Improving Lung Health in Mining Towns - Lesson Plan

HPRB 3850E: Vanguards

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Topic - Lung Cancer

Setting - Western Georgia, specifically Trenton, GA

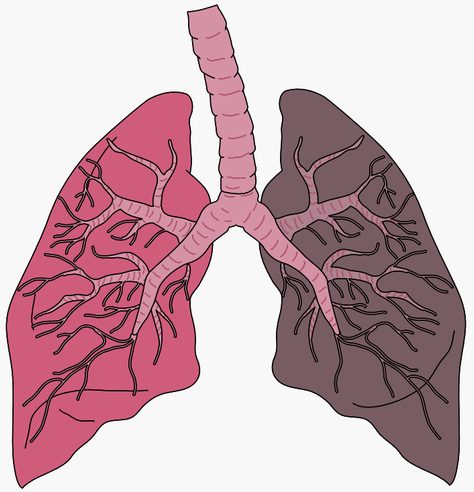
Targeted Population - Current and Former coal miners

Background on Lung Cancer

- an uncontrolled growth of cells in lung tissues, and is the leading cause of cancer-related death (WHO, 2023).
- caused by smoking, exposure to secondhand smoke, exposure to cancer-causing substances, previous radiation therapy, and family history (Mayo Clinic, 2024).
- symptoms include shortness of breath, coughing up blood, chest pain, wheezing, and hoarseness (Mayo Clinic, 2024).
- When lung cancer spreads throughout the body, additional symptoms might appear, such as bone aches, headaches, loss of weight, loss of appetite, and swelling in the face or neck (Mayo Clinic, 2024).

Quick Statistics

- The American Cancer Society's estimates for lung cancer in the US for 2025 are:
  - About 226,650 new cases of lung cancer (110,680 in men and 115,970 in women)
  - About 124,730 deaths from lung cancer (64,190 in men and 60,540 in women) (American Cancer Society, 2025)
- Most people diagnosed with lung cancer are 65 or older; a very small number of people diagnosed are younger than 45 (American Cancer Society, 2025)
- leading cause of cancer death in the US, accounting for about 1 in 5 of all cancer deaths (American Cancer Society, 2025)



Significance of Problem

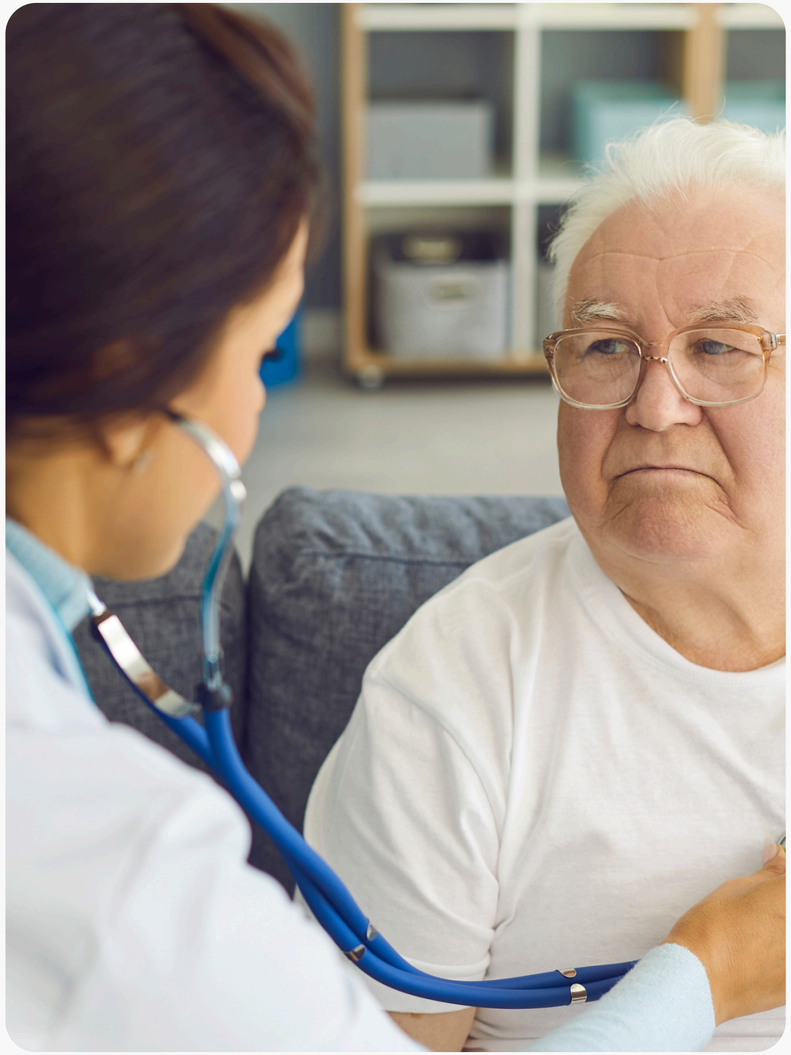
Why does this specifically affect miners?

