

# Bibliometric Analysis of Smoking as a Lifestyle for Women in Indonesia Using VOSviewer

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## ABSTRACT

**Background:** Smoking is an important health issue influenced by various factors, especially among women. Women's smoking behavior is related to lifestyle and daily habits. However, there are still few studies that specifically focus on women's smoking behavior. Therefore, it is important to review how research on smoking among women has been conducted to find new topics that can be studied in the future.

**Objective:** The aim of this study was to analyze how research on smoking as a lifestyle for women was conducted and to find out what topics could be used as research variables in the future.

**Method:** The research method, as a literature review using bibliometric analysis techniques, began by defining the keywords "behaviors smoking" and "Jurnal" in the Publish or Perish application with Scopus

**Results:** Then narrowed the results by selecting a specific topic on "woman behaviors smoking," so that 78 related articles were reviewed from 200 initial search articles. The articles were then compiled using the Mendeley and VOSviewer applications, which were used to create visualizations of research trends

**Conclusion:** The results of the study show the classification of research on smoking in women and lifestyle with topics centered on Health, habits and lifestyle. This study is limited by the lack of variation in the topic of reviewed articles.

**Keywords:** Bibliometric, Mendeley, VOSviewer, Publish or Perish, Smoking, Behaviors

## INTRODUCTION

Smoking remains a global health issue that continues to receive significant attention, and women have become a primary target for tobacco products (Amos et al., 2012; Samet, 2013). Female smokers are considered potential loyal customers for the tobacco industry, but this also poses a serious threat to public health. Women who begin smoking at the age of 11 or younger are more likely to become heavy and regular smokers compared to those who start at an older age. For men, smoking has often been perceived as a lifestyle choice and a common practice. However, the increasing prevalence of female smokers, which is predicted to rise annually, is viewed differently, often being associated with defiance against societal norms (Bilano et al., 2015).

In Indonesia, tobacco control interventions have primarily targeted male smokers, given that Indonesia has the highest prevalence of male smokers globally (Astuti et al., 2020; Islami et al., 2015). Approximately 70% of the productive population in Indonesia are male smokers. This significant percentage represents a potential health burden for the country, necessitating effective health control measures. However, an upward trend in smoking behavior is also observed among women, particularly in the use of

electronic cigarettes. Indonesia currently ranks third in terms of female smoking prevalence in the ASEAN region, following Myanmar and Laos (Hung, 2023; Kristina et al., 2019).

Indonesia has the largest number of smokers in the ASEAN region, with 65.19 million smokers, comprising 62.9% male and 4.8% female smokers in 2018. Various studies have demonstrated that smoking poses significant health risks for women, including an increased risk of breast cancer, fetal growth disorders, disruption of breast milk production, miscarriage, and even fetal death (Sande et al., 2021).

Smoking is generally seen as an acceptable behavior among men without facing negative social judgment. In contrast, women who smoke often encounter negative perceptions from society (Graham, 2012; Greenberg, 1994). Moral judgments are more easily directed at women who smoke, particularly in public settings. Women who smoke are often labeled with derogatory terms, such as "immoral women," "delinquent women," "wild women," or even "rebels." Moreover, the portrayal of female smokers in the media tends to be negative (Goodin, 1989; Poland, 2000).

In developed countries, smoking among women in public places is more prevalent compared to developing countries. In urban areas, smoking among women may be viewed as a symbol of modernization, independence, maturity, and autonomy, with a trend that is expected to increase annually (Bell et al., 2010).

Based on the issues outlined above, the present study aims to conduct a "Bibliometric Analysis of Research Trends on Smoking Habits Among Women." This study seeks to address the following research questions: (1) Why do women adopt smoking as a habit? (2) What are the research trends concerning the relationship between smoking behavior and women's smoking habits? (3) Can the topic of women's smoking habits become a focus for future research?

## MATERIALS & METHODS

This study employs a literature review approach using bibliometric analysis, which applies statistical methods to bibliographic data, particularly within the context of scientific studies, library science, information science, and scientometrics (the analysis of scientific metrics and indicators). These fields are significantly interconnected. In bibliometric studies, the literature review must be conducted systematically and explicitly (Muñoz-Caro et al., 2017) or using a knowledge-mapping approach that emphasizes knowledge boundaries (Tranfield et al., 2003).

