

Family physicians' competencies for early lung cancer detection in an atypical epidemiological context in Cuba: a mixed-methods study

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Research Article

Keywords: Early detection of cancer, family physicians, lung neoplasms, cancer education, occupational exposure, primary health care, clinical competence, Cuba

Posted Date: September 7th, 2026

DOI: <https://doi.org/10.21203/rs.3.rs-10641607/v1>

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Additional Declarations: No competing interests reported.

Version of Record: A version of this preprint was published at BMC Primary Care on October 6th, 2026. See the published version at <https://doi.org/10.1186/s12875-026-03582-1>.

Abstract

Background

Early detection of lung cancer is essential to reduce mortality, particularly in settings where occupational exposures predominate over tobacco use. This study assessed family physicians' competencies for the early detection of lung cancer in Guantánamo, Cuba, a region characterised by an atypical epidemiological profile (93% of cases in non-smokers; 67.5% linked to occupational exposure).

Methods

A mixed-methods study with methodological triangulation was conducted. An adapted validated questionnaire (pilot subscales $\alpha = 0.82\text{--}0.91$; overall $\alpha = 0.91$) was administered to 279 family physicians, 532 medical records were reviewed, and two focus groups were held. Data were analysed using descriptive statistics and thematic analysis, with methodological triangulation.

Results

Favourable attitudes toward early detection were identified in 92.7% of participants. However, only 47.3% were familiar with clinical guidelines, and only 34.7% correctly identified occupational risk factors. A total of 92% of medical records were outdated, and systematic follow-up was evident in only 3.8% of cases. Triangulation revealed substantial agreement across data sources ($\kappa > 0.75$).

Conclusions

A marked dissociation exists between favourable attitudes and adequate clinical practice, largely attributable to decontextualised training and structural barriers. These findings strongly support the implementation of cancer education strategies in primary care that are specifically adapted to the local epidemiological profile.

BACKGROUND

Lung cancer is the leading cause of cancer death in Cuba, with more than 6,000 annual cases and over 70% diagnosed at advanced stages. Early detection is a public health priority that critically depends on the competencies of primary care physicians, especially in regions with atypical epidemiological profiles [1, 2].

Within the Cuban health system, the family physician serves as the cornerstone of primary care delivery. Nevertheless, previous research has documented substantial knowledge gaps among these practitioners concerning cancer detection, especially regarding non-traditional risk factors. In

Guantánamo, recent data indicate that 93% of lung cancer cases arise among non-smokers, and 67.5% occur in workers with documented exposure to occupational carcinogens. This local reality directly challenges the tobacco-centred paradigm that continues to underpin most cancer education programmes [3–6].

Competency assessment is essential for designing targeted cancer educational interventions. Competency gaps may arise from decontextualised training that fails to address local epidemiological realities. The present study aimed to evaluate family physicians' competencies for the early detection of lung cancer in Guantánamo, to identify the specific gaps and barriers that contribute to delayed diagnosis, and, ultimately, to provide a robust evidence base for the design of contextualised cancer education strategies within primary care [7, 8].

METHODS

Study design and setting

A mixed-methods study with methodological triangulation was conducted between 2023 and 2025 in Guantánamo, Cuba. The study was carried out at the "Asdrúbal López Vázquez" Polyclinic, which had the highest incidence of lung cancer in the province, serving a population of 120,000 inhabitants across 76 family medicine clinics.

Participants

The study population comprised 279 family physicians (all physicians at the polyclinic). Mean age was 41.3 years (SD 8.2), and mean experience was 12.4 years (SD 7.6). The sample included specialists (32.6%), residents (28.0%), and general practitioners (39.4%). Women constituted 67.4% of the sample.

Data collection

Methodological triangulation was used with three techniques:

1. **Survey.** A structured questionnaire was administered to all participating physicians. The instrument was an adapted version of the Fear of Cancer Recurrence Inventory – Spanish version (FCRI-Sp), originally validated by Hernández Blázquez and Cruzado (2016) [9]. Because no validated instrument specifically addresses family physicians' competencies for early lung cancer detection in the Cuban context, fewer than 10% of the items were modified to align with the constructs of interest. Content validity was established through review by a panel of 10 experts. The adapted version was subsequently piloted with a sample of 30 family physicians to assess clarity, comprehensibility, and psychometric performance prior to data collection.

