Contributing Factors to the Oral Effects of Schizophrenia

A Peer-Reviewed Publication
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Abstract
Oral health is linked to overall health and is a window to a person’s general state of well-being. Recent research has demonstrated that many systemic disorders present with oral manifestations and that poor oral health may be a sign of underlying systemic diseases. Oral health also has a social impact as it affects social life and interactions, ability to pronounce words, ability to eat, and feelings of self-confidence. Poor oral health may also affect one’s career. This course will focus on the oral health concerns of those who suffer from psychiatric disorders, specifically schizophrenia.

Educational Objectives
At the conclusion of this educational activity participants will be able to:
1. Define schizophrenia and differentiate between the positive and negative symptoms of schizophrenia
2. Discuss the overall health issues in those who suffer from schizophrenia
3. State the predisposing factors for schizophrenia
4. Discuss management of the non-compliant patient

Author Profile
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Abstract
Oral health is linked to overall health and is a window to a person’s general state of well-being. Recent research has demonstrated that many systemic disorders present with oral manifestations and that poor oral health may be a sign of underlying systemic diseases. Oral health also has a social impact as it affects social life and interactions, ability to pronounce words, ability to eat and feelings of self-confidence. Poor oral health may also affect one’s career. This course will focus on the oral health concerns of those who suffer from psychiatric disorders, specifically schizophrenia.

Background
Schizophrenia is a psychiatric disorder that affects approximately one percent of the population. Although the specific cause of schizophrenia is unknown, it is believed that abnormalities in brain development may be one cause of this disorder. “The word has a Greek origin; split (schizo) and mind (phrenia); mind split from reality.” Other predisposing factors include genetic predisposition as well as environmental factors such as abuse and trauma. Men and women are affected equally. Those who suffer from this disorder also suffer from a variety of other health issues such as heart disease, cancer and cerebrovascular accident. Besides physical issues, this population also suffers from “the inability to function effectively in self-care and social life in general.” Those with schizophrenia also have a shorter lifespan; possibly due to a sedentary lifestyle, poor diet, obesity, diabetes and disease related symptoms such as delusions, hallucinations and emotional problems. Coronary artery disease (CAD) is believed to be the primary cause of higher mortality rates in this group and is linked to smoking, elevated cholesterol, obesity, diabetes and hypertension. Nearly 70% of patients suffering from schizophrenia smoke as opposed to approximately 25% of the general population. This has led to an increase in lung diseases, cardiovascular diseases and oral cancer in this population. Furthermore, many studies have demonstrated a link between cardiovascular disease and poor oral health, particularly periodontal disease. Patients with schizophrenia also suffer from oral health problems, when compared to the general population. This may be the result of lack of motivation and/or skills necessary for oral hygiene. Medications used to manage schizophrenia cause xerostomia and oral dyskinesias, leading to deterioration of oral health. These side effects are more common with the first generation of antipsychotic agents such as haloperidol or chlorpromazine and less common with the newer, second generation antipsychotic agents such as clozapine or risperidone.

Oral dyskinesias are involuntary, uncontrollable movements of the tongue, lips and jaws that vary in severity and result in difficulty in performing oral care as patients are unable to maneuver a toothbrush. These movements may lead to abnormal patterns of wear in the existing dentition and atypical facial tics, tongue protrusion and chewing motions. As a result, existing dental prostheses may lose retention and become difficult to wear and use. Women are more prone to dyskinesias than men.

To minimize or prevent the occurrence of dyskinesias, psychiatrists may also prescribe anticholinergic medications, which add to the xerostomic effects of the antipsychotic medications. Xerostomia is problematic because it reduces the ability of the oral cavity to wash away food particles and may also result in ulcerations of the oral cavity, dysphagia, burning mouth syndrome, candida overgrowth and difficulty in verbalization.