Citation analysis is a commonly used bibliometric method based on the construction of citation graphs, networks, or graphical representations of citations shared by documents. Numerous research fields utilize bibliometric methods to explore their impact, assess the influence of a group of researchers, measure the impact of specific papers, or identify highly influential papers in a particular research area. Bibliometric tools are widely integrated in statistical linguistics, thesaurus development, and reader usage evaluation. Beyond their scientific applications, popular web search engines, such as Google's PageRank algorithm, are largely shaped by bibliometric methods and concepts.

The bibliometric analysis method in this study follows five key steps (Fahimnia et al., 2015), including:

- 1. Defining Search Keywords:** Initial keyword selection is determined, with "smoking behavior" as the primary search term.
- 2. Initial Search Result:** This stage involves collecting preliminary data using the defined keywords.
- 3. Refinement of the Search Result:** The search results are refined to ensure the relevance and quality of the data.
- 4. Compiling Statistics on the Initial Data:** Statistical data are compiled to provide a descriptive analysis of the search results.

**5. Data Analysis:** The final stage involves analyzing the collected data to identify trends and insights.

**1. Defining Search Keywords**

Literature searches were conducted in February 2025, using the keyword “smoking behavior” The Publish or Perish software, with Scopus as the database, was utilized to collect data. The search criteria were limited to peer-

reviewed journals, excluding newspapers, magazines, books, book reviews, and any non-academic publications. The initial search using Scopus resulted in 200 articles published between 2010 and 2025.

**2. Initial Search Result**

Table 1 presents the list of the top 10 articles identified through the initial search using Publish or Perish (PoP).

**Table 1. Top 10 Articles Identified by Publish or Perish (PoP)**

Authors	Title	Cited by
G.S. Gould (2017)	Designing an implementation intervention with the Behaviour Change Wheel for health provider smoking cessation care for Australian Indigenous pregnant women	cited by 78 (9.75 per year)
M.M. Johns (2013)	LGBT Community, Social Network Characteristics, and Smoking Behaviors in Young Sexual Minority Women	cited by 71 (5.92 per year)
R.L. Fielder (2013)	Hookah, cigarette, and marijuana use: A prospective study of smoking behaviors among first-year college women	cited by 51 (4.25 per year)
C.E. Schiller (2012)	Association between ovarian hormones and smoking behavior in women	cited by 50 (3.85 per year)
H. Gharaibeh (2011)	Knowledge, attitudes, and behavior in avoiding secondhand smoke exposure among non-smoking employed women with higher education in Jordan	cited by 46 (3.29 per year)
A. Mao (2013)	Caught in a dilemma: Why do non-smoking women in China support the smoking behaviors of men in their families?	cited by 45 (3.75 per year)
T. Scheffers-Van Schayck (2019)	Smoking Behavior of Women Before, During, and after Pregnancy: Indicators of Smoking, Quitting, and Relapse	cited by 44 (7.33 per year)
B.T. Hansen (2010)	Early smoking initiation, sexual behavior and reproductive health - a large population-based study of Nordic women	cited by 44 (2.93 per year)
L. Blanco (2014)	National trends in smoking behaviors among mexican, puerto rican, and cuban men and women in the United States	cited by 39 (3.55 per year)
H. Sakai (2013)	Association of menstrual phase with smoking behavior, mood and menstrual phase-associated symptoms among young Japanese women smokers	cited by 31 (2.58 per year)

**3. Refinement of the Search Result**

The author excluded articles that did not meet the screening criteria, which are presented in Table 2 as the outcome of this procedure. From the initial 200 articles, the author selected 78 articles. After reviewing

titles and abstracts, 122 articles were excluded for various reasons. Table 2 displays a comparison of data and metrics between the initial search and the refined search results.

**Table 2. Article Screening Results**

Screening Result	Number of Articles
Irrelevant (religious review)	1
Non-women smoking behavior topics	121
Women smoking behavior topics	78
Total	200

**4. Compiling Statistics on the Initial Data**

The search results were downloaded, saved in the Mendeley application, and exported

to RIS format to include all relevant information related to the articles, such as title, author names, abstracts, keywords, and journal specifications.