In the pilot study ($n = 30$), internal consistency analysis yielded Cronbach's α coefficients of 0.89 for the knowledge dimension, 0.82 for medical practice, and 0.91 for attitude, with a 95% confidence interval for the overall scale ranging from 0.88 to 0.94. In the main study ($n = 279$), the overall Cronbach's α was

0.91. These values support the internal consistency and reliability of the instrument in the target population. The full adapted questionnaire is available from the corresponding author on reasonable request.

1. **Medical record review.** A total of 532 medical records (7 per clinic) of patients with oncological risk factors (smokers, COPD, > 40 years with other risk factors) were reviewed using an observation guide.
2. **Focus groups.** Two focus groups were conducted: one with 12 physicians (90 min) and another with 5 administrators (60 min). Sessions were recorded and transcribed for thematic analysis.

Data analysis

Quantitative data were processed using SPSS v28.0 (descriptive statistics, Spearman's correlation, chi-square, $p < 0.05$). Qualitative data were analysed using open and axial coding, with inter-coder agreement ($\kappa = 0.82$). Integration was performed through triangulation ($\kappa > 0.75$) [10].

Ethical considerations

This study received formal approval from the Research Ethics Committee of the "Dr. Agostinho Neto" General Teaching Hospital and was endorsed by the Methodological Department of the University of Medical Sciences of Guantánamo. All procedures were conducted in accordance with the Declaration of Helsinki. The Ethics Committee approved the retrospective review of medical records and waived the requirement for individual patient consent because all data were anonymised before analysis. Written informed consent was obtained from the Director of the "Asdrúbal López Vázquez" Polyclinic for documentary review and survey application. All participating physicians were informed of the research objectives, guaranteed absolute confidentiality of their responses, and their right to withdraw at any time, and signed the corresponding informed consent.

RESULTS

Quantitative findings

Knowledge: A total of 47.3% ($n = 132$) of physicians knew the normative documents of the Ministry of Public Health. A moderate positive correlation was found between years of experience and knowledge ($\rho = 0.42$, $p = 0.01$). Tobacco was mentioned as a risk factor by 89.3%, but only 34.7% identified occupational risks. Only 12.0% spontaneously mentioned haemoptysis.

Practice: A review of clinical documentation revealed that 92% of medical records were outdated, with only 8% meeting established standards for completeness. Systematic follow-up of patients with identified risk factors was evident in a mere 3.8% of cases. The pattern of requesting chest X-rays displayed a bimodal distribution: 44% of physicians reported doing so routinely, while 29% occasionally,

and the remaining 27% rarely. Active identification of at-risk patients within their catchment areas was reported by 68% of respondents. Notably, the likelihood of requesting a chest X-ray was significantly associated with professional category ($\chi^2 = 15.2$; $p = 0.004$), with higher adherence rates observed among specialist physicians.

Attitude: A total of 92.7% of physicians considered that early detection increases cure rates. Concern about missing timely diagnoses was expressed by 63.0%, with a higher proportion among physicians with < 5 years of experience (OR = 2.1; 95% CI: 1.3–3.4).

Qualitative findings

Three categories emerged: (1) Knowledge gaps in cancer: demands for “updating” and “practical guidelines”; administrators mostly perceived knowledge as “medium” (82%), “low” (9%) or “high” (9%). (2) Deficiencies in oncological practice: “inadequate detection” and “inadequate use of diagnostic tests”; 99% lacked updated guidelines. (3) Structural barriers in cancer education: excessive workload and multiplicity of programmes.

Triangulation

Quantitative and qualitative data converged across the three dimensions ($\kappa > 0.75$), as shown in Table 1.

Table 1
Triangulation of quantitative and qualitative findings across dimensions

Dimension	Quantitative finding	Qualitative finding	Consistency
Knowledge in cancer	47.3% knew guidelines	Administrators perceived "medium-low" knowledge; demand for updating.	High
Oncology practice	92% outdated records	"Inadequate use of tests"; 99% without updated guides.	High
Attitude toward detection	92.7% favourable	Administrators value positive disposition; structural barriers identified.	High

DISCUSSION

This study reveals a striking dissociation between favourable attitudes (92.7%) and inadequate knowledge and practices in cancer education among family physicians for early lung cancer detection in a region with an atypical epidemiological profile. Fewer than half knew clinical guidelines (47.3%), and only one-third identified occupational risks (34.7%). Medical records were outdated (92%) and follow-up was virtually nonexistent (3.8%).

