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Increasing Lung Cancer Screenings in a Family Medicine Clinic

A DNP Project Submitted to the
Graduate Faculty
of Jacksonville State University
in Partial Fulfillment of the
Requirements for the Degree of
Doctor of Nursing Practice

By
Ashley D. Williams

Jacksonville, Alabama

August 2, 2024

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August 2, 2024

Abstract

Background: Lung cancer is the leading cause of cancer-related deaths worldwide. Although lung cancer screening is an established guideline for intervention in primary care, eligible patients do not receive it. Patients at high risk of developing lung cancer are aged 50 to 80 and currently smoke or have quit smoking within the last 15 years. Obtaining an annual low-dose computed tomography for patients at high risk of developing lung cancer helps detect lung cancer earlier and, therefore, improves patient outcomes.

Purpose: The Doctor of Nursing (DNP) project aimed to increase lung cancer screenings in patients at high risk of developing lung cancer and bring awareness. The project also enhanced awareness and compliance with evidence-based lung cancer screening guidelines.

Methods: This quality improvement project utilized a centralized nurse practitioner design. The nurse practitioner served as an educator, coordinator, and practitioner. Patients were screened for lung cancer risk using the United States Preventive Services Task Force (USPSTF) guidelines.

Results: Utilizing a nurse practitioner-centralized design to screen for high-risk lung cancer with USPSTF guidelines produced clinical improvement and statistical and clinical significance. Following evidence-based practice guidelines increased lung cancer screenings when more treatment options exist.

Conclusion: Among adults aged 50-80 who are current smokers or quit smoking within the last 15 years, the implementation of a centralized nurse practitioner screening program, compared to no program, increased screenings.

Keywords: lung cancer, low-dose computed tomography, family practice, screening

Acknowledgments

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Increasing Lung Cancer Screenings in a Family Medicine Clinic

Lung cancer is the leading cause of cancer-related deaths worldwide. A low-dose computed tomography (LDCT) is an evidence-based intervention for the early detection of lung cancer (Azubuike et al., 2020). All patients should be screened to assess their risk of developing lung cancer. While lung cancer is the second leading cause of cancer in men and women, more people will die from lung cancer than colon, breast, and prostate cancers combined (Siegel et al., 2022). The diagnosis of lung cancer is usually delayed due to a lack of symptoms during the early stages, and within one year of diagnosis, more than 50% of people will die (Covey & Cagle, 2022). Late diagnosis is the primary cause of poor outcomes. More than 70% of patients are not diagnosed until stage III or IV, which are associated with decreased survival rates (Wahla et al., 2022). Azubuike et al. (2020) noted only 15% of lung cancer patients are alive five years following their lung cancer diagnosis. Obtaining an LDCT annually presents the opportunity to identify lung cancer earlier, increase treatment options, and improve patient outcomes.

When diagnosed in the early stages, lung cancer only accounts for about 16% of cases and has a five-year survival rate of 57% (Kinsey et al., 2022). The United States Preventive Services Task Force (USPSTF) identifies a patient at risk for lung cancer as any adult age 50 to 80 who has a 20-pack-year smoking history and currently smokes or a patient who has quit smoking within the last 15 years (Covey & Cagle, 2022). Smoking tobacco is the primary risk factor for lung cancer development and accounts for an estimated 90% of all lung cancer cases (Marshall et al., 2021). All current tobacco users should receive smoking cessation therapy and education regarding the implications of developing lung cancer. Compliance with lung cancer screening using LDCTs is improved when a dedicated nurse practitioner leads outpatient clinic efforts (Kinsey et al., 2022).

The project aimed to increase awareness and lung cancer screening in patients at high risk of developing lung cancer. Failure to follow evidence-based practice guidelines within a family medicine clinic delays the identification of lung cancer, its diagnosis, and treatment and lowers patients' prognosis. Implementing a nurse practitioner-centralized design aimed to improve compliance, increase screening with LDCT, and improve patient outcomes for those at risk of developing lung cancer.