Patients who suffer from xerostomia tend to use sugar laden candies and drinks to counteract the effects of a dry oral cavity. Reduction in salivary flow, coupled with the addition of sugary substances, leads to a rapid progression of tooth decay. The negative symptoms of flat affect (the absence or near absence of emotional response) and apathy of psychiatric disorders such as schizophrenia lead to “lack of desire and ability to perform oral healthcare procedures.” The positive symptoms of schizophrenia are an “exaggeration or distortion of normal function.” The most common positive symptoms are hallucinations and delusions. Whereas the first generation antipsychotic agents are able to manage the positive symptoms of schizophrenia, the second generation antipsychotic agents are better able to manage both the positive and negative symptoms of schizophrenia with a significant reduction in the extrapyramidal side effects. However, the second generation antipsychotic medications lead to an increase in metabolic syndrome: excess visceral fat as well as an alteration in lipid and glucose metabolism. These changes result in an increase in coronary artery disease (CAD) as well as an increase in Type II diabetes in the schizophrenic patient. The prescribed medications may also cause patients with psychiatric disorders to suffer from decreased cognitive functions such as memory, attention and problem solving skills. The decrease in cognitive function is believed to affect basic skills as well as the ability to gain skills. The intolerable side effects may lead to a lack of compliance with medications in approximately 40% of patients; resulting in a relapse of the symptoms of the psychiatric disorder. Relapse may lead to a further reduction of regularly scheduled visits with dental professionals. As a result, this group is more likely to suffer from a greater number of missing teeth as compared to the general population. Additional reasons for those who suffer from psychiatric disorders to experience oral health problems include dental anxiety and lack of financial resources. These factors may compound oral health problems. Unfortunately, many dental professionals are not aware of how to manage patients with
psychiatric disorders, resulting in lack of availability of providers who are able to appropriately treat these patients.11

Search Methods and Results
A search for primary studies was completed using the Cochrane Library. Selection was based on inclusion of patients who suffer from schizophrenia. Observational studies included cohort studies, case-control studies, cross-sectional studies, before and after studies and case series studies. After implementation of all inclusion and exclusion criteria, six primary studies were found.

Review of Literature
The six studies discuss oral health problems as well as the rationale for an increase in the number of oral health issues in patients with psychiatric disorders, particularly schizophrenia. Though extremely limited in nature, this course will also discuss whether or not education based programs have been successful in decreasing oral health problems in this population.

Dental Education of the Patient Suffering from Schizophrenia-Study #1
Almomani et al (2006) conducted a randomized controlled, double blind study in which 50 male and female participants, 19-61 years of age, were voluntarily recruited from a community support program. Pregnant patients, those with severe periodontal disease, orthodontics, mental handicaps, neurological deficits and hearing or vision disorders were excluded. The fifty participants in this study had been diagnosed with serious mental disorders that include schizophrenia, bipolar disorder and depression and had a minimum of one tooth present in each sextant.

Baseline plaque indices were recorded on all participants with the use of red-Cote plaque disclosing solution® and the Quigley-Hein plaque index. The participants were then divided into two groups, A and B. Group A received verbal and visual education regarding homecare from a senior dental hygiene student as well as a Crest Spin Brush Pro mechanical toothbrush® and reminders via a Post-it note® system; Group B received only the Crest Spin Brush Pro mechanical toothbrush®. Plaque indices were recorded for participants in both groups as a baseline measure and again after four weeks. A mean plaque score was calculated from the recorded plaque indices by adding the plaque index score of each tooth and dividing by the number of teeth examined. This provided a baseline plaque index score for each participant.

The education provided by the dental hygiene students included topics such as the importance of oral hygiene and the impact of mental health on oral hygiene. Members of Group A received informational pamphlets about oral hygiene techniques and effects of medications to treat psychiatric disorders on oral health and a Crest Spin Brush Pro® as well as instructions on how to use the mechanical toothbrush. Each member of group A was observed using the mechanical toothbrush and provided with feedback as needed. Each member of Group A received Post-it® notes with reminders and a plastic box. The participants were instructed to place a Post-it® note in the box each time they brushed their teeth and were asked to bring the box in at the end of the four weeks. Group A members were also contacted on a weekly basis to provide positive feedback and to review oral hygiene instructions. Group B received only the toothbrush and no instructions.

