey and O'Malley. Systematic searches were performed using EBSCOhost platform. A keyword search from the following electronic databases were conducted: PubMed/MEDLINE, Google Scholar, Science Direct, World Health Organization (WHO) library, and grey literature. The screening was guided by the inclusion and exclusion criteria. The quality of the included studies was determined by Mixed Method Appraisal Tool (MMAT). A thematic content analysis was used to present the narrative account of the reviews, and NVivo version 11 was employed to extract themes from all included studies.

Results: A total of 2886 articles were screened, and 236 met the eligibility criteria. Furthermore, 167 articles were also excluded following abstract screening. Sixty-nine (69) articles were selected for full-article screening by two researchers with 9 being selected for independent detailed data extraction for this synthesis. These studies were also subjected to methodological quality assessment. Of the nine included studies, eight studies described at least one lung cancer warning signs and symptoms, while one study described the effectiveness of palliative care for lung cancer. Eight articles recognized the level of lung cancer knowledge, risk factors and awareness of warning signs and symptoms in LMICs, mostly Africa and Asia.

Conclusions: Most of the participants were aware of tobacco use as a risk factor for lung cancer, but the majority still had limited knowledge on the other pre-disposing risk factors. There is limited evidence on the palliative treatment of symptoms, and majority of patients continued to suffer from uncontrolled symptoms and unmet needs. Therefore, the urgent need for timely access to palliative care to be introduced from diagnosis to end of life to improve the quality of life of the lung cancer patients and their families.

Background

Cancer is an emerging healthcare problem in Africa and is the second leading cause of death after cardiovascular diseases worldwide (1). Globally, more than 20 million new cancer cases are projected for 2025 compared to an estimated 14.1 million and 17.5 million new cancer cases in 2012 and 2015 respectively (1-4). In low and middle-income countries, lung cancer is often diagnosed at a late stage due to poor public knowledge and awareness of its signs and symptoms (5, 6). Lung cancer is the most

common cancer and cause of cancer-related deaths, responsible for nearly one in five deaths across the globe (7, 8). In 2008, about 715,000 new cancer cases and 542,000 cancer deaths occurred in Africa (9). These numbers are expected to double in the next 20 years due to the aging and population growth, as well as the changes in lifestyle factors. These lifestyle factors are associated with urbanization and economic development of risk factors, such as smoking, obesity, physical inactivity and dietary patterns (4, 9, 10). It is believed that increasing the awareness about lung cancer is key to reducing the diagnosis and treatment delays (10). Evidence suggests that a significant portion of the increase in cancer is due to several factors, including poor awareness of the signs, symptoms, and risk factors for cancer; poor availability of tests or screening programs; and limited access to standard treatment (5, 10, 11). People may delay help-seeking due to poor knowledge of lung cancer symptoms (12, 13), or wait until the disease advances to a terminal stage (14, 15). Lack of public awareness of lung cancer and recognition of what to do when symptoms develop contribute to this delay (16, 17). Early recognition by patients about the signs and symptoms of lung cancer depends on their level of awareness (4). The World Health Organization (WHO) defines palliative care as: “an approach that improves the quality of life of patients and their families facing the problems associated with life-threatening illness, through the prevention and relief of suffering by means of early identification and impeccable assessment and treatment of pain and other problems, physical, psychosocial, and spiritual” (18). Palliative care is focused on providing relief from the symptoms and stress of a life-threatening illness such as lung cancer and improving quality of life for both the patient and the family. Early implementation of palliative care has been reported to improve a patient’s quality of life, symptom burden, and even survival (19, 20). Seventy percent of lung cancer deaths worldwide are due to tobacco use, with smokers being twenty times more likely to die from lung cancer than their non-smoking counterparts (21, 22).