Background

In 2020, Siegel et al. (2022) noted that over 2,206,771 new lung cancer cases were identified globally. Deaths from lung cancer in 2020 were 1,796,144 worldwide (Siegel et al., 2022). An estimated 236,740 people were newly diagnosed with lung cancer in the United States in 2022 (Siegel et al., 2022). Deaths resulting from lung cancer were estimated at 130,180 in the United States in 2022 (Siegel et al., 2022). There were an estimated 6,200 new cases of lung cancer in Tennessee (TN) in 2022 (Siegel et al., 2022). Deaths from lung cancer in TN in 2022 were estimated at 3,680 (Siegel et al., 2022). Healthy People 2030 included two goals directed at lung cancer: reducing the death rate and increasing the number of adults aged 55-80 who receive lung cancer screening (Kinsey et al., 2022). The National Cancer Institute reported the economic costs of cancer totaled \$23.8 billion in 2020 (Marshall et al., 2021). Lung cancer has lasting physical, emotional, and financial effects on patients, their families, and the healthcare system.

Problem Identification

The project setting is a family medicine clinic, an independent practice, in rural middle TN. The clinic's advanced practice providers include four family nurse practitioners, one physician assistant, and one osteopathic physician. The practice provides care for approximately 8,000 patients with chronic and acute illnesses across their lifespans. The DNP student

completed a gap analysis and noted that patients who met lung cancer screening criteria by the USPSTF guidelines were not receiving their annual LDCTs. A review of the practice site's electronic medical records (EMR) identified 2,560 current smokers. The EMR indicated that only 22% or 565 patients received smoking cessation counseling, and only two of these identified as smokers had an initial LDCT performed. The organization's goal is a 95% compliance rate for current or previous smokers who meet USPSTF criteria to have an annual lung cancer screening with LDCT.

Problem Statement and PICOT Question

All patients should be screened utilizing the USPSTF criteria to assess their risk level for developing lung cancer. By following set criteria and identifying high-risk patients early, lung cancer can be identified earlier, improving health outcomes. (Makurumidze et al., 2023). Patients at high risk of developing lung cancer who are eligible for LDCT are not receiving screenings as per the practice's needs assessment. LDCTs aid in early lung cancer detection and decrease mortality in patients who are at high risk (Wahla et al., 2022). The PICOT question related to this project was as follows: Among adults aged 50-80 who are current smokers or quit within the last 15 years, does implementation of a centralized nurse practitioner screening program, as compared to no program, increase screening?

Review of Literature

Establishing best practices for implementing a centralized nurse practitioner-led lung cancer screening program requires an extensive literature review supporting the quality improvement process and results. This author searched the CINAHL and PubMed databases by applying the phrases lung cancer screening program, LDCT, USPSTF, and quality improvement to identify qualitative, quantitative, and mixed-method studies examining a nurse-led lung cancer

screening program. These delimiters led to 46 articles which were reviewed for suitability and correlation to the DNP project. Major themes were identified, including education for nurse practitioners, smoking cessation, patient eligibility, and imaging.

Education for Nurse Practitioners

A clinician's lack of knowledge related to screening, eligibility, current guidelines, and efficacy can hinder LDCT lung cancer screening referrals (Carter-Bawa et al., 2023). Education about provider expectations, the implementation process, the interpretation of LDCT results, and the patient notification process should be acknowledged and reviewed frequently (Fetters et al., 2022). Group-based learning among healthcare professionals has increased knowledge of lung cancer screening, implementation, and program success (Dodd et al., 2023).

Lung cancer screening recommendations for annual LDCT originated from several organizations, including the American Cancer Society, the American College of Chest Physicians, the Centers for Medicare and Medicaid Services, and the USPSTF (Covey & Cagle, 2022). Tobacco product screening should include cigarettes, vapes, and electronic cigarettes (Heinden et al., 2022). Raz et al. (2018) noted that increased awareness of lung cancer screening guidelines among primary care providers was associated with increased LDCT use. Kinsey et al. (2022) found that incorporating a nurse practitioner-led lung cancer screening program showed a significant improvement in screenings and resulted in statistically significant improvement with follow-up recommendations and compliance of patients compared to standard lung cancer screening.