This dissociation between favourable attitudes and inadequate oncological competencies has been documented in other contexts. The low identification of occupational risks is especially concerning,

given that occupational exposure is the predominant risk factor in Guantánamo (67.5% of cases), consistent with the literature on under-recognition of occupational diseases in primary care [6, 11–14].

The qualitative findings lend further weight to this interpretation. Both physicians and administrators identified a series of structural barriers, including excessive workload, a multiplicity of competing programmes, and a notable absence of practical, locally adapted clinical guidelines. A substantial proportion of physicians expressed concern about the prospect of missing an oncological diagnosis (63%), and there was a strong demand for practical workshops (72%) and case-based discussions (65%). These results point to a profession that is not only aware of its limitations but also highly motivated to address them through targeted, relevant education.

Cho et al. propose a paradigm shift from a reactive to a proactive model in cancer detection, emphasising that primary care physicians should identify subtle preclinical indicators of chronic diseases. Our findings support this perspective by demonstrating that although family physicians in Guantánamo have favourable attitudes toward early detection (92.7%), they lack the competencies needed to implement a proactive approach, as evidenced by lack of knowledge of clinical guidelines (47.3%) and low identification of occupational risks (34.7%) [15].

Regarding competency training in primary care, Wattanapisit et al. demonstrated that specific training programmes improve residents' knowledge, skills, and willingness to engage in clinical decision-making. This finding supports our conclusion about the need for specific educational strategies to address competency gaps in the oncological field. However, unlike the approach of Wattanapisit et al. focused on shared decision-making, our study identifies a more fundamental gap: lack of knowledge of occupational risk factors [16].

Together, these findings suggest that decontextualised training is a key obstacle to effective early detection in contexts with atypical epidemiological profiles. The integration of evidence-based educational strategies grounded in local evidence, such as those proposed in this study, could contribute to closing the gap between favourable attitudes and adequate clinical practices in lung cancer detection in primary care.

Implications for clinical practice

The findings support contextualised cancer education strategies with: (1) priority content on occupational risks and evaluation of non-smokers with persistent symptoms; (2) methodology: practical workshops and discussion of real cases; (3) tools: simplified clinical decision algorithms; (4) evaluation: process and outcome indicators.

Limitations

The cross-sectional design does not allow causality to be established. The purposive selection of focus group participants may have introduced bias. Social desirability bias may have overestimated attitudes.

Medical record review only reflects documented practices.

CONCLUSIONS

This study reveals a dissociation between favourable attitudes and inadequate clinical practice in oncological education among family physicians for early lung cancer detection in a region with an atypical epidemiological profile. The low identification of occupational risks (34.7%) is particularly concerning, as occupational exposure is the predominant risk factor.

The findings support cancer education strategies for primary care, prioritising case-based practical learning, occupational risk assessment, and parallel implementation of organisational changes to address structural barriers.

ABBREVIATIONS

· COPD

Chronic Obstructive Pulmonary Disease

· OR

Odds Ratio

· SD

Standard Deviation

· SPSS

Statistical Package for the Social Sciences

· CI

Confidence Interval

DECLARATIONS

Ethics approval and consent to participate:

This study received formal approval from the Research Ethics Committee of the "Dr. Agostinho Neto" General Teaching Hospital and the endorsement of the Methodological Department of the University of Medical Sciences of Guantánamo. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional research committee and with the 1964 Declaration of Helsinki and its later amendments. The Ethics Committee approved the retrospective review of medical records and waived the requirement for individual patient consent because all data were anonymised before analysis. Written informed consent was obtained from the Director of the "Asdrúbal López Vázquez" Polyclinic for documentary review and survey application. All participating physicians were informed of the research objectives, guaranteed absolute confidentiality of their responses, and their right to withdraw at any time, and signed the corresponding informed consent.

Consent for publication:

Not applicable.

Competing interests:

The author declares no competing interests.

Funding:

No direct or indirect funding was received for this research.

Author Contribution

YW: Conceptualization, Methodology, Investigation, Formal analysis, Writing – original draft, Writing – review & editing, Visualization, Project administration.

Acknowledgement

The author thanks the family physicians and administrators of the "Asdrúbal López Vázquez" Polyclinic for their participation, and the Methodological Department of the University of Medical Sciences of Guantánamo for their support

Data availability:

The datasets generated and/or analysed during the current study are not publicly available due to institutional confidentiality policies but are available from the corresponding author on reasonable request.

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