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A SYSTEMATIC REVIEW OF PHARMACEUTICAL INTERVENTIONS FOR SMOKING CESSATION AND THEIR LONG-TERM EFFECTIVENESS.

Thamer A. Alsalmi[1], Abdullah M. Alsaedi[2], Ali Albajali[3], Fahad Altayyari[4], Sultan A. Almuhalbidi[5], Faisal A. Alomari[5], Hanin H. Alrefai[5], Majed H. Albeshri[6]

[1]Pharmacy Department, Khulais Primary HealthCare Centre, Makkah Health Cluster, Ministry of Health, Saudi Arabia

[2]Pharmacy Department, Albarzah Primary HealthCare Centre, Makkah Health Cluster, Ministry of Health, Saudi Arabia

[3]Pharmacy Department, Alkhowar Primary HealthCare Centre, Makkah Health Cluster, Ministry of Health, Saudi Arabia

[4]Pharmacy Department, AL-Talà Primary HealthCare Centre, Makkah Health Cluster, Ministry of Health, Saudi Arabia

[5]Pharmacy Department, Khulais General Hospital, Makkah Health Cluster, Ministry of Health, Saudi Arabia

[6]Pharmacy Department, Shamiyat Asfan Primary HealthCare Centre, Makkah Health Cluster, Ministry of Health, Saudi Arabia

Abstract:

This systematic review aimed to evaluate the effectiveness of different pharmaceutical interventions for smoking cessation. A comprehensive search of the literature was conducted, resulting in the inclusion of 40 studies meeting the inclusion criteria. The findings demonstrated that nicotine replacement therapy (NRT) consistently showed positive outcomes, with higher abstinence rates compared to placebo or no intervention. Bupropion exhibited mixed results, with some studies reporting significant improvements in abstinence rates and others showing no significant difference. Varenicline demonstrated promising efficacy, with higher abstinence rates and reduced relapse risk. The heterogeneity of the included studies and potential sources of bias were identified as limitations. These findings have implications for clinical practice, suggesting the continued use of NRT as a first-line treatment option and considering varenicline as a valuable option for smoking cessation. Further research is needed to clarify the factors influencing the efficacy of bupropion and explore the long-term effectiveness of other pharmaceutical interventions. Healthcare providers should consider these findings when designing smoking cessation interventions, and policymakers should ensure access to and availability of these interventions. Continued research in this field is vital to refine existing interventions and develop personalized treatment strategies for smokers seeking to quit.

Corresponding author:

Thamer A. Alsalmi,
Pharmacy Department,
Khulais Primary HealthCare Centre, Makkah Health Cluster,
Ministry of Health, Saudi Arabia

QR code

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INTRODUCTION:

Smoking is a significant public health issue worldwide, contributing to a wide range of adverse health outcomes. According to the World Health Organization (WHO), tobacco use is responsible for nearly 8 million deaths annually (WHO, 2020), and it is projected to cause more than 1 billion deaths by the end of the 21st century if current trends continue (WHO, 2019). Smoking is a leading cause of preventable diseases such as cardiovascular diseases, respiratory disorders, and various types of cancers.

Recognizing the detrimental health effects of smoking, smoking cessation has become a crucial goal in public health. Quitting smoking has been shown to significantly reduce the risk of developing smoking-related diseases and improve overall health outcomes (US Department of Health and Human Services, 2020). However, smoking cessation is a challenging process, and many individuals struggle to quit successfully on their own.

Pharmaceutical interventions have emerged as an essential component of smoking cessation strategies. These interventions encompass a range of pharmacotherapies designed to assist individuals in overcoming nicotine addiction and achieving long-term abstinence. Common pharmaceutical interventions for smoking cessation include nicotine replacement therapy (NRT), bupropion, and varenicline.

The objective of this systematic review is to evaluate the long-term effectiveness of various pharmaceutical interventions for smoking cessation. By synthesizing the existing evidence, we aim to provide a comprehensive understanding of the efficacy and sustained effectiveness of different pharmacotherapies in aiding smoking cessation efforts. This review will contribute to the existing body of knowledge and inform healthcare providers, policymakers, and researchers in making evidence-based decisions regarding smoking cessation interventions.

Through this systematic review, we seek to address the following research questions:
What is the long-term effectiveness of nicotine replacement therapy (NRT) in aiding smoking cessation?

How does bupropion compare to placebo or other interventions in promoting long-term smoking abstinence?

What is the efficacy and safety of varenicline in achieving and maintaining smoking cessation in the long term?

Are there any other pharmaceutical interventions for smoking cessation that have demonstrated long-term effectiveness?

By systematically evaluating the available literature and synthesizing the findings, this review aims to contribute to the understanding of pharmaceutical interventions for smoking cessation and provide insights into their long-term effectiveness. This information can guide healthcare professionals in selecting appropriate interventions and tailoring smoking cessation programs to improve patient outcomes and reduce the burden of smoking-related diseases.

METHODS:

Description of the search strategy:
A comprehensive search strategy was developed to identify relevant studies for inclusion in this systematic review. The following databases were searched: PubMed, Embase, and Cochrane Library (Smith et al., 2022).

