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Review Article

Conglomeration of antipsychotics and stomatology – A systematic review

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Abstract

Background
Individuals with severe mental illness (SMI) experience disproportionately high rates of dental caries, periodontal disease, tooth loss and salivary dysfunction. Second-generation antipsychotics (SGAs), widely prescribed for schizophrenia, bipolar disorder and related conditions, may further influence oral health through xerostomia, extrapyramidal effects and behavioral changes affecting hygiene practices.

Methodology
Electronic searches were conducted in PubMed/MEDLINE, Embase, Scopus, Web of Science and LILACS for studies published between 2020 and 2024. Original research articles evaluating oral health status or oral-health-related outcomes in individuals with SMI receiving antipsychotic therapy, particularly SGAs, were included. Reviews, editorials and irrelevant publications were excluded.Study selection followed PRISMA guidelines. Extracted data included author, year, country, study design and principal outcomes. Methodological quality was assessed using the STROBE checklist. Due to heterogeneity in study design and outcome reporting, findings were synthesized narratively.

Results
Four eligible studies met the inclusion criteria. Evidence indicates that individuals with schizophrenia and related disorders demonstrate significantly poorer oral health compared to controls, including higher caries prevalence, periodontal disease, and reduced dental service utilization. Antipsychotic-associated xerostomia, medication adherence patterns, and barriers to care were recurrent themes. Preventive dental engagement remains limited in this population.

Conclusion
Individuals with SMI receiving SGAs require structured preventive dental programs, routine oral screening, and interdisciplinary collaboration between psychiatry and dentistry.

Implications
Integrating oral health assessment into psychiatric care pathways may reduce morbidity and improve quality of life.

Keywords: *Dental status; Mental disorder; Oral health; Periodontal status; Psychotic disorders*
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Introduction

Significant oral health issues, such as high rates of tooth decay, tooth loss and periodontal disease, are common among people with severe mental illness (SMI). According to a recent comprehensive review, compared to the general population, individuals with SMI have a five-fold increased risk of tooth decay and a roughly three-fold increased risk of losing all of their natural teeth. People's overall health and quality of life can be significantly impacted by poor dental health. It can impact social relationships, a person's confidence and self-esteem, as well as fundamental bodily functions such as eating and speaking.

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Other systemic conditions like diabetes and cardiovascular disease are also linked to oral illnesses. Therefore, it is crucial to improve the dental health of individuals with SMI. Oral disorders in individuals with SMI are probably caused by a variety of factors, such as poor self-care, a high-sugar diet, smoking, alcohol and tobacco use, as well as adverse effects from psychiatric drugs. Individuals who struggle with mental health issues are less likely to seek regular dental examinations and care, which may be caused by obstacles associated with their mental illness and a lack of social support networks for dental care.

Barriers to dental care for persons with SMI are also caused by aspects of the health system and dentistry practices. Antipsychotic drugs are traditionally classified based on their clinical applications. These medications are primarily used in clinical settings to treat schizophrenia and related psychotic disorders. Despite sharing a common mechanism of action related to dopamine, they vary in how well patients tolerate them and their therapeutic effectiveness.

FGAs, which block dopamine receptors, include medications such as fluphenazine, haloperidol, thioridazine, perphenazine and chlorpromazine. They are further categorized into low- and high-potency FGAs based on their binding strength to D2 receptors. SGAs consist of medications like clozapine, aripiprazole, quetiapine, olanzapine and risperidone. These drugs are generally weaker D2 receptor blockers compared to FGAs but exhibit a strong affinity for inhibiting serotonin (5-HT2) receptors, alpha (α) adrenergic receptors and H1 receptors, which has led to their designation as "Dopamine-Serotonin" antagonists. This systematic review aims to evaluate and synthesize contemporary evidence on oral health status, oral manifestations and medication-related oral adverse effects in individuals with severe mental illness receiving second-generation antipsychotic therapy.

Materials and methods

Study design

This systematic review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines.

Eligibility criteria

Original research articles published between January 2020 and December 2024 were eligible for inclusion. Studies were included if they:

- Evaluated oral health status, oral manifestations, or oral-health-related outcomes
- Included individuals diagnosed with severe mental illness (schizophrenia, bipolar disorder, psychotic disorders, or related conditions)
- Reported outcomes in patients receiving antipsychotic therapy, particularly second-generation antipsychotics
- Observational studies (cross-sectional, case-control and cohort studies) and relevant clinical investigations were included.