Smoking Cessation

Smoking cessation is the most critical risk-modifying behavior to lower the risk of developing lung cancer (Covey & Cagle, 2022). Developing a personalized smoking cessation

plan with interventions for relapse prevention and medical imaging is crucial for reducing the incidence of lung cancer (Quinn-Scoggins et al., 2022). Smoking cessation lowers the risk of lung cancer by 20% after five years, 30% to 50% following ten years, and up to 70% after fifteen years (Covey & Cagle, 2022). Joint lung cancer screening and smoking cessation interventions could result in decreased lung cancer mortality, improved outcomes with lung cancer deaths avoided, and considerable life-years gained (Marshall et al., 2021).

Eligibility and Imaging

To increase the probability of an early-stage lung cancer diagnosis, it is essential to improve lung cancer screenings. This includes reducing disparities to aid in improving access to screening and improving earlier diagnosis (Emmerick et al., 2022). Initiating clinical pathways such as community-based mobile LDCT scanners with in-person lung health checks for those at high risk of developing lung cancer should be implemented (Balata et al., 2022). Lung health checks and community-based mobile scanners detected lung cancer in 4.4% of patients, with an overall detected early lung cancer stage of I or II in 80% of patients (Balata et al., 2022).

In the literature on nurse practitioner-led cancer screening programs, researchers used many tools and interventions to increase the screening of high-risk patients, with varied results. Utilizing a specific nurse navigator for proactive identification of eligible patients showed an increase of 37.3% in early diagnosis, with 59.2% of those patients pursuing LDCT (Thuppal et al., 2023). Screening instruments such as interview guides, questionnaires, and flow diagrams were used to assess the understanding of lung cancer screening, patient values, and future coordination for LDCT (Gomes et al., 2023). Awareness campaigns, educational videos, and digital information displays related to the eligibility and benefits of lung cancer screening can be used as effective strategies to increase participation (Dodd et al., 2023). Medicare approval for

patients to obtain CT screening resulted in a statistically significant improvement in the diagnosis of early-stage lung cancer (Emmerick et al., 2022). Effective screening programs included patient education, LDCT completion, and the ability to interpret and act on radiologic and pathologic results or offer further diagnostic and treatment options (Covey & Cagle, 2022).

Theoretical Framework

Jean Watson's Theory of Human Caring provides a theory-driven approach for this Doctor of Nursing Practice (DNP) project. Watson derived main concepts from nursing, clinical, educational, and social psychology to develop her theory, with caring being the central element (Gunawan et al., 2022). Caring relationships are the bond that promotes healthcare decisions, interventions, healing, health, and continuous improvement (Butts & Rich, 2018). Caring is the foundation of nursing and the basis of theories, practice, academic curriculum, and ethical awareness of the nurse-patient relationship (Romero et al., 2019). Nursing practice aims to provide quality care while protecting the patient's safety and maintaining psychological and emotional support (Romero et al., 2019). Watson's theory can be used as an underlying guide to improve patient relations, promote a healing environment, and increase overall outcomes (Wei & Watson, 2019). When patients feel as though they are cared for, they are encouraged to interact, learn, participate, follow through, and work toward meeting their healthcare goals (Butts & Rich, 2018).

Quality Improvement Methodology

The Knowledge-to-Action (KTA) framework is a seven-step model that can effectively guide evidence-based research findings into practice (Lee & Ho, 2019). KTA consists of two components that interact: the knowledge creation cycle and the action cycle (Xu et al., 2020). The knowledge creation cycle is a funnel from a broader area of knowledge inquiry to a more

defined collection of information synthesis. This cycle provides products and tools for researchers and clinicians (Xu et al., 2020). Throughout the action cycle, implemented knowledge is created continuously, evaluated, and sustained in the clinical setting. The action cycle includes the development of thoroughly interpreted knowledge into practical use with seven factors: problem identification, knowledge adaptation to the current context, barrier assessment, implementation of interventions, monitoring, evaluation of outcomes, and sustainment (Xu et al., 2020).

The application of this framework has resulted in a significant and positive impact on clinical practice and patient outcomes (Xu et al., 2020). Through the direction of the KTA framework and its systematic model, clinicians acquire and maintain a clinical practice that facilitates the adaptation of knowledge specifically applicable to lung cancer screening to patients and providers in the critical phases of the project (Torres et al., 2023). The KTA framework was applied to this student's DNP project for lung cancer screening, applying knowledge in USPSTF evidence-based guidelines and evaluating the implementation of said guidelines.

