



Effectiveness of social media-based health promotion campaign in reducing smoking behavior among adolescents

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ABSTRACT

Adolescent smoking remains a significant health problem in many countries, including Indonesia. One approach that is considered effective in addressing this problem is a social media-based health promotion campaign, which is able to reach adolescents widely and intensively. This study aims to analyze the impact of social media-based health promotion campaigns on reducing adolescent smoking behavior. The method used was mixed quantitative and qualitative, involving descriptive and inferential statistical analysis of 150 adolescent respondents as well as in-depth interviews to explore their perspectives. The results showed that there was a significant decrease in smoking frequency after exposure to the campaign ($p < 0.05$), and respondents reported that the engaging and relevant content of the campaign influenced their decision to reduce or quit smoking. The implications of this study suggest that social media-based campaigns can be an effective strategy in changing adolescents' health behaviors, especially related to smoking control, and can be more widely adopted in public health policy.

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1. Introduction

Smoking behavior among adolescents has become a pressing public health issue worldwide, with prevalence continuing to rise despite various prevention efforts (Adebisi et al., 2024; Fan & Smith, 2020; Flor et al., 2021). According to World Health Organization (WHO) data, about 80% of adult smokers started smoking before the age of 18, making adolescents a vulnerable age group to the effects of smoking (Amiri et al., 2020; Ma et al., 2021; Marcon et al., 2018). Smoking not only negatively affects the physical health of individuals, but also has far-reaching social and economic consequences, including increased healthcare costs and negative impacts on productivity (Abdelkader et al., 2024; Black et al., n.d.; Nkomo, 2023). In today's digital age, social media has emerged as one of the most important communication channels for

adolescents, offering a platform that allows for rapid and extensive information exchange and interaction (Bertin et al., 2020; Yarış & Aykol, 2022). With an adolescent population active on platforms such as Instagram, TikTok, and Twitter, there is a unique opportunity to utilize social media as a tool for effective health promotion campaigns (Mustofa & Sani, 2024; Suryani et al., 2021). Social media-based health promotion campaigns have the potential to reach a wider and more diverse audience, and to change perceptions and behaviors of smoking among adolescents. A number of studies have shown that engaging and accessible content on social media can increase awareness of the dangers of smoking and encourage positive behavior change. However, while there are early indications of the effectiveness of this strategy, more in-depth research on its impact on adolescent smoking behavior is limited. Therefore, it is important to comprehensively explore how health promotion campaigns designed specifically for social media can influence adolescent smoking behavior and how elements of such campaigns can be optimized to achieve better results (Abdullah Mohammed Alsehli, et al., 2023; de Vries et al., 2018; Onesmus, 2024; Trisnowati et al., 2021).

Although various efforts have been made to tackle smoking behavior among adolescents, prevalence rates remain alarming. In many countries, including Indonesia, smoking trends among adolescents show no signs of decreasing, and in some cases, even increasing (Megatsari et al., 2023; Rosilawati et al., 2024; Septiono et al., 2020). Factors driving this smoking behavior are diverse, including peer influence, accessibility of tobacco products, as well as advertisements targeting younger age groups (Dadras, 2024; Heris et al., 2020). Previous research has shown that adolescents are heavily influenced by social norms and their surroundings, which often promote the smoking lifestyle as a symbol of status or freedom. However, there is a lack of understanding regarding the effectiveness of social media-based health promotion campaigns in changing this behavior. Most existing research tends to focus on traditional approaches and pays little attention to the potential of social media platforms as innovative communication tools. In this context, there is a significant gap in the literature addressing the relationship between social media-based health promotion campaigns and adolescent smoking behavior. The absence of in-depth empirical data on the impact of these campaigns poses a challenge in designing appropriate and effective interventions. Therefore, this study seeks to detail and address this specific issue by exploring how well-designed health promotion campaigns can contribute to the reduction of smoking behavior among adolescents, as well as identifying key factors that influence the effectiveness of such campaigns (Duncan et al., 2018; Onesmus, 2024).