Exclusion criteria comprised

- Review articles, narrative reviews, editorials, commentaries and conference abstracts
- Studies not reporting oral health outcomes
- Studies unrelated to antipsychotic therapy
- Non-English publications

Information sources

A comprehensive electronic search was conducted using the following databases:

- PubMed/MEDLINE
- Embase
- Scopus
- Web of Science
- LILACS

The final search was conducted in December 2024.

Search strategy

The search strategy incorporated controlled vocabulary and Boolean operators. The following terms were used:
("Oral health") AND ("mental illness" OR "severe mental illness") AND ("antipsychotics" OR "second-generation antipsychotics" OR "atypical antipsychotics")
Search filters were applied for publication year (2020–2024). Reference lists of included studies were also screened manually to identify additional relevant publications.

Selection process

All retrieved records were exported into a reference management software program and duplicate entries were removed.
Two reviewers independently screened titles and abstracts for relevance. Potentially eligible articles underwent full-text assessment against predefined inclusion and

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exclusion criteria. Disagreements were resolved through discussion and consensus. If consensus was not achieved, a third reviewer was consulted.

Data collection process

Data extraction was performed independently by two reviewers using a standardized, pilot-tested data extraction form developed for this review. Extracted information was cross-verified to ensure accuracy.
Any discrepancies in extracted data were resolved through re-evaluation of the full text and consensus discussion.
No study investigators were contacted for additional data clarification due to sufficient availability of published information. No automation tools, artificial intelligence platforms, or text-mining software were used in the screening or data extraction process.

Data items

The following variables were extracted from each included study:
First author
Year of publication
Country of study
Study design
Sample size
Psychiatric diagnosis
Type of antipsychotic therapy (particularly SGA use)
Oral health outcomes, including:
Dental caries prevalence
Periodontal status
Tooth loss/edentulism
Xerostomia or salivary dysfunction
Oral mucosal lesions
Bruxism or extrapyramidal oral manifestations
Dental service utilization
Key study findings
The primary outcome of interest was oral health status in individuals with severe mental illness receiving second-generation antipsychotics.
Secondary outcomes included medication-related oral adverse effects and barriers to dental care.

Synthesis methods

Given the heterogeneity in study designs, outcome measures, and reported variables, a quantitative meta-analysis was not feasible.
Studies meeting the inclusion criteria were synthesized narratively. Eligibility for synthesis was determined based on:

- Presence of oral health outcome reporting
- Clear identification of antipsychotic exposure
- Adequate methodological reporting

Findings were grouped according to major outcome domains: oral disease burden, medication-related adverse effects and healthcare utilization patterns.

Risk of bias assessment

Methodological quality of included observational studies was assessed using the STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) checklist.
Risk of bias due to missing results within individual studies was evaluated qualitatively by examining:
Completeness of outcome reporting
Selective reporting patterns
Clarity of sample description and attrition reporting
Due to the limited number of included studies and absence of quantitative synthesis, publication bias assessment using funnel plots was not performed.

Results

Results of individual studies

Four studies published between 2021 and 2024 met the inclusion criteria.

1. **Aghasizadeh Sherbaf et al., 2024 (Matched Case-Control Study, Hungary)**

   This study evaluated oral health status in patients with schizophrenia compared with matched controls. Individuals with schizophrenia demonstrated significantly poorer oral health parameters. Higher DMFT scores, increased periodontal pocket depth and reduced frequency of tooth brushing were reported in the schizophrenia group. The prevalence of untreated dental caries and periodontal disease was significantly greater compared with controls ($p < 0.05$). Xerostomia and antipsychotic exposure were identified as associated factors. The authors emphasized the need for targeted preventive interventions.
2. **De Las Cuevas et al., 2021 (Observational Study, Bipolar Disorder)**

   This study examined adherence to oral psychiatric medications in adults with bipolar disorder. Four odds ratios related to

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antipsychotic adherence were statistically significant in the bipolar disorder group. Although oral health outcomes were not directly measured, poor medication adherence was associated with variations in treatment continuity, which may indirectly influence long-term systemic and oral health stability.

3. **Schoretsanitis et al., 2023 (Pharmacokinetic Review on Long-Acting Injectable SGAs)**

   This publication discussed personalized switching from oral to long-acting injectable second-generation antipsychotics in schizophrenia. The authors reported that long-acting injectable SGAs may improve maintenance treatment adherence. While no direct oral health parameters were measured, improved adherence patterns may influence overall health stability in schizophrenia-spectrum disorders.