In Africa, cancer is predicted to have more than 85% increase by 2030, hence Morhason-Bello et al. (23) and Stefan et al. (24) have proposed various interventions, including cancer awareness, advocacy, research, workforce, care, training and funding to avert this situation (24). Poor awareness of cancer symptom is likely to contribute to patient delays in presenting to medical professionals (14, 25), and in turn contribute to later stage diagnosis (25). A systematic review by Austoker et al (26) found limited evidence of the effectiveness of community-level interventions to promote cancer awareness. Over 90% of patients with lung cancer are symptomatic at the time of diagnosis and experience two to three symptoms on average (27, 28). Cough is the most common presenting symptom and has been noted to be a good prognostic indicator (14, 17, 27). It has also been shown that many patients will visit their general practitioner (GP) on more than one occasion before further investigation or onward referral (27). The World Health Organisation (WHO) expects the burden of cancer in Africa to grow rapidly in the coming years and for incidence to exceed 1 million per year by 2030, if the situation is not averted (29). There is little evidence on lung cancer awareness and palliative care interventions implemented in Africa. The findings of this systematic scoping review will better our understanding of the lung cancer awareness and palliative care interventions implemented in Africa, expose knowledge gaps and stimulate research to fill in the gaps. Thus, the purpose of this systematic scoping review is to map the available evidence on the lung cancer awareness and palliative care interventions implemented in Africa.

Methods

This study was conducted through a systematic scoping review. This approach is particularly appropriate when the main sources and types of available evidence are complex or have not previously been comprehensively reviewed (30). This review included a quality assessment as recommended by Levac et al (31) and was guided by the 5-step methodological framework outlined by Arksey and O'Malley (32). These steps consist of: (1) identifying the research question; (2) identifying the relevant studies; (3) study selection and eligibility; (4) charting the data, and (5) collating, summarizing and reporting the results.

1. Identifying the research question.

Our research question was “what evidence exist on the lung cancer awareness and palliative care interventions implemented in Africa?”.

Research sub-question is as follows:

- What awareness programmes and early diagnostic interventions are implemented in Africa for lung cancer?
- What are the palliative care interventions implemented in Africa for lung cancer?

2. Identifying relevant studies.

To identify relevant studies, we performed a systematic scoping review including all study designs published in peer-reviewed journals as well as in grey literature addressing the research question. The search was performed using EBSCOhost platform. A keyword search from the following electronic databases was conducted: PubMed/MEDLINE, Google Scholar, Science Direct, World Health Organization (WHO) library, and grey literature. Studies were identified by searching literatures published in English language from January 2008 to date. We restricted the start date to 2008 because searches of the literature have shown that most relevant studies were conducted after 2008. Articles were also searched through the 'Cited by' search as well as citations included in the reference lists of included articles. The search terms included Lung cancer, Awareness, Palliative care and Interventions. Boolean terms (AND, OR) were used to separate the keywords during the search. Medical Subject Headings (Mesh) terms were also included in the search. We hand searched eligible studies from the list of references of included studies. The search strategy is included in **Additional file 1**.

3. Study selection and eligibility.

Following title screening from the above-mentioned databases, articles with relevant study titles for this research were uploaded on the Endnote X7 software. Search results from different electronic databases were combined in a single EndNote library. Studies which did not address the research question and the duplicates of the same records were then excluded. Abstract and full articles were screened from the included studies by two independent reviewers (UIN and MO). An abstract screening form with questions was developed based on the review eligibility criteria. Discrepancies between reviewers at abstract and

full article stages was resolved by involving a third screener. The relevant studies were identified with guidance from the inclusion and exclusion criteria which was formulated according to the research questions.

Inclusion criteria

For studies to be included they had to meet the following criteria:

- Articles published in English.
- Published from 2008 to present.
- All study designs with relevant interventions.
- Studies focusing on lung cancer awareness and or palliative care interventions in adults.
- Research focusing on lung cancer awareness interventions implemented in Low and Middle-Income Countries (LMICs) and whose conclusions and discussions demonstrate transferable findings to African settings.

Exclusion criteria

Studies with the following characteristics were excluded:

- Articles published in other languages other than English
- Studies published before 2008.
- Articles focusing on lung cancer awareness interventions implemented in High income countries.
- Studies focusing on lung cancer awareness and palliative care interventions in children.

4. Charting the data.

Data on the study setting and the key findings described in each article were recorded and organized into different themes using NVivo 11. Information from the selected studies was sorted and organized into the following categories: author and year, country of origin, aim, study population, study design, study setting, and most relevant findings.

5. Collating, summarising and reporting the results.

In the process of collating and summarizing the findings, the extracted evidence was repeatedly reviewed. Results were summarized to present an overview of the current evidence on lung cancer awareness and palliative care interventions implemented in sub-Saharan Africa. We performed a thematic content analysis of the themes to identify further contextual factors (e.g. knowledge about lung cancer and awareness on risk factors, signs and symptoms for lung cancer, awareness interventions, palliative care interventions etc).