Project Design

Before project implementation, the DNP student received approval from the educational Institutional Review Board (see Appendix A) and completed training on the protection of human subjects (see Appendix B). The project setting is a rural family medicine clinic in TN. The project design began with clinical staff collaboration including the current nurse practitioners, medical assistants, and the office physician to eliminate gaps in knowledge and practice through training and education. The practice includes approximately 8,000 patients. The inclusion criteria were based on current USPSTF guidelines and included adult patients aged 50 to 80 years with a

20-pack-year smoking history who currently smoke or have quit smoking within the past 15 years. The exclusion criteria for the project were patients who did not meet these requirements. Patients were screened as LDCT candidates when they presented for all appointments. Data was analyzed, stored, and collected over six weeks. Patients deemed high-risk for lung cancer were offered smoking cessation counseling and imaging with LDCT. Patients' preferences were respected and supported. If the inclusion criteria were met, the patients were added to a paper list and kept in a locked drawer in the clinic. For added security, only the DNP student and the physician held the keys to the locked drawer. The DNP student provided education on lung cancer screening and smoking cessation if requested, ordered the LDCT, follow up contact with the patient after imaging, and initiated a referral for transthoracic biopsy and oncology consult, if applicable.

Project Results and Evaluation

Throughout the six weeks of project implementation, 1,608 patients were evaluated during appointments to assess their risk of lung cancer. Of the 1,608 patients, 618 patients were between the ages of 50 to 80. It was noted that 259 out of 618 patients (41.9%) were current smokers or had quit within the last 15 years. Of the potential 259 patients, 205 (79.1%) agreed to have LDCT for lung cancer screening. The project implementation resulted in the completion of 98 LDCTs with no confirmed cases of lung cancer found.

After thorough discussion and education, 54 patients explained different rationales for declining the LDCT for lung cancer screening. Of the 54 patients, 13 (24%) refused testing without providing a reason. Of the remaining 41 patients who were not agreeable to LDCT, 30 (73%) stated they were unsure of LDCT scanning strictly due to financial concerns or insurance

variables. The last 11 patients (27%) who declined the LDCT stated they would like to research the LDCT procedure and decide later.

Conclusion

The results of the quality improvement project emphasize and reinforce the importance of evidence-based practice using established guidelines. Significant implications for clinical practice include the early identification of lung cancer for patients. Limitations of the quality improvement project include the designation of a single nurse practitioner responsible for screening all presenting patients for lung cancer risk. For this clinic, having a nurse practitioner who only monitors lung cancer screening for patients is not a feasible option. The plan for sustainability following the project and education of all employees within the practice includes ensuring all clinic providers maintain responsibility for screening their patients for lung cancer risk. Each patient who presents for appointments will be asked about their smoking history, duration of smoking time, quit date as applicable, and previous LDCTs performed. This information will be added to the EMR main screen for all patients as a verification that screening was performed. Dissemination of project findings to occur during the summer of 2024.

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Appendix A

JSU IRB Approval Letter



Institutional Review Board for the Protection of Human Subjects in Research
203 Angle Hall
700 Pelham Road North
Jacksonville, AL 36265-1602

November 7, 2023

Ashley Williams
Jacksonville State University
Jacksonville, AL 36265

Dear Ashley:

Your protocol for the project titled "Increasing Lung Cancer Screenings in a Family Medicine Clinic" protocol number 11072023-06, has been approved by the JSU Institutional Review Board for the Protection of Human Subjects in Research (IRB).

If your research deviates from that listed in the protocol, please notify me immediately. One year from the date of this approval letter, please send me a progress report of your research project.

Best wishes for a successful research project.

Sincerely,

A handwritten signature in black ink, appearing to read "Sarah Donley".

Sarah Donley
Human Protections Administrator, Institutional Review Board

Appendix B

CITI Training



Completion Date 19-Sep-2023
Expiration Date 19-Sep-2026
Record ID 57341306

This is to certify that:

Ashley Williams

Has completed the following CITI Program course:

Not valid for renewal of
certification through CME.

Social and Behavioral Responsible Conduct of Research

(Curriculum Group)

Social and Behavioral Responsible Conduct of Research

(Course Learner Group)

1 - RCR

(Stage)

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