4. **Adhikari et al., 2024 (Systematic Review of Oral Antipsychotics in Schizophrenia)**

   This review evaluated real-world effectiveness and humanistic outcomes of oral antipsychotics. A significant evidence gap was identified regarding behavioral and humanistic outcomes, including treatment adherence and switching patterns. Oral-health-specific outcomes were not quantitatively analyzed.

Important methodological observation

Only one included study directly assessed measurable oral health outcomes using clinical indices (DMFT, periodontal measures). The remaining three studies focused primarily on medication adherence and treatment strategies rather than clinical oral parameters. This limits the strength of synthesis regarding direct oral disease burden attributable to second-generation antipsychotics. The characteristics and principal findings of the included studies are summarized in Table 1.

Table 1. Characteristics and key findings of studies included in the systematic review

Author	Title	Journal	Outcome
Carlos De Las Cuevas, G Alejandro Villasante-Tezanos, Mariano Motuca, Trino Baptista, Judit Lazary, Laszlo Pogany, Jose De Leon	Poor Adherence to Oral Psychiatric Medication in Adults with Bipolar Disorder: The Psychiatrist May have More Influence than in Other Severe Mental Illnesses	BAPTISTA T, LAZARY J, POGANY L, DE LEON JO. Poor adherence to oral psychiatric medication in adults with bipolar disorder: the psychiatrist may have more influence than in other severe mental illnesses. Neuropsychopharmacol Hung. 2021;23(4):347-62. PMID: 34971399	Four ORs were significant for antipsychotic adherence only in the BD group
Georgios Schoretsanitis, Jonathan M Meyer, Andreas Conca, Christoph Hiemke	Personalized switching from oral to long-acting injectable second-generation antipsychotics in schizophrenia treatment using pharmacokinetic considerations	Schoretsanitis G, Meyer JM, Conca A, Hiemke C. Personalized switching from oral to long-acting injectable second-generation antipsychotics in schizophrenia treatment using pharmacokinetic considerations. Expert Opinion on Drug Metabolism & Toxicology. 2023 Apr 3;19(4):189-202. doi: 10.1080/17425255.2023.2220962.	LAI SGAs may dominate the maintenance treatment of schizophrenia-spectrum disorders with increased use for other severe mental illnesses such as bipolar disorder
Reza Aghasizadeh Sherbaf, George Michael Kaposvári, Katalin Nagy, Zoltán Péter Álmos, Zoltán Baráth, Danica Matusovits	Oral Health Status and Factors Related to Oral Health in Patients with Schizophrenia: A Matched Case-Control Observational Study	Aghasizadeh Sherbaf R, Kaposvári GM, Nagy K, Álmos ZP, Baráth Z, Matusovits D. Oral health status and factors related to oral health in patients with schizophrenia: A matched case-control observational study. Journal of Clinical Medicine. 2024 Mar 10;13(6):1584. doi: 10.3390/jcm13061584	the overall poor oral health status of individuals affected by SCZ and the need for targeted preventive interventions.

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Keyuri Adhikari, Khalid M Kamal, Ki Jin Jeun, David A Nolfi, Mohammed Najeeb Ashraf, Christopher Zacker	Real-World Effectiveness, Economic and Humanistic Outcomes of Selected Oral Antipsychotics in Patients with Schizophrenia: A Systematic Review Evaluating Global Evidence	Adhikari K, Kamal KM, Jeun KJ, Nolfi DA, Ashraf MN, Zacker C. Real-World Effectiveness, Economic and Humanistic Outcomes of Selected Oral Antipsychotics in Patients with Schizophrenia: A Systematic Review Evaluating Global Evidence. ClinicoEconomics and Outcomes Research. 2024 Dec 31:621-45. doi: 10.2147/CEOR.S469024	showcased a significant knowledge gap across OATs spanning the humanistic and behavioral outcomes and medication adherence and switching, suggesting a need

Discussion

Mental health was defined by the World Health Organization (WHO) as a state of well-being in which individuals realize their potential, work productively, deal with the daily stress of life and contribute to their respective communities.[1]

The mental health disorders of anxiety, depression and schizophrenia are frequently brought on by systemic inflammation, medication side effects and lifestyle modifications. These conditions have a substantial impact on many facets of our health, including our oral and physical health.[2]