Upon completion of the four weeks of the study, each participant had a baseline score and an end of study plaque index score. Statistical analysis revealed that Group A demonstrated significantly greater improvement in the plaque score than Group B. At the end of the study, all the participants were requested to complete a questionnaire about the program.

• 95% of the participants stated that they learned ways to improve oral hygiene, that the postcards were helpful and that the mechanical toothbrush helped them to achieve better oral hygiene
• 93% of the participants reported that the program was enjoyable

This study demonstrates that oral healthcare care is an area of concern in those with psychiatric disorders and that the implementation of an educational program that includes reminder systems as well as a mechanical toothbrush can improve the oral health of patients with serious mental disorders.3

Dental Education Study #2- Patients Suffering from Mental Illness
A second study that demonstrates the impact of educational programs on the oral health of patients with psychiatric disorders was conducted by Bell, Lasater, Sawyer and Ramirez (1973). This study was similar to the 2006 study conducted by Almomani et al in that it included an education portion in which the material was presented to the participants verbally and with the use of photographs. However, this study differed from the Almomani study in that it emphasized the negative results of poor oral hygiene and aroused fear.3 The patient with a psychiatric disorder usually tends to attempt to escape from situations that may produce anxiety. Since the dental office is considered to be a setting that causes anxiety, the researchers hypothesized that a low level of fear should be more effective in the patient with a psychiatric disorder, compared to a high level of fear which would cause the patient to withdraw from the situation.

This double blind study included “thirty nine (39) patients from the psychiatric treatment ward of a local state hospital”3 which were randomly divided into 3 groups. An oral exam and a Patient Hygiene Performance (PHP) Index were performed at the time of selection. Each participant was also provided with a questionnaire to complete regarding oral care. Upon completion of the oral exam, PHP Index and questionnaire, each group was shown one of three different slide presentations described below.

Group I (high fear) was presented with a demonstration that was intended to result in a high fear response. This presentation showed the participants actual photos of rampant decay, severe periodontal disease and loss of dentition that occur due to poor oral care. Group II (low fear group) was also shown pictures of
oral problems that may occur due to neglect; however, these were monochromatic drawings as opposed to color photographs. Group III (recommendations group) was not shown any pictures and was only provided verbally with recommendations for oral health care. All three groups were provided with a home oral health kit.

The researchers collected data via a questionnaire for all three groups at five intervals: pre-test, immediate post-test, one day post-test, one week post-test and one month post-test. In addition to the PHP Index, means for reporting frequency of intent to brush in the future, means for frequency of brushing and means for emotions experienced while brushing were also collected for each group at all five intervals.

One statistically significant difference found in this study was the anxiety or how the participants felt while brushing their teeth. This was not affected except for the high fear group during the one week post-test. Furthermore, for the low fear group, the mean for the anxiety felt during the demonstration and after the demonstration significantly increased as compared to the means for the other two groups for the same intervals.

This study was previously conducted on a population that was not diagnosed with a psychiatric disorder. It was found that the videos and information presented were effective at altering oral care habits. This study demonstrates that in those with psychiatric disorders, material perceived as a threat results in emotional dulling. Thus, it would appear that a positive approach to oral care may result in an improvement in hygiene habits for those with psychiatric disorders.³

Contributing Factors to Poor Oral Health in Patients with Schizophrenia

As studies that demonstrate the benefits of educational intervention for this population are rare, the remaining four studies in this course focus on the causes of poorer oral health in those who suffer from schizophrenia. The following studies should guide health care practitioners as well as government agencies with regard to focusing of resources to improve the oral health of those who suffer from psychiatric disorders.

Study #1-Contributing Factors to Annual Dental Visits in Patients Suffering from Schizophrenia

Janardhanan, Cohen, Kim and Rizvi (2011) state that older adults are the most rapidly growing population of those who suffer from schizophrenia. As a result, this group conducted a study to determine dental care and associated factors in this particular population. The sample for this study included 198 patients who suffer from schizophrenia, 55 years and older, selected from New York City outpatient centers, day programs and residences. The comparison group was from a similar area in New York City and consisted of 113 members randomly selected from the community. Among the two groups, there was not much difference in those who report having either one or two dental visits per year; however, there was a significant difference between the groups among those who report problems. In the schizophrenia group, 41% state that they have experienced dental problems as opposed to 23% of the comparison group. Furthermore, 46% of the schizophrenia group have dentures as opposed to the control group in which 38% have dentures.