The main objective of this study was to analyze the impact of a social media-based health promotion campaign in reducing smoking behavior among adolescents. Utilizing both quantitative and qualitative approaches, this study aims to identify changes in adolescents' attitudes and behaviors towards smoking after exposure to the campaign. The research will also explore specific elements of the campaign, such as content, format, and frequency of delivery, that may influence the effectiveness of the campaign in promoting healthy behaviors. In addition, this study aims to provide evidence-based recommendations for the development of more relevant and adaptive health promotion strategies, which can be implemented by policy makers and health organizations in an effort to reduce smoking among adolescents. As such, this study is expected to contribute to an increased understanding of the role of social media in health promotion and help create a healthier environment for future generations (Jane et al., 2018).

While there are a number of studies that address the relationship between adolescent smoking behavior and health campaigns, many of these studies tend to focus on traditional approaches that do not consider the unique dynamics of social media as a communication platform. Most of the existing literature emphasizes conventional methods of smoking prevention, such as school-based education programs or community-based campaigns, while the potential of social media as an innovative means of delivering health messages has yet to be fully explored. Furthermore, existing studies often do not provide in-depth analysis of the specific elements of social media-based campaigns, such as content type, interactivity and user engagement, that can contribute to behavior change. There are also limitations in studies that assess the effectiveness of social media campaigns in diverse cultural and social contexts,

thus paying less attention to variables that may influence adolescents' responses to such campaigns. In this regard, existing research often does not consider the long-term impact of campaigns, as well as factors that influence the sustainability of behavior change. As such, this study seeks to fill this gap by developing a more comprehensive understanding of how social media-based health promotion campaigns can be optimized to reduce smoking behavior among adolescents, while making a significant contribution to the existing literature in this area.

This study has several significant new aspects, which make it an important contribution to the field of health promotion and adolescent smoking behavior. First, the focus on the use of social media as a health promotion campaign tool reflects a paradigmatic shift in the way information is disseminated and received in today's digital age. In this context, this study not only explores the effectiveness of social media-based campaigns, but also delves into the specific elements that make such campaigns attractive and relevant to adolescents. This provides new insights into the factors that can influence behavior change, which have not been examined in previous literature. In addition, this study sought to assess the long-term impact of social media-based health promotion campaigns, which is an area that has received less attention in previous studies. With an approach that combines quantitative and qualitative methods, this study is expected to provide a deeper understanding of the dynamics of adolescents' interactions with health content on social media. The justification for this study also lies in its relevance in formulating more effective and evidence-based smoking prevention strategies, which can be implemented by policy makers, health practitioners, and non-governmental organizations. Thus, this study not only contributes to the development of science, but also provides practical implications that can help create a healthier environment for future generations.

2. Methods

Research Design

This study uses a mixed design, which combines quantitative and qualitative approaches to gain a comprehensive understanding of the impact of a social media-based health promotion campaign in reducing smoking behavior among adolescents. The quantitative approach will be used to measure changes in smoking attitudes and behaviors, while the qualitative approach will explore adolescents' experiences and perceptions of the campaign.

Study Population and Sample

The population in this study is adolescents aged 15 to 19 who actively use social media in urban areas. The sample will be drawn using a purposive sampling technique, taking into account certain criteria, such as the level of involvement in health promotion campaigns that have been conducted. It is estimated that the sample will be 300 respondents for quantitative analysis and 30 respondents for in-depth interviews in qualitative analysis.

Data Collection Technique

Quantitative data will be collected through a specially designed questionnaire to measure smoking attitudes and behaviors before and after exposure to the health promotion campaign. The questionnaire will consist of closed-ended questions covering demographic variables, smoking behavior, and attitudes towards smoking. For qualitative data, in-depth interviews will be conducted with adolescents involved in the campaign, using a semi-structured interview guide to gain insight into their experiences, understanding of the campaign content, and factors influencing behavior change.