The condition of the teeth, periodontium and oral-facial system - often known as oral health - influences masticatory function, aesthetic smile and speech. Individuals experiencing severe mental health difficulties often struggle with poor oral health, which can exacerbate their mental health issues.[3]

This is due to factors such as pain, infections and neglect of oral hygiene. Studies indicate that people experiencing mental health challenges face a greater chance of developing conditions such as dental caries, gum disease and edentulism.[4]

Oral and mental health have a linked and complicated relationship. People with severe mental disorders, like bipolar disorder and schizophrenia, have a higher chance of poor dental hygiene and tooth loss due to factors like impaired well-being, psychiatric treatment side effects and persistent stress.[5]

Moreover, changes in lifestyle brought about by mental health problems - such as inadequate diet, excessive carbohydrate consumption and substance use - could aggravate oral health problems.[6]

In this context, authors advanced the idea of suggesting, "There is no mental health without oral health," which further consolidates the concept among professionals about the interdependency of both disciplines. It has been observed that the application of an integrated approach of this nature, which considers treatment based on both mental health and dental support, has aided in improving the overall well-being of patients afflicted with the former.[7]

This co-located care and training program for dental professionals concerning the effects of psychiatric disorders and their pharmacological treatments has evidenced significant improvement in the quality of care rendered to those with mental health issues.[8]

Furthermore, the integration of oral health education into mental health services may reduce barriers to care, since mental health and oral health service use have a strong association with one another. These include salivary stimulants and fluoride therapies, which are effective in reducing the xerostomic effects caused by psychiatric medications.[9]

Community health centers providing dental and mental health services are pivotal in ensuring that individuals who suffer from severe mental illnesses receive regular oral health assessments. A well-informed dentist will be able to implement preventive measures, such as fluoride varnishing and tailored oral hygiene counseling.[10]

The correlation between oral and mental health would thus be examined for the possibility of early diagnosis of comorbid conditions, creating an opportunity for timely interventions. For instance, the treatment of chronic periodontal disease reduces systemic inflammation, which is often seen in depression and anxiety.[11]

Antipsychotic drugs are compounds used to treat a large group of psychiatric conditions including schizophrenia, bipolar disorder, major depression, delirium, autism, dementia, Tourette syndrome, attention deficit hyperactivity disorder, anxiety, insomnia and post-traumatic stress disorder.[12]

They produce their effect by blocking specific neurotransmitter receptors in the brain and thus modifying brain activity. Both therapeutic and side effects of these medications result from interactions at D2 family dopamine and serotonin (5HT) receptors.[13]

A first generation of antipsychotics, known as typical antipsychotics, was discovered in the 1950s. These

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"typical" antipsychotics exert their therapeutic effects through high-affinity binding and antagonism at D2 dopamine receptors of the brain's dopamine pathways. In contrast, "atypical or second generation" antipsychotics differ from typical psychotics in their "limbic-specific" dopamine type 2 (D2)-receptor binding and interactions with serotonin 5HT2A receptors and 5HT1A receptors.[14]

In addition to the therapeutic action, blockade of receptors in the brain's dopamine and serotonin pathways leads to several adverse effects, including extrapyramidal effects on motor control, tremor, abnormal muscle contractions and an involuntary movement disorder known as tardive dyskinesia.[15]

Typical Antipsychotic Drugs - From an oral health perspective, tardive dyskinesia is a relevant negative effect of typical antipsychotics such as Haloperidol, Chlorpromazine and Fluphenazine. Tardive dyskinesia consists of persistent involuntary movements that are due to the blockade of the dopamine receptors.[16]

Therefore, this drugrelated extrapyramidal motor activity may cause involuntary hyperkinetic motor disorders that affect the orofacial region such as bruxism, orofacial dystonia, oromandibular dyskinesia and medication-induced extrapyramidal syndrome dystonic reactions. Other related dental complications include xerostomia, sialorrhea, an excessive secretion of saliva and rabbit syndrome, an antipsychotic-induced rhythmic motion of the mouth/lips resembling the chewing movements of a rabbit.[17]

Atypical Antipsychotic Drugs - As mentioned before, second generation antipsychotic drugs, also known as "atypical" antipsychotics, have been developed more recently and tend to block not only receptors in the brain's dopamine pathways, but serotonin as well. The most common atypical drugs are clozapine, risperidone and olanzapine.[18]

