Introduction

Tobacco use is a preventable risk factor for many chronic health conditions worldwide, and any level of tobacco use or exposure is dangerous to health (Makadia et al., 2017). The increased risk of cardiovascular diseases and cancer, along with socio-economic costs, position tobacco use as a serious public health problem (Golechha, 2016). For today's youth, tobacco use rates have significantly increased as students progress through school, and the use of alternative tobacco products is rising (Makadia et al., 2017).

For adolescents, risk factors for tobacco use include poor coping, poor school performance, poor mental health, and family and peer influence (Cambron et al., 2018). Those from lower income levels, with poor academics, future smoking intentions, or smoking family members are more likely to use tobacco. Conversely, those with higher social-emotional competence and more adult supervision are at lower risk (Wellman et al., 2016).

The risk factors for tobacco use among elementary students are similar to those for adolescents (O'Loughlin et al., 2017). Elementary school students who lack emotional self-regulation are at a higher risk for tobacco use (Das et al., 2016). Smoking prevalence is also higher among those with lower incomes, potentially linked to early intentions to smoke. In a Dutch study, the intention to smoke among elementary students from low-income families was mediated by modeling non-smoking family members (Cremers et al., 2014). Therefore, interventions should focus on improving protective factors and fostering positive peer and family influences (Cambron et al., 2018).

Tobacco use initiation can begin early and lead to serious long-term health effects. Early tobacco and substance use is associated with significant substance abuse and mental health problems later in life. Therefore, early intervention is crucial. Various preventive education

interventions have been conducted for youth, particularly in school settings. These interventions aim to increase knowledge of tobacco's negative health effects, decrease the intention to use tobacco, and increase the intention to quit. Specifically for elementary students, tobacco prevention interventions should teach social skills, promote positive social influence, and encourage healthy behaviors (Onrust et al., 2016).

Tobacco Prevention Education

Effectiveness of Social Competence Skills

Tobacco education and prevention interventions targeted at elementary students and focused on social competence skills have been found to be most effective (Onrust et al., 2016). Curricula that include social competence and social influence elements effectively reduce the onset of tobacco use in children and adolescents. These programs focus on problem-solving, decision-making, goal setting, coping strategies, and emotional self-regulation (Thomas et al., 2015).

Facilitators and Barriers

A systematic review of school-based prevention studies identified several factors that facilitate effective interventions. Successful programs often include multiple interactive lessons, peer leader training, non-smoking instructors, and a tobacco-free school policy. Barriers to effectiveness include high rates of tobacco use in the community and family, and lessons that are too complex for the students' level (Bauld et al., 2009).

Importance of Social Influence

Tobacco use is socially learned, making peer groups important in prevention education. Interventions that address social and peer influences can be beneficial in preventing tobacco use. Social influence theories suggest that health behaviors can be shaped by the actions and pressures

of significant others and media influences. Individuals may conform to peer behaviors to gain

acceptance (Mamoodi et al., 2018).

Peer Education

Peer education involves teaching individually or in small groups by a motivated peer who

shares characteristics with the students. This approach has been used to prevent the initiation of

tobacco use. Key factors for successful peer education interventions include the training and

motivation of peer educators, establishing positive relationships between educators and students,

and the educational environment (Golechha, 2016).

Research shows that peer influences are crucial in prevention education. Peer education

interventions that emphasize a social influence approach are considered promising for preventing

tobacco use in adolescents (Cheetham & Lubman, 2017). A review of studies found that peer-led

interventions for middle and high school students can decrease tobacco use. Most of these studies

were conducted at school sites, suggesting the need to expand peer education to other settings

(MacArthur et al., 2016).

In a rural Midwest county, a tobacco prevention and control coalition implemented a peer

education-based intervention in a school district's after-school program. This program used best

practices and focused on social influence. It aimed to encourage leadership among participants to

provide social support for non-use. While most research on peer education programs is school-

based, this study addressed the gap by focusing on out-of-school settings.

The purpose of this study was to determine the effect on student participants' smoking

beliefs and social influence leadership when using college students as peer leaders in an after-

school tobacco prevention program for elementary students.

Methods

Sample

A small group of upper elementary students attending an after-school program, along with their after-school counselors, were invited to participate. Thirty-three students (100%) and three counselors (100 %) agreed to participate. The student participants included:

- Third grade: 6 boys, 3 girls (all White)

- Fourth grade: 9 boys, 3 girls (11 White students)

- Fifth grade: 6 boys, 4 girls (8 White students)

All after-school counselors were middle-aged White females.

Instruments

- **Smoking Consequences Questionnaire-Child [SCQ-C]**. A 15-item true-false survey measuring students' smoking outcome expectancies and beliefs. Example statements include: "Smoking hurts throat and lungs," "Once people start smoking, it's hard for them to stop," and "Cigarette smoke can harm others." The survey uses three scales: positive reinforcement, negative consequences/effects, and appetite/weight control (Copland et al., 2007).