Quality assessment

Mixed Method Quality Appraisal Tool (MMAT) Version 2011 (33) , was used for quality assessment of included studies for the purpose of evaluating the risk of bias. Two reviewers (UIN and MO) independently assessed the quality of evidence of the studies included. The studies were assessed in the following domains: the appropriateness of aim of study, adequacy and methodology, study design, data collection, study selection, data analysis, presentation of findings, author's discussions and conclusions. An overall quality percentage score for each of the included studies was calculated and scores interpreted as low quality ($\leq 50\%$), average quality (51-75%), and high quality (76-100%).

Results

Screening results

After the title screening and deletion of duplicates, this scoping review found 236 eligible studies from a total of 2886 articles. A total of 167 articles were also excluded following abstract screening. Sixty-nine (69) articles were selected for full-article screening by two researchers with 9 being selected for independent detailed data extraction for this synthesis. These studies were also subjected to methodological quality assessment. Cohen's kappa coefficient (κ) statistic using Stata 13.0SE (Stata corp. College station, Texas, USA) was used to measure inter-rater agreement between reviewers (34), and the result shows that there was 77.78% agreement versus 80.25% expected by chance which constitutes a considerably poor agreement between screeners (Kappa statistic = - 0. 13 and p-value >0.05). However, the McNemar's chi-square statistic suggests that there is not a statistically significant difference in the proportions of yes/no answers by reviewer with p-value >0.05. The degree of agreement calculation is included in **Additional file 2**.

Characteristics of included studies

All included studies were conducted in LMICs and published between 2008 and 2018. The total sample size from primary studies was 3563 participants. Six studies showed majority of the participants to be males (19, 36-40) , two studies had a slight female preponderance (41, 42), while one study (20) was a literature review . Of the nine studies included, 6 were cross-sectional studies (36-39, 41, 42), one was a pre-test and post-test study design (40), one was a prospective study (19) and one was a literature review (20). Of the nine included studies, eight studies described at least one lung cancer warning signs and symptoms (19, 36-42), while one study described the effectiveness of palliative care for lung cancer (20). The participants from one study had a good knowledge about lung cancer (42), one had a moderate knowledge of lung cancer (39), four studies had low level of knowledge about lung cancer (36, 38, 40, 41) and one study stated that knowledge about lung cancer varied significantly by socio-demographic factors (37). Characteristics of the included studies are presented in **Additional file 3**.

Quality of evidence from included primary studies

Of the 9 included studies, 8 primary studies went through quality assessment using the Mixed Methods Appraisal Tool (MMAT) – Version 2011 (33) while 1 study was a literature review, hence did not undergo quality assessment (20). The studies were assessed based on all the categorized domains. Four studies scored the high - quality percentage of 76-100% (19, 37, 38, 41). The remaining four studies scored an average quality percentage of 51 - 75% (36, 39, 40, 42). None of the seven included studies for quality assessment scored low quality ($\leq 50\%$) percentage. The overall evidence was considered to have minimal risk of bias. Quality assessment of included studies are presented in **Additional file 4**.

Themes from included studies

Knowledge about lung cancer

From the seven studies, participants from one study had a good knowledge about lung cancer (42), and another one had a moderate knowledge of lung cancer (39). In another study, knowledge about lung cancer varied widely, mainly by socio-demographic factors (37), whereas in other four studies, low levels of knowledge about lung cancer were revealed (36, 38, 40, 41). A study conducted in Malaysia found that most of the students had a good knowledge about lung cancer (42). They also knew that not only males were affected by lung cancer (42), in contrast with a very poor knowledge of lung cancer demonstrated by more than half of the teachers in West Bengal. They mentioned that only males are affected by lung cancer, which is an incorrect information. Lung cancer can affect both males & females (39).