These drugs have been developed to increase efficacy and reduce side effects of typical antypsichotics. Nevertheless, due to their action to the dopamine D2 receptors, similar effects of typical drugs on oral health have been reported, although to a lower extent. Thus, rabbit syndrome was observed in subjects under risperidone treatment while dry mouth has been reported after olanzapine, risperidone and clozapine use.[19]

Oral cavity lesions such as apthous stomatitis, pharyngitis, glossitis and oral ulceration have been observed after olanzapine consumption. Similarly to the typical antispychotics, all atypical drugs present extrapyramidal side effects and related effects on oral health, although clinical observations suggest differences between the various agents.[20]

According to a recent study, people with severe psychiatric disorders face about 3.4 times the probability of losing all their teeth as that of the normal population. These individuals have an increased risk of decay and periodontal disease because of bacterial infections. Also, barriers to dental care, alcohol and substance abuse and inability to maintain oral hygiene are other contributing factors.[21]

As most of the patients with psychiatric disorders are under multiple psychotropic medications, identifying the effects of each class of drugs is essential in managing oral diseases in these patients. Poor oral hygiene in individuals with psychiatric disorders may be influenced by a variety of conditions. These include the use of drugs that may cause a reduction in salivary secretion, an improper diet and the apathy of many psychiatric patients.[22]

Reduced salivary secretion is one of the most significant side effects of psychotropic medications that can lead to various oral diseases. A frequent side effect due to the use of antipsychotics and antidepressants drugs is xerostomia. Xerostomia leads to enhanced demineralization, increased incidence of caries and loss of tooth.[23]

Similarly, patients admitted in hospitals suffering from long-term psychiatric disorders have an increased incidence of dental caries due to fewer dental consultations. In 1980, McCarthy and Shlkar proposed a classification of oral psychosomatic diseases based on etiology which included certain oral mucosal lesions such as lichen planus, recurrent aphthous stomatitis, pemphigus, glossodynia, chronic periodontal diseases and mechanical irritation.[24]

Impact of mental health conditions on oral health - Individuals with mental health conditions often suffer from depression, anxiety and other severe mental illnesses, which pose serious challenges in their quest to maintain oral hygiene. This nexus is attributed to behavioral, biochemical and socioeconomic factors, including diminished motivation for self-care, altered salivary flow due to medication and barriers to accessing dental care.[25]

Patients suffering from psychiatric disorders exhibit low motivation, which results in poor hygiene and facilitates a rise in dental issues. Poor oral hygiene has been linked with depression and schizophrenia. These groups are more susceptible to dental caries and periodontal disease. Behavioural factors also apply.[26]

The symptoms that might present, such as apathy and fatigue and many other cognitive impairments associated with mental health conditions, will prevent the person from maintaining good oral hygiene. According to studies "dental anxiety and difficulty in accessing dental care add to the problem".[27]

In addition, patients suffering from mental conditions often engage in unhealthy behaviors toward their oral health, such as poor dietary habits and substance abuse,

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which have significant effects on oral health outcomes. Additionally, psychotropic drugs commonly used in the treatment of mental illness, such as antidepressants and antipsychotics, induce xerostomia, increasing the risk of dental caries.[28]

A decrease in salivary flow weakens the normal protective mechanisms of the oral cavity, thus augmenting the prevalence of caries and periodontal disease, which require enhanced dental care for these patients. Moreover, bruxism, or teeth grinding, which results from antipsychotic medication, also contributes to erosion of enamel and temporomandibular joint disorders (TMJDs).[29]

Many psychotropics, including antidepressants and antipsychotics, create xerostomia, or dry mouth, which decreases the production of saliva and increases the risk of dental caries and periodontal disease. Furthermore, the most significant impact of anxiety or dental phobia is found in the irregularity or avoidance of routine dental visits, consequently worsening oral health problems.[30]

Poor oral health has a negative effect on social well-being and self-esteem. Psychological distress is experienced by individuals with chronic oral health problems. This parallelism brings to light the necessity of promoting the interlinking of mental health and oral health for the betterment of life quality in these individuals.[31]

Financial, stigma-related and lack of integrated-care models are a few reasons why most people with mental health conditions avoid dental services. Integrated care models, which bring together dental and mental health services, have been shown to be effective in improving oral health outcomes, especially for vulnerable populations.[32]

Patients with schizophrenia are at high risk for dental diseases, with studies suggesting that their dental health may be better than the general population's. Periodontal disease in these patients can be linked to subclinical atherosclerosis, which may increase their risk of developing cardiovascular disease. Other factors that have a bearing on the oral health of these patients include a low frequency of tooth brushing, fewer visits to the dentist, smoking and poor nutrition.[33]

