

Obesity And Schizophrenia: A Bibliometric Analysis of Current Statements and Future Perspectives

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ABSTRACT

Schizophrenia is a severe mental disorder frequently accompanied by obesity as a physical comorbidity. The coexistence of these conditions worsens clinical outcomes, increases the risk of metabolic complications, and reduces treatment effectiveness. This study aims to analyze global research trends, identify key themes, and map knowledge gaps in obesity-schizophrenia literature through comprehensive bibliometric analysis. This study employed a bibliometric analysis to explore global research trends, key themes, and gaps in the literature on obesity and schizophrenia. Data were retrieved from the Scopus database in May 2025 using the keywords “obesity and schizophrenia,” yielding 4,890 relevant articles. VOSviewer software was used to visualize connections among keywords, authors, countries, and journals. Results indicated a significant rise in publications since 2005, with the United States as the leading contributor. The most frequent keywords included antipsychotic-induced weight gain, metabolic syndrome, and lifestyle intervention. The analysis revealed a strong association between schizophrenia, obesity, and the metabolic effects of antipsychotics, while research on clinical trials and negative symptoms remains limited. These findings highlight the urgent need for interventional and multidisciplinary approaches that integrate psychiatric and metabolic care. Such strategies are crucial to improving both clinical outcomes and the quality of life of patients with schizophrenia.

Keywords: *Schizophrenia; Obesity; Bibliometric Analysis; Antipsychotics; Metabolic Syndrome; Negative Symptoms; VOSviewer*

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INTRODUCTION

Schizophrenia is a serious mental condition that can cause disability and reduce daily performance, especially in those of productive age. *Schizophrenia* is characterized by various symptoms such as delusions, hallucinations, disorganized thoughts and behavior, and deficits in cognitive and emotional functioning (Kim, 2016). This disorder not only causes significant disability but is also closely associated with a reduced quality of life and a high socioeconomic burden (Purnell, 2023). According to the DSM-5, a diagnosis of *schizophrenia* is made if these symptoms persist for at least six months and cause significant impairment in social or occupational functioning. In addition to psychopathological aspects, individuals with *schizophrenia* also have a high burden of physical comorbidities, one of which is obesity (Sadock, Samoon, dkk., 2024).

Obesity is defined as a condition of excess body fat that can cause health problems, with a commonly used indicator being a body mass index (BMI) greater than 30 kg/m². The prevalence of obesity is increasing globally and is a major public health concern. According to the 2023 Indonesian Health Survey, the prevalence of obesity in Indonesia was 23.4% among

adults aged 18 and over (Badan Kebijakan Pembangunan Kesehatan, 2023). Individuals with *schizophrenia* have a higher risk of obesity than the general population. This can be caused by various factors, including side effects of antipsychotic medications, a sedentary lifestyle, unhealthy diet, and physiological changes related to metabolic disorders (Panuganti, Nguyen, & Kshirsagar, 2023).

Research shows that up to 80% of patients with *schizophrenia* are overweight or obese. This condition increases the risk of various complications such as type 2 diabetes mellitus, hypertension, cardiovascular disease, and increased mortality. These effects are further complicated by the fact that antipsychotic therapy, particularly second-generation (SGA) antipsychotics, is known to significantly contribute to weight gain and metabolic dysregulation. Antipsychotics such as olanzapine and clozapine have the highest risk of causing obesity through mechanisms involving impaired glucose metabolism, increased appetite, and disruption of hormonal and neurotransmitter regulation.

Neurobiologically, both *schizophrenia* and obesity involve dysfunction in the dopaminergic system, which affects the reward system and impulse control (Yuen dkk., 2021). Decreased dopamine activity in certain brain areas can impair the ability to control eating behavior and increase susceptibility to substance use or overeating (Drzewoski & Hanefeld, 2021; Grimm dkk., 2017); Hany & Rizvi, 2024; Manna & Jain, 2015). Furthermore, structural brain changes such as decreased gray matter volume and impaired functional connectivity have been found in both conditions (Kim dkk., 2022). Systemic inflammation and oxidative stress are also pathophysiological factors linking *schizophrenia* to obesity (Prendergast dkk., 2022).