## 5. Data Analysis

This article presents a bibliometric analysis using the keyword "smoking behavior," which was then narrowed down to the field of "women smoking behavior" from the Scopus database. The bibliometric analysis utilized the Publish or Perish (PoP)

application, yielding 200 articles from the initial search with a total of 15,973 citations per year. After refining the search according to predefined categories, 78 articles remained. The citation count also changed accordingly, resulting in 937 citations per year.

**Table 3. Comparative Matrix**

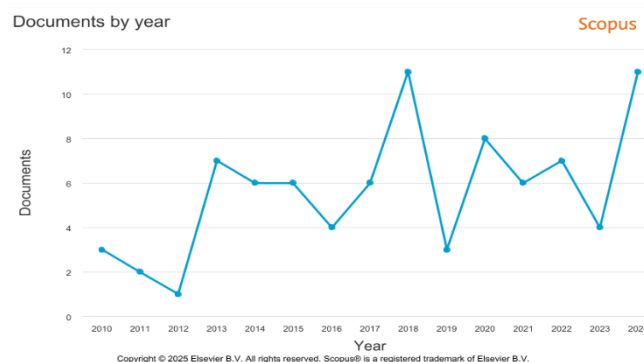
Data Matrix	Initial Search	Refined Search
Keyword	Journal, smoking behavior	Women smoking behavior
Source	Scopus	Scopus
Number of Articles	200	78
Total Citations	17,803	937
Citations per Year	1,186.87	62.47
Article Authors	200	78

## RESULT AND DISCUSSION

The findings of this bibliometric analysis indicate that the most cited article is authored by Designing G.S. Gould (Gould et al., 2017) titled "*An implementation intervention with the Behaviour Change Wheel for health provider smoking cessation care for Australian Indigenous pregnant women*", published in *Implementation Science*, with a total of 78 citations. The second most cited article is by M.M. Johns (Johns et al., 2013), entitled "*LGBT Community, Social Network Characteristics, and Smoking Behaviors in Young Sexual Minority Women*", published

in the *American Journal of Community Psychology*, which has been cited 71 times. In this section, the author presents the annual output data sourced from the Scopus database, which serves as the primary element in conducting this bibliometric analysis. This output data not only reflects the intensity of research activity but also illustrates the development of recent issues that attract interest from researchers and authors alike. By providing this output data, it is expected that readers can recognize and understand the growth patterns of publications, thematic distributions, and future research directions.

**Figure 1. Number of Publications per Year**

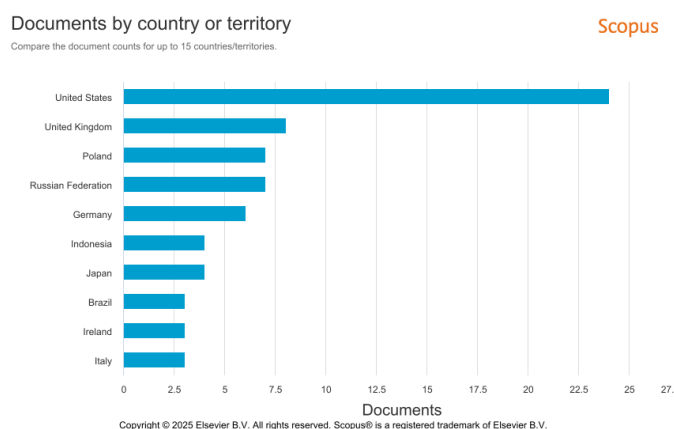


Based on the publication count graph per year, the number of publications on women and smoking behavior has fluctuated from 2010 to 2025. During the period from 2010 to 2012, the publication count was very low and even showed a decline. Although there

was an increase in publications in 2013, the numbers decreased again until 2017. The peak publication years occurred in 2018 and 2024. Overall, publications on this theme appear unstable, as evidenced by sharp declines in certain years. This instability

may be related to fluctuating interest or competition with other research topics deemed more attractive.