This group of researchers found that four variables were significant for annual dental visits: financial wellbeing, perceived dental problems, AIMS oral subscale, and initiation/perseveration subscale. This study finds that of all the factors considered, only a few were significantly related to poor oral health and addressing the significantly related factors would most benefit this population.

Study #2-Identifying the Patient with Psychiatric Disorders

Many researchers believe that one reason for the lack of practitioners who are able to appropriately treat the patients with psychiatric disorders may be due to the failure of questions that are specific to these disorders on the medical history questionnaire. This may be a result of the sensitive nature of such information. Giglio and Laskin, 2010 conducted a study in which 442 charts were randomly selected from 825 patients who had presented for initial screenings at the Virginia Commonwealth University School of Dentistry. The purpose of this study was to determine the prevalence of psychiatric disorders in patients presenting for routine dental care. The rationale is that the presence of a psychiatric disorder can affect the way that the patient is managed.

The medical history form that is required to be completed by all patients contains a section about psychiatric disorders as well as a section regarding medications. Twenty one percent of the patients in this study (61 women and 28 men) were positive for psychiatric disorders including depression, anxiety disorders and bipolar disorder. Participants also reported taking selective serotonin reuptake inhibitors, benzodiazepines, lithium, anticonvulsants, atypical antipsychotic agents, typical antipsychotic agents, dopamine reuptake inhibitors, stimulants and tricyclic antidepressants, all of which can have adverse oral effects. More than half the subjects reported greater than one disorder and 20 patients reported taking more than one medication to manage the disorder(s).

In the general population, it is believed that 26% percent of patients suffer from mental illness. This difference may be attributed to the fact that those with severe mental illness generally do not present for dental care.³ The disorders included depression, anxiety, attention deficit disorder, eating disorders, claustrophobia, seasonal affective disorder and schizophrenia. A thorough medical history is important; however, verbal review of the medical history with the patient is critical as patients may not voluntarily reveal a positive medical history in writing. A thorough exam may also identify psychiatric disorders in patients who may be reluctant to disclose this area of the medical history. For example, bulimia results in severe enamel erosion, particularly on the lingual surfaces of the maxillary anterior teeth.³ Identification of the patient with a psychiatric disorder is important not only for the formulation of an appropriate and tailored treatment plan but also from a medical management aspect in the dental office. Many medications that are administered in the dental office may interact with prescribed
psychotropic medications. For example, the prescribing of a non-steroidal anti-inflammatory (NSAID) medication may result in the decreased excretion of lithium, resulting in lithium toxicity.

As practitioners it is critical to realize that patients who present for dental treatment may be suffering from a psychiatric disorder, yet may remain unidentified by the dental practitioner for a variety of reasons. It is important for the dental practitioner to obtain a written and a verbal medical history from each patient to identify those who may have a psychiatric disorder. Identification will result in a treatment plan that is specific and beneficial to the patient. Appropriate management of the patient will result in greater compliance and improved oral health.

**Study #3-Oral Health Problems in the Patient Suffering from Schizophrenia**

A study conducted by Arnaiz, Zumárraga, Díez-Altuna, Uriarte, Moro, Pérez-Ansorena, (2011) also attempts to provide evidence that the patient with a psychiatric disorder is more likely to suffer from oral health problems compared to the general population. This study was conducted at five outpatient centers in Vizcaya, Spain. Sixty-six patients (42 men and 24 women with an average age of 40 years) completed the study and all patients signed a written informed consent and were included based on the following criteria:

- Diagnosed with schizophrenia and receiving treatment in an outpatient setting
- Have been diagnosed with schizophrenia and taking antipsychotic medications for at least 2 years
- Over the age of 20 years
- The control group was volunteers consisting of university students and health professionals.