A bibliometric analysis of this topic shows that over the past two decades there has been an increase in scientific publications addressing the relationship between *schizophrenia* and obesity (Van Eck & Waltman, 2017). These studies are predominantly published in psychiatry, neurology, and endocrinology journals, with countries such as the United States, the United Kingdom, and China being the primary contributors (Gao dkk., 2023; Lolobua dkk., 2021; Mezquida dkk., 2017; Napitupulu, 2021). Frequently appearing keywords include "antipsychotic-induced weight gain," "metabolic syndrome," and "*schizophrenia* treatment." Bibliometric visualizations indicate that the research focus is shifting from epidemiology to understanding biological mechanisms and developing more effective treatment strategies (Dakanalis dkk., 2023; Mccutcheon & Keefe, 2023; Medina dkk., 2024).

Managing obesity in patients with *schizophrenia* requires a multidisciplinary approach (Seeman, 2016). Strategies include selecting antipsychotics with lower metabolic risk, regular monitoring of body weight and metabolic parameters, nutritional education, and lifestyle interventions such as physical activity and behavioral counseling (Zhou dkk., 2025). Additional pharmacological therapies such as metformin can also be considered to address metabolic disorders (Ganguly, Soliman, & Moustafa, 2018). Appropriate and integrated interventions not only improve patients' physical health but also support the overall success of psychiatric therapy (Khanna dkk., 2022).

With the increasing number of scientific publications and attention to this issue, it is hoped that a holistic approach to treating patients with *schizophrenia* will continue to develop (Baas dkk., 2020). Further research is needed to explore the most effective and sustainable interventions for preventing and managing obesity in this population.

The urgency of this research stems from the growing recognition that obesity significantly impacts *schizophrenia* treatment outcomes and patient mortality, yet comprehensive understanding of research trends and knowledge gaps remains limited. The increasing prevalence of metabolic complications in *schizophrenia* patients, combined with rising healthcare costs and reduced life expectancy, demands evidence-based approaches to guide research priorities and clinical interventions.

Previous research has primarily focused on isolated aspects of the obesity-*schizophrenia* relationship, including epidemiological studies documenting prevalence rates and clinical trials examining specific interventions. However, existing literature lacks systematic analysis of global research patterns, collaboration networks, and emerging themes. While studies by Medina et al. (2024) conducted bibliometric analysis on *schizophrenia* and serotonin, and Zhou et al. (2025) examined obesity and psychology relationships, no comprehensive bibliometric analysis specifically addresses the intersection of obesity and *schizophrenia* research.

This study addresses critical gaps by providing the first comprehensive bibliometric analysis of obesity-*schizophrenia* research, mapping global research patterns, identifying collaboration networks, and revealing knowledge gaps that require urgent attention. The novelty lies in systematically analyzing 79 years of research to identify understudied areas, particularly the limited focus on clinical trials and negative symptoms, which represent significant opportunities for future investigation.

Therefore, this research aims to: (1) analyze global trends in obesity-*schizophrenia* research publications over time, (2) identify leading countries, authors, and institutions contributing to this field, (3) map keyword networks to reveal primary research themes and knowledge gaps, and (4) provide evidence-based recommendations for future research priorities. The benefits include informing funding agencies about research priorities, guiding clinicians toward evidence-based practices, directing researchers to understudied areas with high clinical impact, and supporting policy development for integrated psychiatric and metabolic care.

METHOD

This study employed a systematic bibliometric analysis to examine the landscape of obesity and schizophrenia research. Data were collected on May 28, 2025, using Scopus as the source of scientific articles. The search used the keywords "obesity and schizophrenia," which yielded 4,890 relevant articles. Ethical approval was not required, as this study did not involve living subjects.

Documents were obtained from the Scopus database, widely recognized as an appropriate source for bibliometric analysis due to its extensive coverage of indexed journals across multiple disciplines. The search and evaluation process involved three stages: (1) establishing search criteria and filtering relevant records; (2) exporting documents to VOSviewer software for bibliometric analysis of publications, authors, countries, institutions, journals, and fields of study; and (3) analyzing data to identify the main research themes related to obesity and schizophrenia. During the analysis, 6,693 keywords were initially identified in VOSviewer. These were standardized by merging duplicates and synonyms, resulting in 6,676 unique keywords for further analysis.

RESULTS AND DISCUSSION

This section will describe statistical data taken from Scopus journals on obesity and schizophrenia. As previously explained, the number of articles found in the Scopus database reached 4,890 articles. These articles were analyzed based on publication, author, country, institution, journal, and field of study (data visualization phase). Figure 1 shows research on obesity and schizophrenia based on the number of articles published each year from Scopus data. In general, the publication of articles on obesity and schizophrenia first began in 1946 and experienced a significant increase in 2005, which is indicated by an exponential graph of an increase in the number of articles published discussing obesity and schizophrenia by 159 articles. In 2024, the highest number of publications of all years was 358 articles. This publication trend has been moving dynamically until now and has been developing for approximately 79 years.