Awareness on risk factors, signs and symptoms for lung cancer

All the participants from the seven studies showed a good knowledge for lung cancer risk factors (36-42). Regarding lung cancer signs and symptoms, two studies had a good knowledge about the signs and symptoms for lung cancer (36, 42), three studies showed poor knowledge for lung cancer (38, 40, 41), one had a very poor knowledge about lung cancer signs and symptoms (39) and one study was not specific on the participant's knowledge of the signs and symptoms for lung cancer (37). Regarding the knowledge about lung cancer and smoking, two studies showed that about 92% (39) and 91.3% (36) of the participants mentioned that cigarette smoking was the most common risk factor of lung cancer respectively. Chawla et al. (37) found that 100% of the males were aware that smoking is a primary risk factor for lung cancer. Three studies showed that the participants had a low awareness of the non-specific warning signs of lung cancer (38, 40, 41). A study conducted by Naskar et al. (39) in West Bengal showed that 92% of the participants reported that asbestos, ionizing radiation and other cancer-causing substances are some of risk factors of lung cancer (39). Another Malaysian study by Al-Naggar et al. (36) reported that 75.6% of the participants mentioned that occupational exposure was one of the risk factors of lung cancer (36).

A study by Zainuddin et al, conducted in Malaysia among undergraduate students showed that 43.5% of the students knew that exercise or physical activities may reduce the risk of getting lung cancer (42). This is contrary to the study conducted by Al-Naggar et al among secondary school male teachers in the same country, whereby the majority (83%) knew that exercise could reduce the risk factors of lung cancer (36).

Lung cancer awareness interventions

A study by Shankar et al (40), conducted a Pink Chain Campaign on lung cancer awareness in 2011 in various women colleges in India. The same questionnaire was used for a Pre-test and post-test related to lung cancer awareness programs at the end of interactive session, at 1 year and 6 months respectively (40). The campaign at pre-test awareness showed a significant increase in level of knowledge regarding lung cancer at 6 months and this was sustained at 1 year. At post-awareness after 1 year and 6 months, there was a significant change in alcohol and smoking habits (40). This shows the adoption of safe practices after an improved awareness about lung cancer. Magazines and newspapers were the primary source for information regarding risk factors, signs and symptoms of lung cancer in more than 60% of teachers whereas more than 30% teachers were educated by doctors (40).

Palliative care interventions

Palliative treatment options for lung cancer include chemotherapy, radiotherapy and supportive care (20). The Turkish study by Bulbul et al. (19), showed that, at least 50% of all lung cancer patients were using nonnarcotic analgesics either alone or in combination with narcotic analgesics for the relief of pain (19), 30.2% of the patients underwent palliative radiotherapy for bone metastasis (19). This study also found that female patients were more likely to report higher levels of anxiety and depression than their male counterparts (19). A literature review by Li and Li (20) on the effectiveness of palliative care for non-small cell lung cancer showed that palliative care has been recommended as the standard of care for patients with advanced NSCLC based on the results of random clinical trials completed over the past several decades (20). A study showed that Home oxygen use, and bronchodilator use was higher among lung cancer patients, since 1/4 to 1/2 of lung cancer patients are reported to have chronic obstructive pulmonary disease (19).

Discussion

Mapping evidence on the lung cancer awareness and palliative care interventions implemented in Africa is of primary importance to inform recognition of lung cancer risk factors, signs and symptoms, particularly in LMICs. In this scoping review, we identified 9 articles published between 2008 and 2018. Eight articles recognized the level of lung cancer knowledge, risk factors and awareness of warning signs and symptoms in LMICs mostly Africa and Asia (19, 36–42). We found limited evidence to inform policy on individual or community level interventions to promote lung cancer awareness and palliative care in LMICs. The major symptoms of lung cancer as reported by the included studies were chest pain, coughing out blood, appetite loss, pain, shortness of breath, repeated respiratory infection, depression and tiredness (36, 38–42). The reviewed studies all stated the importance in educating the public on how to know and recognize the risk factors and symptoms of lung cancer. Available evidence from our reviewed studies suggest that most of the participants recognized tobacco use as the main risk factor for lung cancer and more than half believed that second-hand smoking and air-pollution were also risk factors for lung cancer (36–42). This may reflect the effectiveness of anti-smoking initiatives in