- Occupational hazards and exposure have a role in development of lung cancer, particularly around coal miners.
- Coal miners are at risk of developing lung diseases such as coal workers' pneumoconiosis (CWP) and chronic obstructive pulmonary disease (COPD), which could potentially lead to lung cancer (Almberg & Cohen, 2023).
- The odds of death from lung cancer, as well as lung diseases, were twice as likely in US coal miners than the general US male population (Almberg et al., 2023).
- there is limited healthcare access in rural areas, which can delay diagnoses and lead to poor outcomes of treatment.

Significance of Problem Continued

- In Georgia in 2018, lung cancer accounted for 1217 incidences in both sexes; 1103 deaths were reported
- The population living in the Appalachia region is disproportionately impacted by lung disease. The coal dust is driving the ongoing disparity, but so is the subsequent rise of unemployment and poverty. This is due to the decline of the coal mine industry (DeBolt et al., 2021)
- Smokers had a higher lung cancer risk if they had worked in high-risk occupations for more than 10 years (Garcia et al., 2023)

Risk Behaviors



Risk Behaviors for Lung Cancer

- Environmental pollution (radon exposure from underground mines)
- Occupational exposure (coal dust, silica, and diesel exhaust)
- limited access to healthcare (rural disparities, late-stage diagnosis)

What will be done to Address

- Primary and secondary prevention
- Health Belief Model
- A lesson plan aimed at this community

Prevention

- **Primary Primary**: Increasing awareness and improving education about the development and dangers of lung cancer. This would influence the proper use of personal protective equipment on the job.
- **Secondary Prevention**: Promoting and increasing regular health checkups, as well as getting lung screenings to detect early screenings of cancer.

Health Belief Model

Using the Health Belief Model as a Framework for Understanding Desired Change

- The model helps to understand coal miners' behaviors, especially when facing both visible and invisible environmental hazards.
- **Perceived Susceptibility**: This program displays how the miner's daily exposure in the mines increases the risk of developing lung cancer.
- **Perceived Severity:** Important risk and consequences from long-term exposure need to be grasped by the workers.
- Real-life stories and health data used, showing how symptoms like coughing and fatigue disrupt day to day life.

Health Belief Model cont.

Using the Health Belief Model as a Framework for Understanding Desired Change

- **Perceived Benefits:** Program lays out the benefits, including the benefits of early screenings and seeking early medical care.
- The hope is to increase quality of life and decrease mortality.
- **Perceived Barriers** such as rigid work schedules and cultural hesitations around discussing health.
- This program creates a healthy space to discuss and problem-solve.
- **Cue to Action and Self Efficacy** tools integrated as reminders to health participants build confidence in their health.

Summary of Lesson

The educational session will be hosted at a local health center in Trenton, GA. It will be supported by mining unions and clinics from Trenton and neighboring mining towns.

There will be sessions that are also offered at mining sites during shift changes to reach current miners. We aim to meet the participants, physically, and in their level of comfortability of discussing health concerns.
The lesson has been designed to be interactive and supportive. It is based on the Health Belief Model. This means that it will not just be relaying information, but trying to change perspectives and encourage actions.