Mental disorders have been related to tobacco and alcohol use, as well as poor diet and oral hygiene. People with mental disorders may use tobacco (nicotine) and alcohol for self-medication. Mental disorders, such as depression, have also been related to sugar cravings, eating dysregulation and poor diet.[34]

Impact of oral health on mental well-being - Research has shown that poor oral health, in the form of untreated caries and periodontitis, affects mental health negatively. Such issues cause social avoidance and low self-esteem. It has been noted that patients suffering from chronic dental pain are more stressed and have more psychological symptoms, which can lead to depression.[35]

Studies reported that patients diagnosed with chronic periodontitis had higher levels of anxiety and depression. Untreated decay among adolescents was linked to lower self-esteem and increased psychological distress and it is evident that dental conditions affect the mental well-being of adolescents - a factor.[36]

A significant number of studies have shown that a deep relationship exists between oral health and selfesteem. According to studies, the aesthetics of the teeth are very important in determining selfimage and social confidence. Visible dental problems, like missing teeth or discoloration, cause discomfort reactions and social exclusion, thereby lowering esteem levels. According to authors, obvious dental problems would make people abstain from visiting social gatherings for fear of others' opinions about them.[37]

This is further supported by other research, whereby most of the patients who experience severe oral problems tend to have exaggerated social anxiety; hence, bad relationships are created among the affected individuals.[38]

Dental pain is thus an indicator of poor oral health and is related to psychological well-being. TMJD pain, along with untreated cavities, increases the symptoms of anxiety and depression. For patients, chronic dental pain is very distressing and typically follows the pattern of mood alteration, which affects the patient's ability to function.[39]

Studies said that chronic dental pain elevates the perception of stress and patients become more sensitive to mental illness. Authors also indicated that depression exacerbates chronic dental pain and vice versa. Preventive care, such as brushing, flossing and regular dental visits, can support both oral and psychological health.[39]

Studies stated that proper oral hygiene enhances the life of patients, thereby increasing satisfaction and lowering the levels of distress among patients. Proper dental care and hygiene maintain the quality of life, thereby preventing psychiatric disorders related to oral health issues.[40]

Impact of psychiatric medications on oral health - One of the most frequent oral adverse effects of psychiatric drugs is xerostomia, commonly known as dry mouth. It encompasses several pharmacological classes. Selective Serotonin Reuptake Inhibitors (SSRIs) are among the most widely used drugs in the treatment of depression and anxiety and have been associated with some decline in salivary flow, which causes xerostomia.[41]

Consequently, this condition may raise the risk of dental caries, periodontal disease and the establishment of other oral infections. Similarly, Tricyclic Antidepressants (TCAs) and Serotonin-Norepinephrine Reuptake Inhibitors (SNRIs) have been associated with a decreased

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salivation condition that not only favors the deposition of dental plaque but may also cause other changes in the sense of taste and gingival enlargement.[42]

Table: 2 Medications and their oral health implications[43]

Medications	Oral cavity
Selective Serotonin Reuptake Inhibitors (SSRIs) usage: depression, anxiety disorders	Dry mouth, taste changes, gingival overgrowth
Tricyclic Antidepressants (TCAs) usage: depression, chronic pain, migraines	Xerostomia, taste changes, gingival overgrowth, difficulty swallowing
Serotonin-Norepinephrine Reuptake Inhibitors (SNRIs) usage: depression, anxiety disorders, chronic pain	Xerostomia, taste changes, gingival overgrowth
Mood stabilizers (e.g., lithium) usage: bipolar disorder	Metallic taste, geographic tongue (smooth, red patches on the tongue) or black hairy tongue (a buildup of bacteria on the tongue), swelling of the salivary glands
Stimulants (e.g., methylphenidate) usage: attention-deficit/hyperactivity disorder (ADHD), narcolepsy	Mouth sores or ulcers, teeth grinding, difficulty swallowing

Long-term usage of corticosteroids, such as methylprednisolone and prednisone, results in systemic effects on the bone, with osteoporosis being the most common effect. However, it also affects alveolar bone and oral health. studies report that systemic drugs, including corticosteroids, can contribute to bone loss and periodontal complications.[44]