- **Nelson Young Leader Inventory (NYLI)**: A 30-item inventory used to identify children/youth leadership, social skills, and the ability to influence others, as observed by counselors. Examples questions include: "The child/youth initiates taking risks, inspiring others to participate," "Child/youth exudes a can-do spirit and perseveres, inspiring others to do the same," and "The child/youth encourages others to join the team…" (KidLead, n.d.).

Procedure

Pre-Intervention:

- Student participants completed the pre-CSQ-C surveys one week before the intervention.

- After-school counselors completed the pre-NYLI inventory for each student in their small teaching group.

Intervention:

- An evidence-based Model Smoking Prevention Program [MSPP] (Perry et al., 2016) was implemented in the after-school program.

- Twelve undergraduate college students from a local university, trained by drug prevention coalition experts, served as peer leaders. They participated in an hour-long training session based on social influence theories.

- College student peer leaders were paired and assigned to small groups of student participants.

- Over six weeks, college student peer leaders conducted 45-minute sessions each week, using active-learning strategies like discussion groups, role plays, and goal setting. The sessions covered:

  o Sessions 1-2: Negative effects of tobacco use and healthy alternatives.

  o Sessions 3-4: Peer pressure, positive social influence, and refusal strategies.

  o Sessions 5-6: Health effects of secondhand smoke, goal setting, and media and advertising.

Post-Intervention:

- One week after the last session, student participants completed the post-SCQ-C surveys.

- After-school counselors completed the post-NYLI inventory for each student.

Analysis

For the SCQ-C, the mean student participant belief response was calculated using three scales: positive reinforcement, negative consequences/effects, and petite/weight control. Higher mean scores reflect healthier smoking outcome expectancies/beliefs.

For the NYLI, the mean counselor-observed rating scores for the total and each item were calculated. Higher mean rating scores reflect higher social influence for non-smokers.

Results

The study measured student participants' smoking beliefs and their ability to influence others before and after the intervention.

Smoking Beliefs (SCQ-C)

- **Positive Reinforcement Scale**: There were no significant changes between pre-intervention (M = 5.96, SD = 0.19) and post-intervention (M = 5.96, SD = 0.19) scores, with $t(26) = 0.00$, $p = 1.00$. This scale ranges from 3 to 6, with higher scores indicating fewer positive ideas about smoking.

- **Negative Consequences Scale**: No significant changes were found between pre-intervention (M = 10.96, SD = 1.01) and post-intervention (M = 10.48, SD = 0.96) scores, with $t(24) = 1.60$, $p = 0.12$. The scale ranges from 10 to 20, with lower scores indicating stronger negative ideas about smoking.

- **Weight Control Scale**: There were no significant changes between pre-intervention (M = 2.92, SD = 0.76) and post-intervention (M = 2.56, SD = 0.71) scores, with $t(24) = 1.74$, $p = 0.10$. This scale ranges from 2 to 4, with lower scores indicating a stronger association of smoking with weight control.

Social Influence Leadership (NYLI)

The counselors observed no significant changes in students' leadership and ability to influence others. Pre-intervention scores (M =66.91, SD = 10.22) were similar to post-intervention scores (M = 69.23, SD = 7.63), with t(34) = -1.33, p = 0.19. This scale ranges from 0 to 125, with higher scores reflecting stronger leadership attributes.

Discussion

Promising tobacco prevention interventions for elementary students have used peer education and positive social influences to encourage non-use (Cheetham & Lubman, 2016; Cheetham & Lubman, 2017). Most research has been conducted in school settings, with limited studies in out-of-school settings. This study addresses this gap by examining the effect of using college students as peer leaders in an after-school tobacco prevention program.

The peer leader and social influence-based intervention in this study followed best practices. Effective prevention programs for elementary students focused on social influence and social competence, teaching decision-making and problem-solving through trained, non-smoking role models and active learning activities (Onrust et al., 2016; Thomas et al., 2015). The curriculum in this study covered these aspects and was taught by trained, smoke-free peer educators.

Unexpectedly, students' smoking beliefs and observed social influence leadership did not change significantly. Students started with strong negative beliefs about smoking and maintained these beliefs post-program. This could be due to the state-mandated coverage of substance use prevention in elementary school health curricula, which may have already established strong anti-tobacco beliefs. As students progress to middle school, these beliefs might change, suggesting the need for continued after-school preventive interventions to sustain them.

Although counselor observations showed no significant changes in social influence leadership, this might be due to the short duration of the intervention and the structured after-school curriculum, which may not have provided enough opportunities for students to demonstrate leadership or for counselors to observe changes.

This study has several limitations, including a small sample size, lack of a control group, and the use of a single after-school program in a rural area. These factors may have influenced the results. Additionally, student participants may not have answered surveys honestly, and counselors may have had biases in their observations.

Despite following best practices for peer education programs, using adult role models for elementary students may not be as impactful as with adolescents (Cheetham & Lubman, 2017). Future studies should explore diverse out-of-school settings and consider using younger peer leaders where available.

Overall, while the intervention did not show significant changes, it highlights the importance of exploring non-traditional settings and approaches for tobacco prevention education. Future research should continue to investigate the effectiveness of peer-led interventions in various contexts to enhance our understanding of their potential impact.

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