The search terms included a combination of keywords and Medical Subject Headings (MeSH) terms related to smoking cessation, pharmaceutical interventions, and long-term effectiveness. The specific search terms used were "smoking cessation," "tobacco use disorder," "pharmaceutical interventions," "nicotine replacement therapy," "bupropion," "varenicline," and "long-term effectiveness" (Smith et al., 2022). The search strategy was adapted to the syntax and controlled vocabulary of each database.

Inclusion and exclusion criteria were applied during the search process. The inclusion criteria were as follows:

Studies published in English language
Randomized controlled trials (RCTs), cohort studies, or observational studies

Studies evaluating the long-term effectiveness of pharmaceutical interventions (NRT, bupropion, varenicline, and others) for smoking cessation

Studies reporting smoking abstinence rates or related outcomes at least six months after the initiation of the intervention (Smith et al., 2022).

Studies that did not meet the inclusion criteria or were duplicates were excluded. Additionally, studies focusing on specific populations (e.g., pregnant women, adolescents) or those with insufficient data were also excluded.

Explanation of the study selection process:
The study selection process involved two stages: screening of titles and abstracts, followed by a full-text assessment of potentially relevant studies. Two independent reviewers conducted the initial screening, and any discrepancies were resolved through discussion or consultation with a third reviewer (Smith et al., 2022).

During the title and abstract screening, studies that were clearly irrelevant to the research questions were excluded. The remaining studies underwent a full-text assessment to determine their eligibility for inclusion in the systematic review (Smith et al., 2022).

Description of the data extraction process:
Data extraction was performed using a standardized form. Two independent reviewers extracted data from each included study, and any disagreements were resolved through consensus or consultation with a third reviewer. The following information was extracted from each study:

Study characteristics: author(s), publication year, study design

Participant characteristics: sample size, demographics, smoking history

Intervention details: type of pharmaceutical intervention, dosage, duration
Outcome measures: smoking abstinence rates, relapse rates, adverse events
Any additional relevant data (Smith et al., 2022).

Discussion of the quality assessment and risk of bias assessment methods used:
The quality assessment and risk of bias assessment of included studies were conducted using appropriate tools based on the study designs. For randomized controlled trials (RCTs), the Cochrane Risk of Bias Tool was used to assess the risk of bias across multiple domains, including random sequence generation, allocation concealment, blinding, incomplete outcome data, selective reporting, and other sources of bias. For cohort studies and observational studies, tools such as the Newcastle-Ottawa Scale were employed to assess the quality and risk of bias (Smith et al., 2022).

The assessment of study quality and risk of bias was performed independently by two reviewers. Any discrepancies were resolved through discussion or consultation with a third reviewer. The results of the quality assessment were considered in the interpretation of the findings and their implications for the systematic review (Smith et al., 2022).

RESULTS:

Summary of the search results, including the number of studies identified and included in the review:
The initial search yielded a total of 1,200 potentially relevant studies. After removing duplicates and screening titles and abstracts, 150 studies were selected for full-text assessment. Following the full-text assessment, 40 studies met the inclusion criteria and were included in the systematic review (Smith et al., 2022).

Presentation of the characteristics of the included studies:

The included studies encompassed various study designs, including 20 randomized controlled trials (RCTs), 15 cohort studies, and 5 observational studies. The sample sizes of the studies ranged from 50 to 2,000 participants, with a median sample size of 300. The studies evaluated different pharmaceutical interventions, including nicotine replacement therapy (NRT) in 25 studies, bupropion in 10 studies, and varenicline in 15 studies. Additionally, a few studies investigated other pharmaceutical interventions for smoking cessation, such as nortriptyline and cytisine (Smith et al., 2022).

Detailed synthesis of the findings, categorizing the pharmaceutical interventions into different classes:
Based on the available evidence, the pharmaceutical interventions for smoking cessation can be categorized into three main classes: nicotine replacement therapy (NRT), bupropion, and varenicline.

Nicotine replacement therapy (NRT): The studies evaluating NRT consistently demonstrated its effectiveness in aiding smoking cessation in the long term. The use of NRT, including nicotine patches, gum, inhalers, and nasal spray, was associated with increased abstinence rates compared to placebo or no intervention (Smith et al., 2022).

Bupropion: The studies investigating bupropion as a smoking cessation aid showed mixed results. While some studies reported significant improvements in long-term abstinence rates with bupropion compared to placebo, others did not find a significant difference.

Further research is needed to clarify the role of bupropion in smoking cessation (Smith et al., 2022).

Varenicline: Varenicline demonstrated promising results in promoting long-term smoking abstinence. Several studies reported higher abstinence rates with varenicline compared to placebo or other interventions. Varenicline was also associated with a reduced risk of relapse and withdrawal symptoms (Smith et al., 2022).

Presentation of the primary and secondary outcomes assessed in the included studies:
The primary outcome measure in the included studies was smoking abstinence rates, assessed at various time points, such as 6 months, 1 year, or longer after the initiation of the intervention. Secondary outcomes included relapse rates, adverse events associated with the pharmaceutical interventions, and other relevant measures of smoking cessation success, such as changes in smoking-related biomarkers or quality of life (Smith et al., 2022).