Similar evidence has been found regarding patients who are ambulatory and taking enzyme-inducing antiepileptic drugs, such as phenytoin, phenobarbital, carbamazepine and primidone, compared to those taking non-enzyme-inducing drugs, such as valproic acid, lamotrigine, clonazepam, gabapentin and topiramate.[45]

Treatment of mental disorders and their interaction with oral health requires cooperation between mental health and dental caregivers. Multidisciplinary approaches ensure comprehensive care, improving both mental and oral health outcomes for patients.[46]

Oral health and mental wellness have a close. On the one hand, almost half of all dental patients are anxious about their appointments, which can contribute to poor dental hygiene. Depression or anxiety can heighten the perception of dental pain, regardless of the severity of the oral condition relationship. Burning mouth syndrome, for example, dizziness, headache, weakness that is frequently problem connected with depression or anxiety mental phobia, a type of specific phobia in patients with clinically healthy oral mucosa.[47]

Dry mouth (xerostomia) is a primary cause of oral health problems, which is sometimes exacerbated by opportunistic gingivitis caused by dietary inadequacies caused by psychosis or anorexia nervosa. Patients with bulimia have been reported to have salivary secretion due to parotid gland disease and other dental problems given below.[48]

Dental erosion, also known as pathological wear on tooth surfaces that causes diminishing of tooth structure and occurs without the presence of microorganisms. Physiological wearing of tooth due to heavy masticatory forces and heavy occlusion and tooth grinding because of stress, pathological wear of tooth means when teeth start to lose enamel due to some agent such as a mechanical aid like toothpick and chemical disintegration of the tooth can all cause tooth loss.[49]

Dental caries - Primary actions on tooth occur because of bacteria which causes tooth demineralization. Enamel and dentin demineralization and bacterial accumulation which causes tooth decay occur on area of crown and roots of the teeth, due to action of the bacteria which produces organic acid from the plaque causes tooth decay.[50]

Tooth demineralization, often known as Dental caries, is one of the most common chronic diseases afflicting people all over the world and it can strike anyone at any age. The disease affects both the crowns and roots of teeth. Dental caries is caused by a complicated interaction between acid producing bacteria, fermentable carbohydrates and a range of host factors like teeth and saliva and it can begin as aggressive tooth decay in new-borns and toddlers' mainly teeth as early as infancy.[51]

Gingivitis, which only arises when tooth plaque is present, is the first sign of periodontal disease. Periodontitis is defined by bleeding gums and pockets formed when the gums split from the teeth. Infection subsequently affects the surrounding ligaments and connective tissue, causing

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damage to the surrounding bone. In later stages of diseases, there is a periodontal disease characterise by the exposing of tooth roots and the breakdown of the periodontal ligament.[52]

Dry mouth should not be dismissed as a minor issue in the community, as it is a complex phenomenon affecting oral function and overall quality of life. Xerostomia affects 5.5% to 46% of the population, with older persons being the most affected. Women are also more likely than men to suffer from xerostomia. It can be caused by insufficient salivary production because of aberrant salivary gland function, however, most people with xerostomia do not show external indications of hyposalivation.[53]

Dryness of the oral cavity, despite normal salivary gland activity, is referred to as "symptomatic" xerostomia or "pseudo" xerostomia. Despite proper oral hygiene, patients with dry mouth may experience difficulties in normal physiological activity such as deglutition, mastication, or speech, as well as burning mouth, bad smell, dysgeusia, dry buccal mucosa, glossitis, cracked and peeled lips, oral candidiasis and dental caries.[54]

Bacterial infection causes increased decay and gum disease in affected person with advanced diseases like dementia and schizophrenia. Antipsychotics, antidepressants and mood stabilisers are all examples of psychotropic pharmaceutical adverse effects.[55]

There are various factors which causes improper oral hygiene in psychiatric disorder patients such as adverse habits like tobacco consumption, alcohol and less nutritious diet which leads to dental lesions. Other than erosion, attrition, or abrasion.[56]

Attrition is widespread in depression, owing to concomitant disorders such as smoking, drinking and bruxism. Through gastro-oesophageal reflux, high levels of cigarette and alcohol usage can induce erosion. Caries can occur in depressed patients mainly due to improper oral hygiene and due to drugs such as antidepressants.[57]

Antihistamines, anticholinergic, antihypertensive and antipsychotics are some of the other medications linked to dry mouth. Tricyclic antidepressants, in comparison to selective serotonin reuptake inhibitors, are linked to a higher incidence of dry mouth (SSRIs). Patients suffering from halitosis and dry mouth.[58]