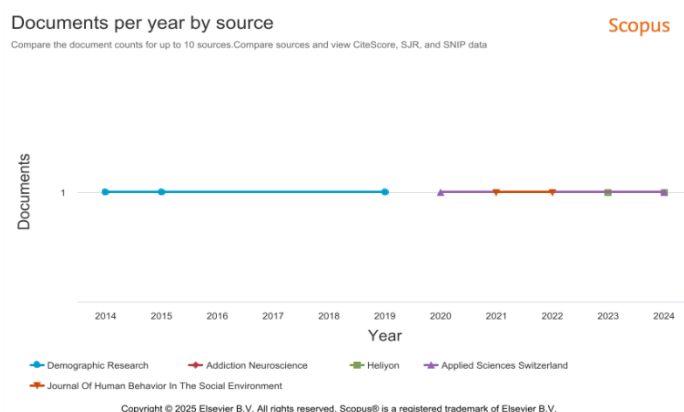
**Figure 2. Number of Publications by Country or Region**



Based on the analysis of publication counts by country, there are 10 countries with the highest number of publications. The United States ranks first with more than 23 articles published, followed by the United Kingdom with 8 articles, Poland and the Russian Federation each with 7 articles, Germany with 6 articles, Indonesia and Japan each with 4 articles, Brazil, Ireland, and Italy each with 3 articles. Based on this data,

research on women's smoking behaviors is more frequently conducted in developing countries, which may be influenced by factors such as feminism movements, health awareness, and lifestyle changes that are considered important in the modern era. Women in both developing and developed countries perceive smoking as a form of self-actualization to demonstrate equality, independence, and maturity.

**Figure 3. Number of Publications Per Year Based on Source**



Based on the data above, publications related to the analyzed topic are distributed across several journal sources, including *Demographic Research*, *Addiction Neuroscience*, *Heliyon*, *Applied Sciences Switzerland*, and *Journal of Human Behavior in the Social Environment*. The number of documents published appears consistent, with approximately one article

per journal per year within the presented timeframe of 2010 to 2025. There are no significant spikes or variations observed among the journal sources.

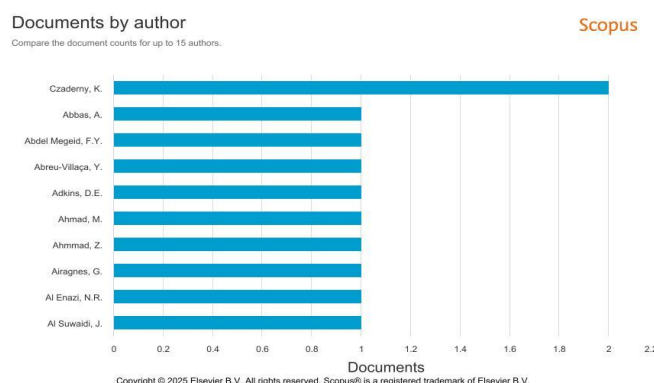
This indicates that although the chosen topic is relevant and the publications are consistent, the contribution from each journal remains very limited, comprising only a small number of articles. This may be



attributed to the specificity of the research, which targets an audience focused within

the particular scope of each respective journal

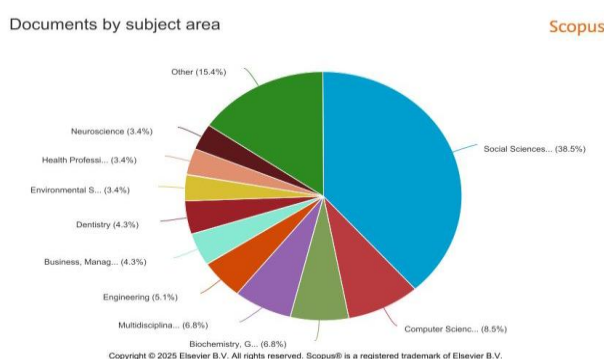
**Figure 4. Number of Publications Per Year Based on Authors**



Looking at the classification of authors, the number of articles published per year is relatively consistent at about one article per year. Based on the output data, Czadermy K. is the author who has published the most articles, with an average of two articles per year. Following are Abbas, Abdel Megeid, Abreu-Villaca, Adkins, Ahmad, Ahmmad, Airagnes, Al Enarzi, and Al Suwaidi, each with one article per year. Czadermy has made a significant contribution to the development of this research topic, which may indicate a high level of expertise and proficiency in this field.

This publication trend might be influenced by the researchers' disciplinary backgrounds and their specific areas of expertise. The topic is considered interesting, yet not many authors are attracted to explore it. At certain times, authors also consider the relevance of the topic to the development needs of knowledge and academic insight within specific scholarly communities. Nevertheless, the data show that the consistency of these authors reflects their effort to advance scientific knowledge within the scope of the research topic.