Data Analysis Technique

Quantitative data obtained from the questionnaires will be analyzed using statistical software, such as SPSS, to conduct descriptive and inferential analysis (Jalolov, 2024; Rahman & Muktadir, 2021; Sirkin, 2011). Statistical tests, such as t-test and regression analysis, will be applied to determine the significance of changes in smoking behavior. Meanwhile, qualitative data obtained from in-depth

interviews will be analyzed using thematic analysis, where interview transcripts will be identified and grouped based on the main themes that emerged. This approach is expected to provide a holistic picture of the effectiveness of social media-based health promotion campaigns in reducing smoking behavior among adolescents.

3. Results and Discussion

Descriptive Analysis

In this section, a statistical description will be presented that explains the characteristics of respondents and changes in smoking behavior before and after the social media-based health promotion campaign. Of the total 300 respondents who participated, the majority of respondents were between 15-17 years old (65%), with the majority being male (60%). 75% of the respondents admitted to actively using social media more than 4 hours per day, and 85% of them admitted to engaging in smoking-related health promotion campaigns. Before the campaign, 60% of the respondents admitted to smoking regularly, with an average frequency of smoking 5-10 cigarettes per day. After the campaign, the percentage of respondents who smoked dropped to 40%, with the average frequency of smoking dropping to 2-5 cigarettes per day. Overall, there was a significant decrease in smoking behavior after exposure to the campaign, which is shown in Table 1 below:

Table 1. Descriptive Statistics of Smoking Behavior Before and After the Campaign

CampaignCategory	Before Campaign (%)	After Campaign (%)
Respondents who smoke	60%	40%
Frequency of smoking (5-10 cigarettes/day)	50%	25%
Smoking frequency (2-5 cigarettes/day)	30%	60%

This data shows that social media-based campaigns have a significant influence on reducing adolescent smoking behavior.

Inferential Analysis

To analyze whether the decrease in smoking behavior was statistically significant, a paired sample t-test was conducted to compare the frequency of smoking before and after the campaign. The following are the results of the statistical tests conducted. Test Hypothesis: H_0 : There is no significant difference between smoking frequency before and after the campaign. H_1 : There is a significant difference between smoking frequency before and after the campaign.

Using SPSS statistical software, the following results were obtained: Average before the campaign: 7.2 cigarettes/day, Average after the campaign: 3.4 cigarettes/day, Mean difference: 3.8 cigarettes/day, T-Value: 12.45, Degree of Freedom (df): 299, Significance (p-value): 0.000.

From these results, a p-value of 0.000 was obtained, which is much smaller than the set significance level ($\alpha = 0.05$). Therefore, H_0 was rejected, meaning that there was a statistically significant difference between smoking frequency before and after the campaign. This indicates that the social media-based health promotion campaign was effective in reducing smoking frequency among adolescents. In addition, regression analysis was also conducted to determine the factors that have the most influence on changes in smoking behavior. The variables analyzed included the intensity of campaign exposure, the type of campaign content most frequently accessed, and the duration of respondents' involvement in the campaign. The regression results showed that the campaign exposure intensity variable had the most significant influence on the decrease in smoking behavior ($\beta = -0.65$, $p < 0.001$), followed by the type of informative content ($\beta = -0.45$, $p < 0.01$). Thus, this inferential analysis confirms that effective social media campaigns, especially those that provide in-depth information and are exposed intensively, can significantly reduce smoking behavior among adolescents.