educating the public on the harmful effects of cigarette smoke (41). There is a poor recognition of the early warning signs of lung cancer in LMICs, so there is urgent need for the public and health professionals to be aware of the signs and symptoms of lung cancer to avoid delays in timely diagnosis (43). Lung cancer preventive measures mentioned by the participants were smoking cessation, avoiding second-hand smoking, avoiding unnecessary x-ray image of the chest, banning smoking totally in public places as well as in institutions (36, 39). A study stated that at least 50% of all lung cancer patients were using non-narcotic analgesics either alone or in combination with narcotic analgesics for pain relief (19), and there was a significant number of unmet needs reported by patients with lung cancer (19). Most patients reported continuing symptoms, and a significant number of patients with dyspnea and pain reported that they were not receiving treatment (19). There is need for early palliative care to provide relief from pain and other distressing symptoms and give the patients and their families the best possible quality of life. Some studies suggest that exercise or physical activities may reduce the risk of getting lung cancer (36, 42). A study by Shankar et al. (40), conducted during a Pink Chain Campaign on cancer awareness in 2011 in various women colleges in India found that the overall awareness of risk factors, sign and symptoms, screening modalities of lung cancer improved within a year along with practices related to smoking and alcohol consumption (40). There is therefore, a need to increase public awareness of lung cancer through the media and awareness campaigns.

Strengths and limitations of this study

The advantage of conducting a scoping review was evident in how it highlighted the dearth of evidence on the lung cancer awareness and palliative care interventions in Africa, thereby identifying potential research gaps and future research needs. The systematic nature of the searches using different database and different searching strategies (manual and electronic) were the most important strength of this study. An important limitation is that, although a thorough search of the literature was conducted using clear inclusion and exclusion criteria, it is possible that relevant articles were missed particularly given that only one person was involved in study selection. The review was limited to studies published in English, as it is the commonly used language for communication in most SSA countries. The review was limited to articles published from 2008 to June 2018 because the literature searches showed that most relevant studies were conducted after 2008. The review focused on articles published in LMICs, due to comparable settings and similar resources available.

Conclusions

This systematic scoping review of literature highlighted the lung cancer awareness and palliative care interventions implemented in LMICs. We found some evidence on interventions delivered to individuals during a campaign which showed improvement in healthy practices related to smoking and alcohol consumption. Most of the participants were aware of tobacco use as a risk factor for lung cancer but majority still had limited knowledge on the other pre-disposing risk factors. From our studies, there was limited evidence on the palliative treatment of symptoms, and majority of patients continued to suffer from uncontrolled symptoms and unmet needs. Therefore, the urgent need for timely access to palliative

care to be introduced from diagnosis to end of life to improve the quality of life of the lung cancer patients and their families. Health education activities against smoking should be implemented in schools, universities and the community and also awareness programmes and campaigns to increase lung cancer knowledge and warning signs.

Declarations

Ethics approval and consent to participate

This article is part of a MMedSc thesis, which is being currently conducted in accordance with permission from the ethics committee of the University of KwaZulu-Natal (UKZN) Humanities & Social Sciences Ethics Committee (HSSREC), under the protocol reference number HSS/0544/018M.

Consent for publication

Not applicable

Availability of data and materials

All data generated or analysed during this study are included in this published article and its supplementary information files.

Competing interests

The authors declare that they have no competing interests.

Funding

Not applicable

Authors' contributions

UIN conceptualised the study under the supervision of TGG and KWH and designed data collection methods. UIN, TGG and KWH contributed to writing the final manuscript. All authors critically reviewed and approved of the final manuscript.

Acknowledgements

The authors would like to thank the College of Health Sciences, University of KwaZulu-Natal (UKZN) for the provision of resources towards this review. The Multinational Lung

Cancer Control Programme (MLCCP) to have supported this project and the UKZN Systematic Review Unit for providing the training and technical support.

Authors' information

No additional information provided.

Abbreviations

GP General practitioner

LMICs Low- and Middle-Income Countries

MeSH Medical Subject Headings

MMAT Mixed Method Appraisal Tool

NSCLC Non-Small Cell Lung Cancer

PRISMA Preferred Report Items for Systematic and Meta-Analysis

SSA Sub-Saharan Africa

WHO World Health Organization

References

1. Fitzmaurice C, Allen C, Barber RM, Barregard L, Bhutta ZA, Brenner H, et al. Global, regional, and national cancer incidence, mortality, years of life lost, years lived with disability, and disability-adjusted life-years for 32 cancer groups, 1990 to 2015: a systematic analysis for the global burden of disease study. *JAMA oncology*. 2017;3(4):524-48.
2. Ferlay J, Soerjomataram I, Dikshit R, Eser S, Mathers C, Rebelo M, et al. Cancer incidence and mortality worldwide: sources, methods and major patterns in GLOBOCAN 2012. *International journal of cancer*. 2015;136(5).
3. Fidler MM, Soerjomataram I, Bray F. A global view on cancer incidence and national levels of the human development index. *International journal of cancer*. 2016;139(11):2436-46.
4. Torre LA, Bray F, Siegel RL, Ferlay J, Lortet-Tieulent J, Jemal A. Global cancer statistics, 2012. *CA: a cancer journal for clinicians*. 2015;65(2):87-108.
5. Al-Azri M, Al-Hamed I, Al-Awisi H, Al-Hinai M, Davidson R. Public awareness of warning signs and symptoms of cancer in Oman: a community-based survey of adults. *Asian Pacific journal of cancer prevention : APJCP*. 2015;16(7):2731-7.