Lesson Plan Goals

- Participants will have an understanding of the risks for lung cancer that they face from their occupation and environment.
- Participants will be able to recognize early symptoms of lung cancer.
- Participants will learn about the preventative measures that they can take, including the protective equipment, screening options, and changes that can be made to their lifestyle.

Lesson Plan Objectives

- By the end of this session, participants will:
- Identify major risk factors for lung cancer. This is to support perceived susceptibility.
- Describe the key symptoms of early-stage lung cancer and how early detection can improve outcomes. This reinforces perceived severity and benefits.
- Demonstrate the correct usage of personal protective equipment. This is to build self-efficacy.
- Develop a personal action plan that incorporates a barrier and a cue to action. This is to apply perceived barriers and cues to action.

Resources Included

- Informational resources on lung cancer and prevention methods

- List of local healthcare services that will do lung cancer screenings

- Personal Protective Equipment (PPE) for demonstration (respiratory masks, dust monitoring tools, etc)

- Pamphlet providing key information and an area to take notes

Lesson Plan

1. Welcome and Icebreaker (10 minutes)
    - relaxed environment
    - participants will be asked about work history and concerns
    - The point is to create a comfortable and personalized environment
2. Pre-session Survey (5 minutes)
    - short survey to gauge baseline knowledge and attitude of participants
    - results can help adjust the program to put emphasis on specific topics
3. Presentation about understanding lung cancer risks (15 minutes)
    - explains exposures miners are facing at work
4. Demonstration of personal protective equipment (15 minutes)
    - practice using respiratory masks and dust-monitoring tools
    - hands on experience
    - Participants can continue practicing for as long as they need

Lesson Plan

5. Group Discussion on Barriers to Healthcare a (20 minutes)
    - discuss individual barriers that they feel
    - topics like time, transportation, fear of diagnosis will be suggested
    - work together to find solutions to the problems
6. Create Individual Simple Action Plans (10 minutes)
    - personalized plans to take after the session
    - includes scheduling screenings and getting better equipment for themselves
    - ensure that reminders are set on phones or post its to ensure plan is followed
7. Summary of Key Takeaways and Post-session Survey (5 minutes)
    - quick overview of the information that was shared
    - short survey, same as pre-session, to see what was learned
    - encourage participants to stay in touch with each other and the healthcare providers at the session

Sample Survey Questions

1. List two or more risk factors for lung cancer that may affect people in Trenton, GA.
    a. Answers should include: coal dust, radon, diesel exhaust, smoking, secondhand smoking, family history)
2. How serious do you think lung cancer is for coal miners in your community?
    a. Not serious
    b. Slightly serious
    c. Moderately serious
    d. Very serious
    e. Extremely serious
3. Do you think you are personally susceptible to getting lung cancer?
    a. Not likely
    b. Slightly likely
    c. Moderately likely
    d. Very likely
    e. Extremely likely

4. Do you believe that early detection or quitting smoking can lower your chances of getting lung cancer?
    a. No
    b. Not sure
    c. Somewhat
    d. Yes, 100%
5. Do you know where you can get screened for lung cancer in your community?
    a. Yes
    b. No
6. How confident are you, in yourself, that you could, and know how, to take action to reduce your risk of getting lung cancer?
    a. Not confident
    b. Somewhat confident
    c. Moderately confident
    d. Very confident
    e. Extremely confident

Evaluation

There are three different forms of evaluation

1. Knowledge and Attitude Change

- The pre- and post- session surveys will be used to measure the understanding that was gauged during the session.
- It will assess the level of change in their understanding of the risk factors and how they use the PPE.

2. Behavioral Intentions

- A copy of the individual action plans will be collected.
- This will be used as a guide for the one-month check in.
- It is a useful tracker of if their behaviors have followed the plan they placed.

3. Feedback

- The participants are encouraged to voice their opinions on how the session has helped, or what needs improvement.

Conclusion

This lesson plan about lung cancer prevention is designed to empower coal miners with the important knowledge and tools they need to protect their lung health. By addressing the risk factors liike occupational exposure, environmental hazards, and limited healthcare access, the plan promotes awareness. It also promotes early detection and safer practices. Through education and community engagement, we hope to reduce lung cancer risks for current and former miners.

Thank you!

References

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