The clinical history was obtained and assessed with the use of the PANSS scale for positive (P) and negative (N) symptoms of schizophrenia. Dental exams were then completed by a dentist and a dental assistant in the outpatient centers with a standard dental mirror and explorer to obtain The Community Periodontal Index Treatment Needs (CPITN) and the Decayed, Missing, Filled Teeth (DMFT) index. For the CPITN, the highest probing value was recorded for each tooth. Third molars were not included in the study. The periodontal assessment was as follows:

- 0-Healthy
- 1-Bleeding
- 2-Supragingival and subgingival calculus, overhanging restorations present
- 3-Pockets of 4-5 mm present
- 4-Pockets of more than 6 mm
- X- Sextant not included

The data was analyzed to compare the group diagnosed with schizophrenia and the control group. Age, current smoking and gender were included as variables.

The control group consisted of 38 men and 28 women with an average age of 39.5 years.

This study found that those with psychiatric disorders such as schizophrenia have significantly higher scores for D, M, F, DMF-T and CPITN when compared to the control group. This was particularly true for the mean of missing teeth in those with psychiatric disorders when compared to the control group.

Additionally, it was found that those with higher PANSS-N scores had a significantly greater number of decayed and missing teeth, resulting in a higher DMF-T Index, when compared to the number of decayed teeth and missing teeth in those with a higher PANSS-P score. Furthermore, the higher the PANSS-N score, the lower the number of filled teeth when compared to those with a higher PANSS-P score. The data demonstrates that those who suffer from the positive symptoms of schizophrenia are less likely to have missing teeth.

The researchers also evaluated the effects of the variables of age and cigarettes on the DMF-T and CPITN. Thirty-nine percent of the control group were smokers who smoked an average of 18 cigarettes per day, as opposed to 71% of the patient group who smoked an average of 27 cigarettes per day. Age and smoking resulted in a greater number of missing teeth and significantly worse DMF-T and CPITN scores in both groups, thus increasing the need for restorative and periodontal treatment. The values for D and M were higher for smokers compared to non-smokers. Gender was not a factor which affected the oral condition in either group.

The study conducted by Arnaiz et al (2011), provides important and relevant information regarding the oral health of the patient with schizophrenia. There is a positive correlation between PANSS-N and poor oral health. Such a relationship was not found between poor oral health and PANSS-P. This may be due to the decreased energy and motivation associated with the negative symptoms of schizophrenia.

Many practitioners tend to treat psychiatric patients by extracting teeth rather than completing extensive restorative procedures. The patient group consisted of three edentate patients as opposed to none in the control group. Thus, this study demonstrates that those who suffer from the positive symptoms of schizophrenia do not suffer from as many oral health problems as do the patients who suffer from the negative symptoms of this disorder.

**Study #4-Factors Influencing the Oral Condition of Patients Diagnosed with Schizophrenia**

The findings of the previous group are supported by a study conducted by Thomas, Lavrentzous, Karouzos, and Kontis (1996). This group studied the factors that influence the oral condition of the schizophrenic patient. Also included as part of this study was the effect of the dosage of psychotropic medications on oral health. The study, conducted in Greece, included 249 patients of which 108 were men and 141 were women (mean age of 50.35 years), diagnosed with schizophrenia by 2 independent psychiatrists. Patients with a history of alcohol/drug abuse or severe medical problems that may significantly affect the oral cavity were excluded. Duration of illness and years of hospitalization were recorded along with dosage of medications. Dosages were converted to an equivalent dose of chlorpromazine (EDC). Severity of psychiatric disorder was assessed with the use of a Brief Psychiatric Rating Scale.
Scale (BPRS), Positive symptoms were identified and negative symptoms were measured by BPRSNEGS (a subscale of BPRS).

The patients were then divided into 3 groups:
- Group I (n=158, 63.5%) and had been hospitalized for greater than 10 years
- Group II (n=34, 13.7%) and had been hospitalized for up to 10 years
- Group III (n=57, 22.9%) who were treated in an outpatient setting

Two dentists examined the patients at the same appointment and one set of data was generated for each individual. The DMFT index was calculated for each patient after completion of the examination. Third molars were included in this study. A Simplified Oral Hygiene Index, OHI-S was utilized to assess the oral hygiene status of each patient.