6. Hanson HM, Raag M, Adrat M, Laisaar T. Awareness of Lung Cancer Symptoms and Risk Factors in General Population. *Open Journal of Respiratory Diseases*. 2016;7(01):1.
7. Ferlay J, Shin HR, Bray F, Forman D, Mathers C, Parkin DM. Estimates of worldwide burden of cancer in 2008: GLOBOCAN 2008. *International journal of cancer*. 2010;127(12):2893-917.
8. Ferlay J, Soerjomataram I, Ervik M, Dikshit R, Eser S, Mathers C, et al. GLOBOCAN 2012 v1. 0, cancer incidence and mortality worldwide: IARC CancerBase No. 11. Lyon, France: International agency for research on cancer. 2013;19.
9. Jemal A, Bray F, Forman D, O'brien M, Ferlay J, Center M, et al. Cancer burden in Africa and opportunities for prevention. *Cancer*. 2012;118(18):4372-84.
10. Poudel K, Sumi N. Knowledge about Risk Factors for Cancer among Adults in Nepal. *KnE Life Sciences*. 2018;4(4):126-36.
11. Sankaranarayanan R, Ramadas K, Qiao Y-I. Managing the changing burden of cancer in Asia. *BMC medicine*. 2014;12(1):3.
12. Quaife SL, Forbes LJL, Ramirez AJ, Brain KE, Donnelly C, Simon AE, et al. Recognition of cancer warning signs and anticipated delay in help-seeking in a population sample of adults in the UK. *British Journal Of Cancer*. 2013;110:12.
13. Birt L, Hall N, Emery J, Banks J, Mills K, Johnson M, et al. Responding to symptoms suggestive of lung cancer: a qualitative interview study. *BMJ open respiratory research*. 2014;1(1):e000067.
14. Smith SM, Campbell NC, MacLeod U, Lee AJ, Raja A, Wyke S, et al. Factors contributing to the time taken to consult with symptoms of lung cancer: a cross sectional study. *Thorax*. 2008.
15. Hall SE, Holman CD, Threlfall T, Sheiner H, Phillips M, Katriss P, et al. Lung cancer: an exploration of patient and general practitioner perspectives on the realities of care in rural Western Australia. *The Australian journal of rural health*. 2008;16(6):355-62.
16. Barrett J, Hamilton W. Pathways to the diagnosis of lung cancer in the UK: a cohort study. *BMC family practice*. 2008;9(1):31.
17. Crane M, Scott N, O'Hara BJ, Aranda S, Lafontaine M, Stacey I, et al. Knowledge of the signs and symptoms and risk factors of lung cancer in Australia: mixed methods study. *BMC public health*. 2016;16(1):508.
18. World Health Organization. "WHO Definition of Palliative Care" Available from: <http://www.who.int/cancer/palliative/definition/en> . Geneva [Last accessed on 2012 Mar 02].
19. Bülbül Y, Ozlu T, Arinc S, Ozyurek B, Gunbatar H, Senturk A, et al. Assessment of Palliative Care in Lung Cancer in Turkey. *Medical Principles and Practice*. 2017;26(1):50-6.
20. Li H, Li J. Effectiveness of palliative care for non-small cell lung cancer. *Experimental and therapeutic medicine*. 2016;12(4):2387-9.
21. Ezzati M, Riboli E. Can noncommunicable diseases be prevented? Lessons from studies of populations and individuals. *science*. 2012;337(6101):1482-7.