**Figure 5. Number of Publications Based on Research Subjects**



Based on the flow chart above, it can be concluded that the research subject most frequently discussed in relation to women's smoking behavior is social sciences, accounting for 38.5% of the total. This is followed by other subjects at 15.4%, computer sciences at 8.5%, multidisciplinary sciences at 6.8%,

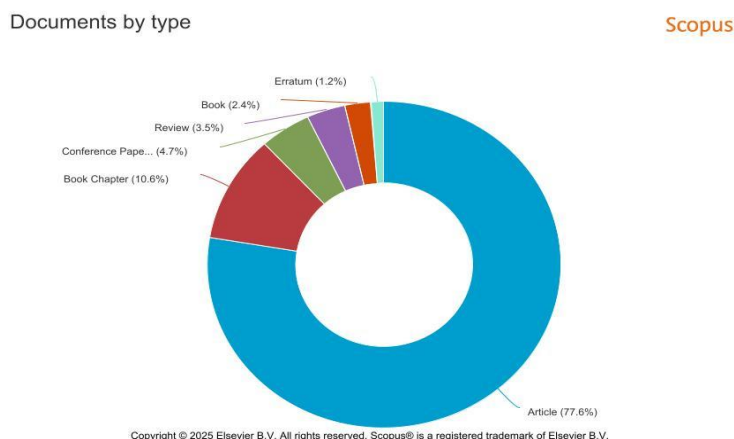
engineering at 5.1%, business and management at 4.3%, dentistry at 4.3%, environmental sciences at 3.4%, health professions at 3.4%, and neurosciences at 3.4%.

Social sciences dominate as the primary subject of discussion on this topic, possibly because women smokers are perceived as

deviating from social order, making it an important issue to be addressed. Discussions within the social sciences may also relate to the contemporary feminist movements that coincide with global modernization. Consequently, some groups approach

women's smoking behavior through the lens of societal norms and religious values. The use of this subject area likely aims to evaluate the conformity of such behavior with prevailing community norms and values.

**Figure 6. Number of Publications Based on Type**



Based on the publication types, articles constitute the highest percentage at 77.6%, followed by book chapters and conference papers each at 10.6%, reviews at 3.5%, and errata at 1.2%. Article writing and publication are perhaps considered more specific in focus, although naturally their scope remains limited.

In addition to the analysis using Scopus, after considering citation frequencies and

other metrics, the researcher further analyzed the data using the Publish or Perish (PoP) application and then imported the results into VOSviewer to identify frequently occurring keywords. The VOSviewer application was utilized to visualize bibliometric maps in three different formats: network visualization, overlay visualization, and density visualization.

**Figure 7. Visualization of Trends and Research Maps**



A full calculation using the Publish or Perish (PoP) application was performed with a Co-Occurrence analysis type, using keywords as the unit of analysis and applying the fractional counting method.

This process resulted in 52 keywords and a threshold of 7. The researcher also excluded common terms that were not directly related to the research analysis, such as results, study, research, and findings. Ultimately,

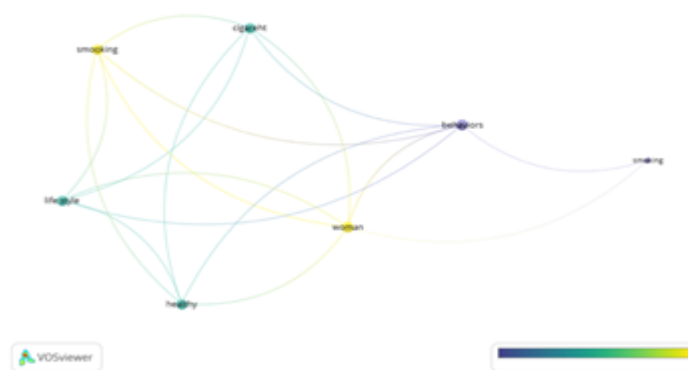
two clusters were identified. The first cluster consisted of the keywords: cigarette, healthy, lifestyle, smoking, and woman. The

second cluster consisted of the keywords: behaviors and smoking. The occurrence values can be seen in Table 4.