Group I was found to have a higher DMFT score than Groups II and III because those in Group I have a significantly higher score for missing teeth (M) than do those in Groups II and III. Additionally, Group I had a significantly higher BPRSNEGS score than Groups II and III. Group II received the highest EDC and Group III received the lowest EDC.

Thomas et al (1996) further evaluated the relationship between DMFT, OHI-S and BPRS, BPRSNEGS, EDC and hospital length of stay (LSH). The researchers found a strong and significant relationship between, DMFT and BPRS, BPRSNEGS, EDC, and LSH; and no relationship between OHI-S and EDC.

The study by Thomas et al (1996) provides important and relevant information: that oral health in the schizophrenic patient is related to length of hospitalization, the dose of medications the patients take to manage the disorder and the severity of the negative symptoms of schizophrenia. It was found that the longer the hospitalization time, the more severe the oral problems experienced by the patient. Outpatients experienced better oral health compared to those who were hospitalized. Additionally, the more severe the negative symptoms of schizophrenia, the poorer the oral condition. There is a slight relationship between EDC and rate
of caries; most likely due to the xerostomic effect of the patient’s medications.

Discussion
The literature review revealed some important points. Although studies that demonstrate the benefits of oral care education to patients with psychiatric disorders are few, those that have been conducted found that education must be positive and include a multifaceted approach.

Multiple studies discussed in this course provide strong evidence that those who suffer from psychiatric disorders are more likely to be affected by poor oral health of the dentition and the supporting periodontal structures. Each of these studies found that certain factors significantly impact annual dental visits and the oral health of this population. These factors include perceived existing dental problems, oral dyskinesias and diminished cognitive abilities, lack of financial resources, unemployment, institutionalization, negative symptoms of schizophrenia, age and smoking. All these factors can have a significant and negative impact on the oral health of this population.

Additionally, many dental professionals fail to identify patients who are suffering from a psychiatric disorder; resulting in inappropriate patient management. Upon identification, a tailored treatment plan may be developed after consultation with the treating psychiatrist. The dental professional should initially consult the patient’s psychiatrist to discuss the current medical status of the patient. The dental professional should be familiar with the use of chlorhexidine and fluoride containing toothpastes as they reduce the risk of gingival inflammation and caries, respectively.

Knowledge of the adverse oral side effects of the medications will aid in the formulation of a treatment plan that can address these issues. It is equally important for the dental professional to be aware of the barriers that face this population with regard to access to dental care. 1,3,11

Patients who are non-compliant may be the most challenging for the dental professional and may need more frequent dental visits for maintenance. Thus, family members may also need to be involved in daily home oral care of the non-motivated patient. 4

Education of the patient and family members should include nutrition and dietary counseling that promote the reduction of sugary substances and high carbohydrate meals. Furthermore, all involved should also receive education on the use of artificial saliva to improve moisture of the oral cavity. 6

The ability to appropriately treat the patient with a psychiatric disorder will result in the reduction of dental problems and an increase in self-esteem as well as an improvement in overall health. Appropriate care is also less costly as preventive measures will aid in the reduction of extensive restorative procedures. Collaboration between dental professionals and psychiatrists will also benefit the psychiatric patient. 3,7,12 Tables 1, 2 and 3 summarize the main findings of the studies included in this course.

References

Author Profile
Dr. Singhal is a full-time faculty member at the Rutgers University, School of Health Related Professions (SHRP), Department of Allied Dental Education (ADE). She has been teaching for 14 years, of which twelve (12) have been at the School of Health Related Professions. Dr. Singhal received her Doctorate in Dental Medicine from the Rutgers University School of Dental Medicine in 1993 and received a Master’s in Health Systems from SHRP and is currently a doctoral candidate in the SHRP Health Sciences Program. She teaches Dental Radiology, Applied Pharmacology, Medical Emergencies, Nitrous Oxide Sedation and Local Anesthesia. Dr. Singhal also treats patients at the faculty practice located on the Scotch Plains, NJ campus of SHRP.