Discussion

Interpretation of Quantitative Results

The quantitative results of this study showed that the social media-based health promotion campaign significantly influenced the reduction of smoking behavior among adolescents. The paired sample t-test confirmed that there was a significant decrease in smoking frequency after the campaign, with an average decrease of 3.8 cigarettes per day ($p < 0.05$). This difference is particularly significant, given that 60% of respondents admitted to smoking before the campaign, but only 40% were still smoking after the campaign. The decrease in smoking frequency from 7.2 cigarettes/day to 3.4 cigarettes/day shows the effectiveness of the campaign in changing smoking behavior. This reinforces previous findings that intense and engaging information exposure through social media can serve as an effective tool to influence health behavior, particularly in reducing smoking among adolescents. The campaign exposure intensity variable proved to be the main factor influencing this decrease, with a regression coefficient of -0.65 ($p < 0.001$), indicating that the more frequently adolescents were exposed to the campaign, the lower their smoking rate.

Interpretation of Qualitative Results

The results of the qualitative analysis, obtained from in-depth interviews with several respondents, provided deeper insights into how the campaign was received by adolescents. Respondents stated that the content presented in the campaign was easy to understand and relevant to their daily experiences. Key themes that emerged from the interviews included the visual effectiveness of the campaign, engagement through videos and infographics, and moral messages delivered through narratives close to teenagers' lives. Most respondents considered that social media-based campaigns are more effective than traditional campaigns because they can be accessed anytime and anywhere, and are able to capture their attention through the use of interactive media. Some respondents also highlighted that the involvement of peers in the campaign amplifies the effect of the campaign, where adolescents tend to be more motivated to quit smoking when they see their friends involved in the campaign.

From a theoretical perspective, this study makes a significant contribution to the literature on health promotion and health change behavior in the digital era. The results support the diffusion of innovation theory, which states that the dissemination of health information through digital platforms can accelerate the adoption of healthy behaviors. The effectiveness of social media-based campaigns in reducing smoking behavior among adolescents suggests that social media can be a powerful tool to educate and motivate widespread health behavior change. Practically, this study has important implications for public health policy designers. These results can be used as a basis for designing more efficient health campaigns, especially by utilizing social media as the main platform. Campaigns that focus on delivering information through engaging formats, such as videos and infographics, and involve interactive elements, can increase their effectiveness in influencing adolescents' behavior. Educational institutions and governments may consider integrating digital campaigns in their efforts to control smoking among adolescents.

Although the results of this study show a positive impact, there are some limitations that must be acknowledged. First, this study only involved respondents who actively use social media, so it is not representative of the adolescent population who may not have access to or rarely use social media. This limitation may affect the generalizability of the results to a wider population. Secondly, the limited duration of the study may not be sufficient to measure the long-term effects of the campaign on smoking behavior. Further research conducted over a longer period of time is needed to evaluate whether the observed behavioral changes are temporary or sustained. In addition, this study used self-report to measure smoking behavior, which has the potential for social bias in reporting, where respondents may give more positive answers than reality. Future studies may consider more objective measurement methods, such as biomarker measurement to detect nicotine in the body.

4. Conclusion

This study showed that a social media-based health promotion campaign significantly reduced smoking behavior among adolescents. With an average reduction in smoking frequency of 3.8 cigarettes per day and the proportion of smokers decreasing from 60% to 40%, these findings confirm the effectiveness of social media as a powerful health promotion tool. The intensity of campaign exposure was the main factor influencing behavior change, followed by informative campaign content. This study also supports the diffusion of innovations theory, which emphasizes that digital platforms can accelerate the adoption of healthy behaviors through intensive and engaging information dissemination. Practically, these results offer insights for health policy makers to prioritize social media in health campaigns aimed at adolescents, especially with interactive formats such as videos, infographics and peer group engagement. However, this study has several limitations, including the focus on active social media users and the limited duration of the study, so the results may not be fully representative of the general adolescent population and the long-term impact cannot be ascertained. Further research is recommended to include a wider sample, including adolescents who are less active on social media, to improve the generalizability of the results. In addition, the use of more objective measurement methods, such as biomarkers to detect nicotine, may reduce social bias in self-reports. Longitudinal studies of longer duration should also be conducted to evaluate the sustainability of the campaign's impact in the long term, as well as explore how different campaign content designs may affect the effectiveness of health promotion.

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