22. Daniels M, Donilon T, Bollyky T. The emerging global health crisis: noncommunicable diseases in low-and middle-income countries. 2014.
23. Morhason-Bello IO, Odedina F, Rebbeck TR, Harford J, Dangou J-M, Denny L, et al. Challenges and opportunities in cancer control in Africa: a perspective from the African Organisation for Research and Training in Cancer. *The lancet oncology*. 2013;14(4):e142-e51.
24. Stefan DC, Elzawawy AM, Khaled HM, Ntaganda F, Asiimwe A, Addai BW, et al. Developing cancer control plans in Africa: examples from five countries. *The lancet oncology*. 2013;14(4):e189-e95.
25. Ironmonger L, Ohuma E, Ormiston-Smith N, Gildea C, Thomson C, Peake M. An evaluation of the impact of large-scale interventions to raise public awareness of a lung cancer symptom. *British journal of cancer*. 2015;112(1):207.
26. Austoker J, Bankhead C, Forbes LJ, Atkins L, Martin F, Robb K, et al. Interventions to promote cancer awareness and early presentation: systematic review. *British journal of cancer*. 2009;101(S2):S31.
27. Athey VL, Suckling RJ, Tod AM, Walters SJ, Rogers TK. Early diagnosis of lung cancer: evaluation of a community-based social marketing intervention. *Thorax*. 2011:thoraxjnl-2011-200714.
28. Latimer KM, Mott TF. Lung cancer: diagnosis, treatment principles, and screening. *American family physician*. 2015;91(4).
29. O'Brien M, Mwangi-Powell F, Adewole IF, Soyannwo O, Amandua J, Ogaja E, et al. Improving access to analgesic drugs for patients with cancer in sub-Saharan Africa. *The Lancet Oncology*. 2013;14(4):e176-e82.
30. Colquhoun HL, Levac D, O'Brien KK, Straus S, Tricco AC, Perrier L, et al. Scoping reviews: time for clarity in definition, methods, and reporting. *Journal of clinical epidemiology*. 2014;67(12):1291-4.
31. Levac D, Colquhoun H, O'Brien KK. Scoping studies: advancing the methodology. *Implementation Science*. 2010;5(1):69.
32. Arksey H, O'Malley L. Scoping studies: towards a methodological framework. *International Journal of Social Research Methodology*. 2005;8(1):19-32.
33. Pluye P, Robert E, Cargo M, Bartlett G, O'cathain A, Griffiths F, et al. Proposal: A mixed methods appraisal tool for systematic mixed studies reviews. Montréal: McGill University. 2011:1-8.
34. McHugh ML. Interrater reliability: the kappa statistic. *Biochemia medica*. 2012;22(3):276-82.
35. Moher D, Liberati A, Tetzlaff J, Altman DG. RESEARCH METHODS & REPORTING-Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement-David Moher and colleagues introduce PRISMA, an update of the QUOROM guidelines for reporting systematic reviews and meta-analyses. *BMJ (CR)-print*. 2009;338(7716):332.
36. Al-Naggar RA, Kadir SY. Lung cancer knowledge among secondary school male teachers in Kudat, Sabah, Malaysia. *Asian Pacific journal of cancer prevention : APJCP*. 2013;14(1):103-9.
37. Chawla R, Sathian B, Mehra A, Kiyawat V, Garg A, Sharma K. Awareness and assessment of risk factors for lung cancer in residents of Pokhara Valley, Nepal. *Asian Pacific journal of cancer prevention: APJCP*. 2010;11(6):1789-93.

38. Desalu OO, Fawibe AE, Sanya EO, Ojuawo OB, Aladesanmi AO, Salami AK. Lung cancer awareness and anticipated delay before seeking medical help in the middle-belt population of Nigeria. *The international journal of tuberculosis and lung disease : the official journal of the International Union against Tuberculosis and Lung Disease*. 2016;20(4):560-6.
39. Naskar S, Das P. Knowledge and Awareness about Lung Cancer: A Study on the Secondary School Teachers in West Bengal. 2017.
40. Shankar A, Roy S, Malik A, Rath G, Julka P, Kamal VK, et al. Level of Awareness of Various Aspects of Lung Cancer Among College Teachers in India: Impact of Cancer Awareness Programmes in Prevention and Early Detection. *Journal of Cancer Education*. 2016;31(4):709-14.
41. Loh JF, Tan SL. Lung cancer knowledge and screening in the context of the Malaysian population. *Journal of Pharmacy Practice and Research*. 2018;48(1):56-64.
42. Zainuddin N, Thabit H. Knowledge and Perception on Lung Cancer and Its Screening: A Study among Undergraduate Students of the International Islamic University Malaysia, Kuantan Campus. *Journal of Biomedical and Clinical Sciences (JBACS)*. 2018;2(2):61-6.
43. Robb K, Stubbings S, Ramirez A, Macleod U, Austoker J, Waller J, et al. Public awareness of cancer in Britain: a population-based survey of adults. *British Journal of Cancer*. 2009;101(S2):S18.