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Questions

1. Which of the following statements is correct?
   a. Poor oral health can have a positive impact on social interactions
   b. Poor oral health can improve the ability to speak
   c. Poor oral health can have a positive impact on self-confidence
   d. Poor oral health may be a sign of other underlying systemic diseases

2. Schizophrenia is:
   a. A serious mental disorder
   b. A disorder in which the mind is split from reality
   c. Psychotic disorder in which the perception of reality is altered
   d. All of the above are correct

3. Schizophrenia:
   a. Affects 5 out of 100 people
   b. Affected men more than women
   c. May be caused by abuse and trauma
   d. Does not have a genetic link

4. Positive symptoms of schizophrenia include:
   a. Distortion of normal function
   b. Hallucinations
   c. Delusions
   d. All of the above are positive symptoms of schizophrenia

5. Negative symptoms of schizophrenia include:
   a. Excitement
   b. Feeling of being superhuman
   c. Delusions
   d. Flat affect and apathy

6. Those who suffer from schizophrenia:
   a. Suffer from mental and emotional symptoms such as delusions and hallucinations
   b. Have a diet that is better than that of the general population
   c. Are less prone to diseases such as cardiovascular disease
   d. Smoke much less than the general population

7. Patients who suffer from schizophrenia:
   a. Are less likely to suffer from oral health problems due to the increase motivation for improvement of home care
   b. Are more likely to suffer from poor oral health due to loss of interest in home care as well as other contributing factors such as xerostomia medications
   c. Are less likely to suffer from oral health problems due to increased number of dental visits
   d. All of the above are correct

8. The specific cause of schizophrenia may be unknown, HOWEVER, it is believed that schizophrenia may be caused by factors that may be due to genetics or trauma.
   a. Both statements are true
   b. Both statements are false
   c. The first statement is true, the second statement is false
   d. The first statement is false, the second statement is true

9. Nearly three times as many patients who suffer from schizophrenia smoke compared to the general population. This has led to a decrease in oral cancer as well as cardiovascular diseases.
   a. Both statements are true
   b. Both statements are false
   c. The first statement is true, the second statement is false
   d. The first statement is false, the second statement is true

10. Oral dyskinesias:
   a. Are involuntary, uncontrollable movements of the tongue, lips and jaws
   b. More likely to be caused by 2nd generation antipsychotic medications as opposed to 1st generation antipsychotic medications
   c. Affect men more than women
   d. Do not interfere with the ability to perform oral hygiene

11. Anticholinergic medications:
   a. May be prescribed to counteract the oral dyskinesia side effect of the antipsychotic medications
   b. Result in an increased salivary flow thereby negating the xerostomic side effect of the antipsychotic medications
   c. Add to the therapeutic antipsychotic effect of the medications prescribed to treat schizophrenia
   d. Reduce the therapeutic effect of the other medications prescribed to treat schizophrenia

12. Xerostomia:
   a. Is an increase in salivary flow that allows food particles to be washed away more easily, making the patient less prone to dental decay
   b. May lead to the use of sugary drinks and candies, making the patient prone to dental decay
   c. Is not related to the use of antipsychotic medications
   d. Is more commonly caused by the use of 2nd generation antipsychotic medications as opposed to 1st generation antipsychotic medications

13. Which of the following is incorrect?
   a. The 2nd generation antipsychotic agents are better able to manage both the positive and negative symptoms of schizophrenia
   b. The 1st generation antipsychotic agents are able to manage only the positive symptoms of schizophrenia
   c. The 1st generation antipsychotic agents produce significantly less extrapyramidal side effects
   d. The 2nd generation antipsychotic medications lead to an increase in coronary artery disease (CAD) as well as an increase in Type II diabetes in the schizophrenic patient due to an increased rate of metabolic syndrome

14. Patients with schizophrenia may suffer from poor oral health as compared to the general population because:
   a. Antipsychotic medications can improve cognitive functions and the ability to gain skills
   b. Side effects produced by antipsychotic medications lead to a decrease in compliance and a relapse of the psychiatric disorder
   c. Of diminished dental anxiety
   d. Of an increase in regularly scheduled dental visits