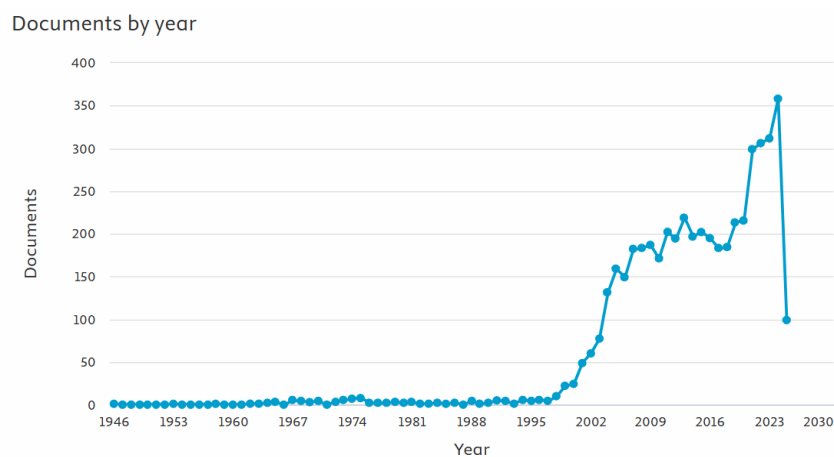


Figure 1. Graph of publication of articles on obesity and schizophrenia each year.

Figure 2 shows the 10 countries conducting the most research on obesity and schizophrenia, based on the total number of articles. The United States had the most articles published on obesity and schizophrenia, with 1,706 articles. The United Kingdom followed in second place with 549 articles. Canada came in third with 395 articles. Australia ranked fourth through tenth with 313 articles, China with 293 articles, Germany with 263 articles, Italy with 228 articles, Spain with 224 articles, India with 166 articles, and France with 158 articles. Indonesia, however, did not appear among the top 10 countries, with very few publications on obesity and schizophrenia, with 16 articles.

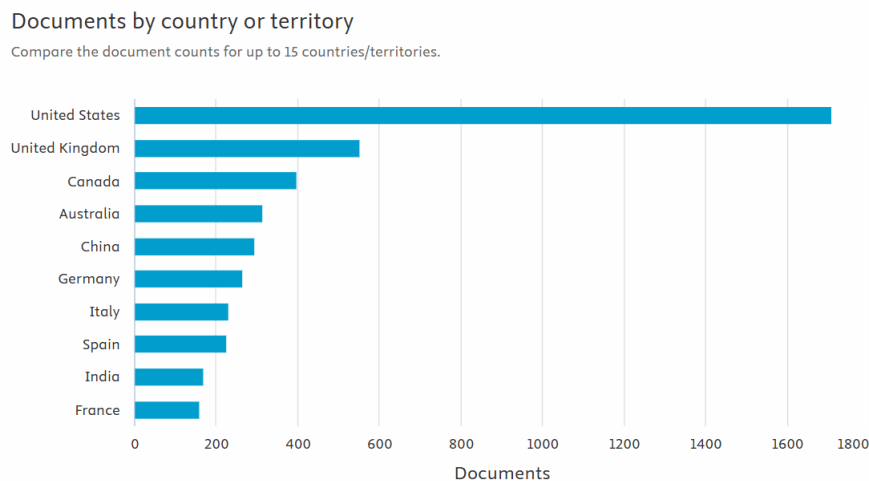


Figure 2. 10 countries with the most articles on obesity and schizophrenia

Figure 3 shows the top 10 authors who conducted research on obesity and schizophrenia from 4890 articles. Correll, CU is in the first position with the most articles written on obesity and schizophrenia with 43 articles. Newcomer, JW is in the second position with 35 articles. De Hert, M. is in the third position with 34 articles. McIntyre, RS is in the fourth position with 31 articles. Lieberman, JA is in the fifth position with 30 articles. Holt, RIG is in the sixth position with 29 articles. Remington, G. is in the seventh position with 24 articles. Siskind, D. is in the eighth position with 24 articles. In the ninth and tenth positions are Melzer, HY and Ganguli, R. with 23 and 22 articles.