Figures

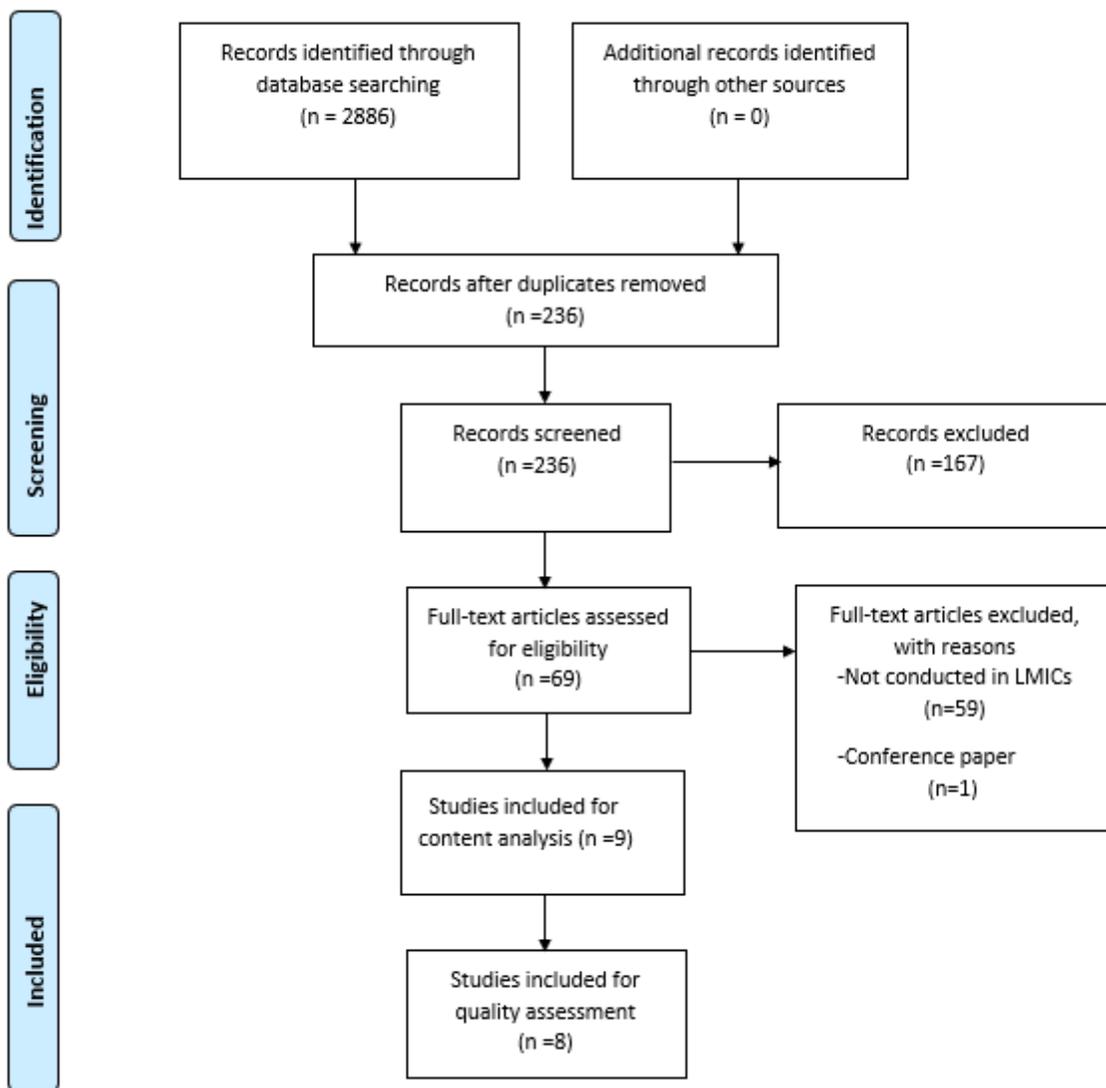


Figure 1

PRISMA record screening flow-chart. [Source: Adapted from Moher et al.(35)].

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