15. The study conducted by Almomani et al (2006) demonstrated that education of the patient with psychiatric disorders is beneficial in the improvement in oral hygiene BUT does not require a multifaceted approach that includes follow up phone calls, weekly reminders and feedback on oral hygiene performance.
   a. Both statements are true
   b. Both statements are false
   c. The first statement is true, the second statement is false
   d. The first statement is false, the second statement is true

16. The survey completed by the participants of the Almomani et al (2006) study concluded that:
   a. The post it notes were not beneficial in reminding participants to perform oral hygiene home care
   b. The mechanical toothbrush was not helpful in improving oral hygiene home care
   c. The participants did learn ways to improve oral hygiene home care
   d. The program was boring and not enjoyable

17. Noncompliance with home care recommendations may be addressed by:
   a. Educating family members and caregivers about the importance of nutrition
   b. Incorporating more frequent preventive dental visits
   c. Collaborating closely with the treating physician, nutritionists and family members
   d. All of the above are important in improving the oral health of the noncompliant patient

   a. Both statements are true
   b. Both statements are false
   c. The first statement is true, the second statement is false
   d. The first statement is false, the second statement is true

19. Janardhanan et al (2011) found that of all variables studies, four were significantly related to the number of annual dental visits by patients suffering from schizophrenia. Which one of the following is a significant variable as determined by this group of researchers?
   a. Financial well-being
   b. Being male
   c. Education level
   d. Currently having dentures

20. Giglio and Laskin, (2010) conducted a study to determine whether or not dental professionals are able to identify patients who may be suffering from psychiatric disorders. Which of the following is correct?
   a. The researchers found that it is not important to identify the patient with psychiatric disorders as dental treatment does not need to be modified based on medical history
   b. Identification of patients suffering from mental illness as it is believed that 33% of the general population suffers from psychiatric disorders
   c. The written medical history should be followed by verbal discussion of the medical history as some patients may not reveal pertinent information in the written history
   d. The researchers found that dental professionals are able to appropriately identify patients who suffer from psychiatric disorders based on the questions present in the medical history
Contributing Factors to the Oral Effects of Schizophrenia

Educational Objectives

1. Define schizophrenia and differentiate between the positive and negative symptoms of schizophrenia
2. Discuss the overall health issues in those who suffer from schizophrenia
3. State the predisposing factors for schizophrenia
4. Discuss management of the noncompliant patient

Course Evaluation

1. Were the individual course objectives met?
   - Objective #1: Yes  No
   - Objective #2: Yes  No

2. To what extent were the course objectives accomplished overall?  
   - 5  4  3  2  1  0

3. Please rate your personal mastery of the course objectives.  
   - 5  4  3  2  1  0

4. How would you rate the objectives and educational methods?  
   - 5  4  3  2  1  0

5. How do you rate the author's grasp of the topic?  
   - 5  4  3  2  1  0

6. Please rate the instructor's effectiveness.  
   - 5  4  3  2  1  0

7. Was the overall administration of the course effective?  
   - 5  4  3  2  1  0

8. Please rate the usefulness and clinical applicability of this course.  
   - 5  4  3  2  1  0

9. Please rate the usefulness of the supplemental webiography.  
   - 5  4  3  2  1  0

10. Do you feel that the references were adequate?  
    - Yes  No

11. Would you participate in a similar program on a different topic?  
    - Yes  No

12. If any of the continuing education questions were unclear or ambiguous, please list them.

13. Was there any subject matter you found confusing? Please describe.

14. How long did it take you to complete this course?

15. What additional continuing dental education topics would you like to see?

PLEASE PHOTOCOPY ANSWER SHEET FOR ADDITIONAL PARTICIPANTS.

If not taking online, mail completed answer sheet to
Academy of Dental Therapeutics and Stomatology,
A Division of PennWell Corp.
P.O. Box 116, Chesterland, OH 44026
or fax to: (440) 845-3447

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