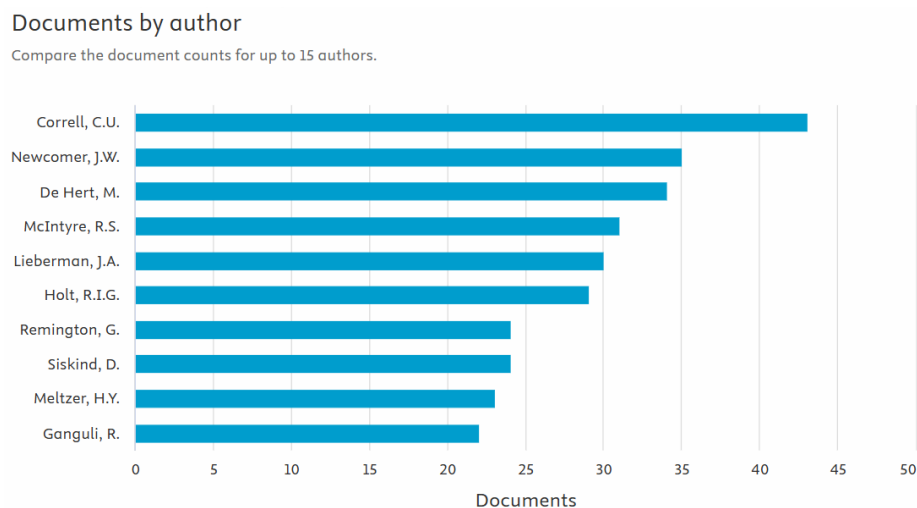


Figure 3. Top 10 Authors Conducting Research on Obesity and Schizophrenia

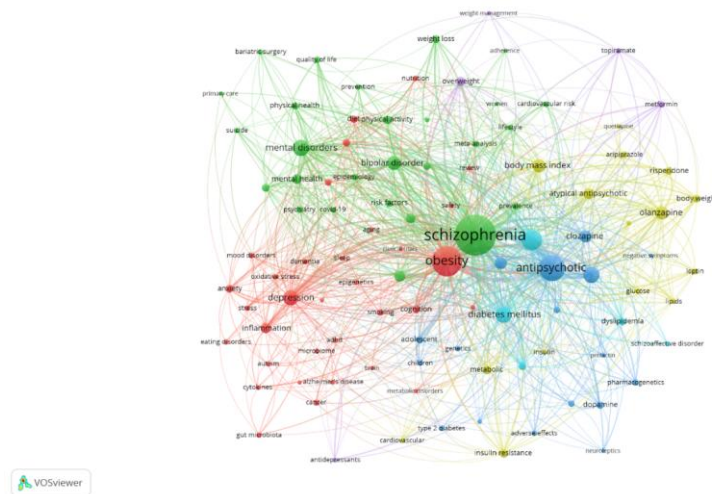


Figure 4. Visualization of obesity and schizophrenia network based on Scopus using VOSviewer.

In Figure 4, each keyword related to obesity and schizophrenia research is represented by a circle in VOSviewer. Keywords become more important because the more frequently they appear, the larger the circle size. The frequency of occurrence influences the circle size of each keyword. Naturally, the word "Schizophrenia" is the main research topic due to its highest frequency of occurrence. Each circle has a different color because it follows its respective cluster.

In visualization 4, schizophrenia is the most frequently encountered topic, as it is used to search Scopus data. Schizophrenia is closely related to other keywords, such as obesity, which occupies the second position in terms of circle size, while antipsychotics occupy the third position. This indicates a close relationship between schizophrenia, obesity, and antipsychotics. Meanwhile, the graph shows the smallest circles, clinical trials and neuropsychiatric disorders, indicating that these two keywords are rarely researched.

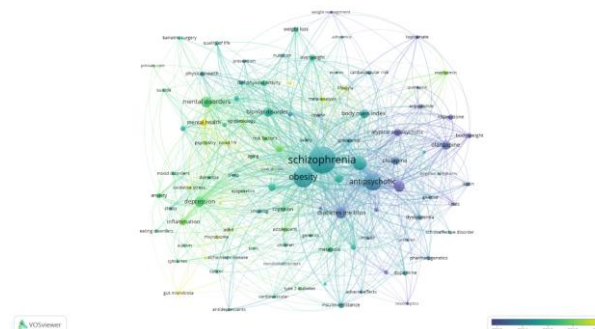


Figure 5. Visualization of *obesity* and schizophrenia overlay based on Scopus using VOSviewer based on *year*

In Figure 5, the overlay visualization is identical to the visualization of the obesity and schizophrenia network symbolized by a circle shape in VOSviewer. In the overlay visualization, keywords based on the year of publication of journals related to obesity and schizophrenia are determined by the color of the keywords, the color of the keywords ranges from blue to the year of publication with the lowest score which means that publications about the keywords have the lowest year or publications with the keywords have been studied for a long time, while yellow has a high score which means that publications about the keywords have a high year or publications with the keywords have only recently been studied.