**Table 4. Clusters and Occurrence Values of Research Trends**

CLUSTER 1	OCCURRENCE VALUE	CLUSTER 2	OCCURRENCE VALUE
Cigarette	22	Behavior	25
Healthy	22	smoking	23
Smoking	23		
Life Style	22		
Woman	24		

**Figure 8. Research Overlay Visualization**

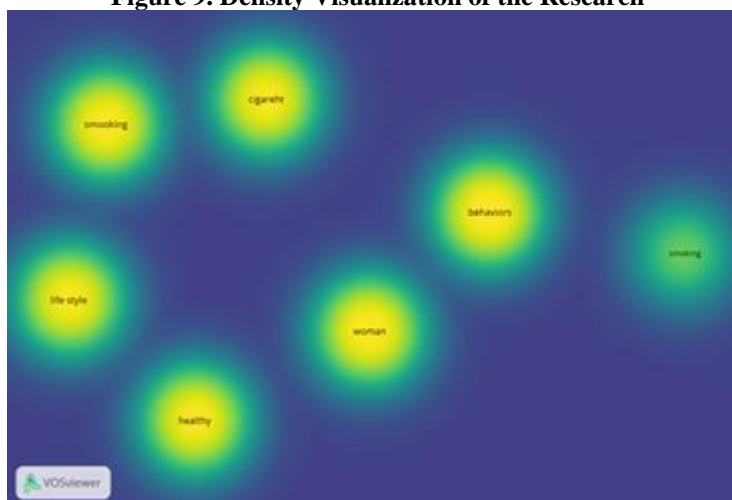


Overlay visualization serves to display the historical trace of research. If the visualization appears darker, it indicates that the research has been conducted for a long time; conversely, if the visualization is brighter, it means the research was recently conducted or will be conducted in the future.

From the analysis results of the overlay visualization, it can be seen that research

related to the keywords and clusters of *behavior* and *smoking* has been conducted for a long time, whereas research on *cigarette*, *healthy*, and *lifestyle* can be considered relatively new. Research related to *woman* and *smoking* is the newest and is likely to continue to develop in the future. Smoking among women in the modern era has become a common habit.

**Figure 9. Density Visualization of the Research**





The final visualization is the Density Visualization, which serves to show the level of discussion within research clusters. If the visualization appears brighter, it indicates that the research topic is more frequently studied, while a darker visualization means the topic is less frequently discussed.

From the analysis of Figure 3, it is clear that the topics *woman*, *behaviors*, *smoking*, *life style*, *healthy*, and *cigarette* are frequently discussed in research. Smoking habits among women can be influenced by several external and internal factors, including social interactions or shifts in lifestyle. There is a public assumption that female smokers are considered modern, sexy, glamorous, mature, and independent women. Additionally, female smokers may use cigarettes as an escape from problems and the pressures of life they experience. Most of them believe that smoking can reduce or even eliminate stress, so by smoking, they sometimes feel comfort and relaxation when facing life's problems. Besides being a tool to relieve frustration, smoking also serves as a symbol in social relationships. Many active female smokers initially only tried smoking due to peer influence and eventually decided to become addicted to cigarettes. This makes it difficult to quit, and such habits turn smoking into a lifestyle and routine for them.

## CONCLUSION

This study examined 38 articles related to the themes of female smokers, lifestyle, and behavior. The articles were collected through the Scopus database using PoP software. The 38 articles obtained were the result of screening from a total of 200 articles found in the initial search. Narrowing the search based on categories determined by the researcher left 38 relevant articles (an 85% reduction).

The gaps identified in this study indicate directions for future research agendas on the topic of female smokers as a habit and lifestyle, as well as support and important findings from this review. Overall, this

research topic is on an upward trend, with special attention needed to increase collaboration across subtopics such as smoking culture in society, the consequences of smoking habits, and the impact of smoking on women's health.

This study has limitations. The researcher classifies these limitations into two. First, this study is based on a limited set of keywords, which potentially limits the scope due to the database used in collecting articles. Second, although formal analysis tools such as PoP, Mendeley, and VOSviewer were used, the researcher's objective assessment could still introduce errors.

Future research would be better and more comprehensive if it uses a larger sample size, expands the keywords used, and accesses more databases. Additionally, comparing the analysis results with different bibliometric analysis software could improve the quality of the study.

## Declaration by Authors

**Ethical Approval:** Not Applicable

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**Conflict of Interest:** The authors declare no conflict of interest.

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