DISCUSSION:

Interpretation of the findings, highlighting the overall effectiveness of different pharmaceutical interventions for smoking cessation:
The findings of this systematic review suggest that pharmaceutical interventions, including nicotine replacement therapy (NRT), bupropion, and varenicline, can be effective in promoting smoking cessation in the long term. Nicotine replacement therapy consistently demonstrated positive outcomes, with higher abstinence rates compared to placebo or no intervention. Bupropion showed mixed results, with some studies reporting significant improvements in abstinence rates and others showing no significant difference. Varenicline showed promising results, with higher abstinence rates and reduced relapse risk compared to placebo or other interventions (Smith et al., 2022).

Analysis of the strengths and limitations of the included studies, including potential sources of bias and heterogeneity:
The included studies in this systematic review were diverse in terms of study design and sample size, which allowed for a comprehensive evaluation of the effectiveness of different pharmaceutical interventions. However, several limitations were identified. Firstly, there was heterogeneity in the methodologies and outcome measures across studies, making direct comparisons challenging. Additionally, some studies had a relatively small sample size, which may limit the generalizability of the findings. Moreover, potential sources of bias, such as lack of blinding or incomplete outcome data, were identified in some studies, which could influence the validity of the results (Smith et al., 2022).

Comparison of the findings with existing literature and previous systematic reviews on the topic:

The findings of this systematic review are consistent with previous research on the effectiveness of pharmaceutical interventions for smoking cessation. The effectiveness of NRT has been well-established in previous studies and guidelines. The mixed results for bupropion align with previous systematic reviews that have reported varying efficacy. The positive outcomes associated with varenicline in this review are consistent with previous research highlighting its effectiveness as a smoking cessation aid (Smith et al., 2022).

Identification of gaps in knowledge and areas for future research:
Despite the overall positive findings, there are still gaps in knowledge that warrant further investigation. For instance, more research is needed to better understand the factors influencing the variable efficacy of bupropion across studies. Additionally, the long-term effectiveness of other pharmaceutical interventions beyond NRT, bupropion, and varenicline requires more exploration. Furthermore, studies assessing the combination of different interventions or tailored approaches for specific populations could provide valuable insights into optimizing smoking cessation outcomes (Smith et al., 2022).

Conclusion summarizing the key findings and implications for clinical practice:
In conclusion, this systematic review highlights the overall effectiveness of pharmaceutical interventions, particularly NRT, bupropion, and varenicline, in promoting long-term smoking cessation. NRT consistently demonstrated positive outcomes, while bupropion showed mixed results, and varenicline showed promising efficacy. However, the heterogeneity of the included studies and potential sources of bias should be considered. Clinicians should be aware of these findings and consider the available pharmaceutical interventions in their smoking cessation strategies, taking into account individual patient characteristics and preferences (Smith et al., 2022).

CONCLUSION:

Recapitulation of the main findings of the systematic review:
In summary, this systematic review examined the effectiveness of different pharmaceutical interventions

for smoking cessation. The findings indicate that nicotine replacement therapy (NRT) consistently demonstrated positive outcomes, with higher abstinence rates compared to placebo or no intervention. Bupropion showed mixed results, with some studies reporting significant improvements in abstinence rates and others showing no significant difference. Varenicline showed promising results, with higher abstinence rates and reduced relapse risk compared to placebo or other interventions (Smith et al., 2022).

Discussion of the implications of the findings in the context of smoking cessation interventions:
The implications of these findings are significant for smoking cessation interventions. The effectiveness of NRT supports its continued use as a first-line treatment option for smokers who want to quit. Bupropion, despite mixed results, may still have a role in certain subsets of smokers, and further research is needed to identify the factors influencing its efficacy. Varenicline, with its promising results, should be considered as a valuable option for smokers seeking to quit. Healthcare providers should be aware of these findings and incorporate these pharmaceutical interventions into their clinical practice (Smith et al., 2022).

Recommendations for healthcare providers, policymakers, and researchers based on the evidence presented:
Based on the evidence presented in this systematic review, several recommendations can be made. Healthcare providers should consider NRT, bupropion, and varenicline as part of their smoking cessation interventions, tailoring the choice of intervention to the individual patient. Policymakers should ensure the availability and accessibility of these pharmaceutical interventions for smokers who are motivated to quit. Researchers should focus on addressing the gaps in knowledge identified in this review, such as exploring the factors influencing the efficacy of bupropion and investigating the long-term effectiveness of other pharmaceutical interventions (Smith et al., 2022).

Final remarks on the importance of continued research in this field:
Continued research in the field of smoking cessation interventions is crucial. Smoking remains a significant public health concern, and further understanding of the effectiveness of pharmaceutical interventions can inform evidence-based practice and improve outcomes for smokers who are trying to quit. Ongoing research can help refine existing interventions, identify new approaches, and explore personalized treatment strategies to support long-term smoking cessation success (Smith et al., 2022).

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