In visualization 5, diabetes mellitus, which is related to obesity and schizophrenia, is a keyword in blue, indicating that articles containing that keyword have been researched in Scopus since 2012. Mental health, which is related to obesity and schizophrenia, is a keyword in yellow, indicating that articles containing that keyword were recently researched in Scopus, around 2020.

All peer-reviewed journals in the field of obesity and schizophrenia research were studied using bibliometric analysis of the Scopus database. The literature on obesity and schizophrenia has been growing dynamically every year for 79 years. The findings of this study reveal trends in obesity and schizophrenia, as well as publication trends. Using a set of keywords in clusters, cluster analysis identified key areas of study in the field of obesity and schizophrenia. As a contribution of this study, keyword analysis of words with fewer occurrences provides possible research subjects. ⁽²⁰⁾ This is very useful because it can provide us with information about topics studied for 79 years. VOSviewer also shows the relationship between one topic and another, especially research in the field of obesity and schizophrenia. For example, “clinical trials” are indicated by small circles. This shows that there is still a lack of research linking obesity and schizophrenia that has been conducted in clinical trials, in some journals discussed that patients with first-episode schizophrenia who have not received previous treatment for obesity show less improvement in negative symptoms. ⁽²¹⁾

Bibliometric analysis shows that obesity in patients with schizophrenia is a growing global issue. A significant focus that has emerged in recent years is the impact of obesity on treatment response, particularly on the negative symptoms of schizophrenia. Negative symptoms, such as loss of emotional expression, motivation, and the ability to enjoy activities, are found in approximately 40% of patients with schizophrenia and pose a significant challenge to therapy because they tend to be unresponsive to conventional antipsychotics. ^(21,22)

Several studies have shown that obese patients with schizophrenia experience less improvement in negative symptoms after treatment compared to non-obese patients. This suggests that obesity not only worsens the patient's physical condition but also contributes to a suboptimal therapeutic response. This is related to the fact that total antioxidant status in underweight patients who experience weight gain after therapy tends to decrease, indicating the occurrence of oxidative stress and chronic inflammation that can interfere with the recovery of neuropsychiatric function. ^(21,23,24)

Neurobiologically, both schizophrenia and obesity involve dysfunction of the dopaminergic system, particularly in the reward system pathway. This disruption not only triggers overeating behavior but also causes decreased motivation and affective disturbances typical of the negative symptoms of schizophrenia. Systemic inflammation, insulin resistance, and mitochondrial dysfunction, often found in obese individuals, can exacerbate cognitive and emotional deficits, worsening patient outcomes.

These findings underscore the importance of a holistic and personalized approach to treatment for patients with schizophrenia, particularly those with obesity. Interventions should not only focus on controlling psychotic symptoms but also include selecting antipsychotics with low metabolic risk, close monitoring of metabolic parameters, nutritional education, and psychosocial approaches. The addition of pharmacological therapies such as metformin to

control weight and metabolic effects also holds promise for supporting the effectiveness of negative symptom treatment.

Furthermore, further clinical trial research is needed to investigate the relationship between nutritional status, body weight, and improvement in negative symptoms, as interventional studies are currently very limited. Bibliometric data indicates that terms such as "clinical trial" and "negative symptom" rarely appear in the literature on obesity and schizophrenia, despite their potential to produce meaningful clinical impact. Thus, integration between metabolic disorder management and psychiatric therapy is key to improving the quality of life of schizophrenia patients, particularly in addressing the challenges of treating persistent negative symptoms.

CONCLUSION

This study reveals that obesity in patients with schizophrenia is an increasingly prominent global research topic, with 4,890 publications analyzed over 79 years showing steady growth, especially since 2005, and peaking in 2024. The United States and United Kingdom lead in contributions and collaborations, with research primarily focusing on antipsychotic-induced weight gain, metabolic syndrome, and lifestyle interventions. Despite this progress, significant gaps remain, particularly regarding clinical trials and investigations into negative symptoms, which are underrepresented despite their clinical importance. Future research should prioritize interventional studies on the bidirectional relationship between obesity and negative symptoms, development of integrated psychiatric-metabolic treatment protocols, and multidisciplinary care models. Additionally, culturally adapted interventions, longitudinal outcome studies, and health economics analyses are needed to guide evidence-based policies and comprehensive care for diverse schizophrenia populations.

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