

# Lung Cancer Awareness: Risk Factors, Vaping Misconceptions, and Prevention Through Digital Education Intervention

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## **SUMMARY**

Lung cancer is the leading cause of cancer-related death worldwide. Tobacco smoke alone accounts for approximately 90% of lung cancer cases in the United States. Vaping has emerged as a socially normalized alternative, yet evidence shows it contains toxic chemicals and nicotine that pose long-term health threats. This study aimed to increase awareness of risk factors, address misconceptions about vaping, and highlight the benefits of early detection. A digital survey intervention with 43 participants used a pre/post True-or-False questionnaire. A paired two-tailed t-test showed significant overall improvement ( $p = 0.0104$ ). Additional analysis revealed that participants averaged 4.83 improvements from incorrect to correct per question compared to only 0.5 regressions, for a net average gain of 4.33. Question 5, which addressed lung cancer as the leading cause of cancer deaths, showed the largest change. Results demonstrate that the intervention method consistently improved knowledge and positively shifted perceptions toward prevention.

## **KEYWORDS**

**Awareness, Lung Cancer, Prevention, Public Health, Vaping**

## **INTRODUCTION**

Lung cancer is the leading cause of cancer-related death worldwide, reaching around 1.8 million deaths in 2020, with the highest mortality rates in both men and women. Tobacco smoke is responsible for about 90% of U.S. cases, but vaping, especially among youth, has emerged as a new risk factor. Many perceive vaping as safer, yet it contains harmful chemicals and reinforces inhalant behaviors. This study aimed to raise awareness about lung cancer risk factors, highlight the dangers of vaping, and promote early detection through LDCT screening.

## **METHODS**

### **Participant Recruitment**

Forty-six participants were recruited through social media, direct messaging, and word of mouth. After excluding three invalid responses, 43 participants were included in the final analysis.

### **Survey Design**

A digital Google Forms survey included a pre/post True-or-False questionnaire, with results kept anonymous. Six questions were used to measure participant understanding before and after exposure to informational slides to assess knowledge on lung cancer risk, vaping, and prevention. The following questions were used: 1) You don't need to worry about lung cancer if you've never smoked, 2) There's no way for people to lower their chances of lung cancer, 3) Quitting smoking can repair much of the lung damage that could lead to cancer, 4) Vaping is a safer alternative to smoking, 5) Lung cancer is the leading cause of cancer deaths, 6) Lung cancer often doesn't show symptoms until they have spread too far to be cured.

### **Intervention Procedure**

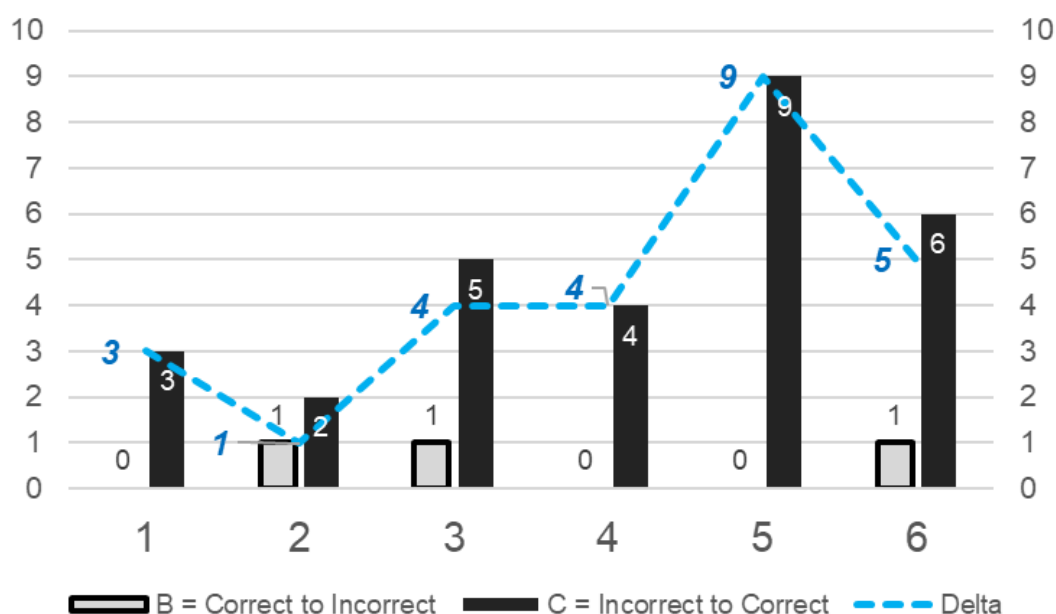
After taking the initial questionnaire, participants were presented with educational slides on lung cancer risk factors, symptoms, treatments, and misconceptions. The post-intervention survey and open-ended feedback were collected.

### **Data Analysis**

A paired two-tailed t-test evaluated overall differences between pre- and post-test scores, yielding  $p = 0.0104$  ( $< 0.05$ ). Per-question differences were summarized descriptively, focusing on directional changes.

## RESULTS AND DISCUSSION

The intervention produced a statistically significant improvement in participant knowledge ( $p = 0.0104$ ). Across questions, an average of 4.83 participants improved (incorrect to correct) per question, while only 0.5 regressed (correct to incorrect), for a net positive shift of 4.33. No question showed more regressions than improvements, underscoring consistent directional gains (Figure 1). Question 5 on the survey, which asked about lung cancer as the leading cause of cancer deaths, drove the largest impact with a delta of +9 ( $0 \rightarrow 9$ ). These significantly statistical results highlight the effectiveness of the intervention in correcting key misconceptions. Participant feedback emphasized the informativeness of the training, though some questions may need rephrasing to reduce ambiguity. Overall, this intervention method proved to be effective, cost-efficient, and geographically inclusive. To improve on this intervention, I plan to rephrase the questions to be less ambiguous. For the future, I would also like to implement this project as an in-person session.



**Figure 1** Improvement in participant knowledge by survey question.

Incorrect to correct values represent improvements and correct to incorrect values represent regressions. The delta represents the difference between the two values.

## CONCLUSIONS

This study demonstrated that a simple, cost-effective digital intervention can significantly improve knowledge of lung cancer risk factors, vaping dangers, and the importance of early detection. These findings support the use of accessible, targeted educational programs to drive awareness and prevention behaviors.

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