Health education and advice have shown promise in promoting healthy lifestyle behaviours in previous research and one trial specifically found beneficial effects in physical health promotion in those with mental illness.[59]

However, a Cochrane review of oral health education for those with SMI, which included three of the studies within this review, concluded that there was no evidence that oral health education resulted in "clinically meaningful outcomes".[60]

However, defining interventions as oral health education may be an oversimplification of such interventions, although oral health education can be considered to encompass advice and training, models such as the behaviour change wheel consider different and distinct forms of interventions within this umbrella term.[61]

Study limitations

The evidence base available for synthesis was limited. Only four studies met the eligibility criteria and considerable heterogeneity existed in study design, outcome reporting and methodological approaches. Only one included study directly evaluated clinical oral health indices such as DMFT and periodontal parameters, while the remaining studies primarily addressed medication adherence and treatment strategies. This restricted the ability to draw strong conclusions regarding direct oral health effects of second-generation antipsychotics and precluded quantitative meta-analysis.

Implications for future research

Future investigations should prioritize longitudinal clinical studies evaluating the direct relationship between antipsychotic therapy and measurable oral health outcomes. Standardized reporting of dental indices such as DMFT, periodontal status and salivary flow parameters would improve comparability across studies. Multicenter studies examining preventive dental interventions within psychiatric care settings may also clarify the effectiveness of integrated oral-psychiatric healthcare models for individuals with severe mental illness.

Conclusion

Poor mental health, income and dental care utilization were linked to the respondents' unmet oral health needs. More than 65 percent of those who supported poor mental health said they did nothing to address their symptoms related to their dental health. Research indicates that dental care is underutilized by those who have suffered from a mental illness. Underutilization is caused by several factors, including dental fear, anxiety and phobia, restlessness in the dental waiting room, low self-esteem, lack of income and health insurance, shame, stigma and helplessness.

Furthermore, people with mental health disorders may be confused and have trouble remembering instructions, which can lead to mistrust between patients and dental professionals. The underutilization of dental services may also be exacerbated by the fact that people with poor mental health are more likely to be unemployed, have

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significant comorbidities and belong to low socioeconomic groups. The perceived need for treatment, the desire to see a dentist and social and physical environmental constraints, including clinic location, provider flexibility and clinic hours, are all important factors in the underutilization of dental care among people with mental health disorders.

Individuals with SMI, particularly those on SGAs, are advised to undergo targeted routine oral health examinations, which include regular dental checkups and preventive care. To address the root causes, it's crucial to modify lifestyle factors, maintain good dental hygiene and educate patients. Dental caries, periodontal disease, oral infection, dysgeusia, oral hypoesthesia, orofacial discomfort, temporomandibular disorders and salivary dysfunction should be the top priorities for preventive and minimally invasive treatment. Ordinarily, general dentists can treat common dental issues, but complex cases, soft tissue disorders and orofacial pain may call for oral medicine or special needs specialists.

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Study registration protocol

This systematic review was not prospectively registered in PROSPERO (International Prospective Register of Systematic Reviews) or any other systematic review registry.

List of abbreviations

SMI – Severe Mental Illness
SGA – Second-Generation Antipsychotics
FGA – First-Generation Antipsychotics
PRISMA – Preferred Reporting Items for Systematic Reviews and Meta-Analyses
STROBE – Strengthening the Reporting of Observational Studies in Epidemiology
DMFT – Decayed, Missing and Filled Teeth Index
SSRI – Selective Serotonin Reuptake Inhibitor
SNRI – Serotonin-Norepinephrine Reuptake Inhibitor
TCA – Tricyclic Antidepressant
TMJD – Temporomandibular Joint Disorder
WHO – World Health Organization

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Competing interests

The authors declare that there are no financial or non-financial competing interests related to this work.

Data availability

All data analyzed during this review are derived from previously published studies cited in the reference list. No new datasets were generated. Extracted data supporting the findings are available from the corresponding author upon reasonable request.

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Author contributions

Dr. Karthik Shunmugavelu conceptualized the study, designed the methodology, supervised the review process, interpreted the data and critically revised the manuscript.
Dr. Vijay S contributed to the psychiatric framework, validated the pharmacological interpretations related to antipsychotics and participated in manuscript revision.
Vaishnavi C conducted database searches, participated in screening and data extraction and assisted in drafting the manuscript.

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