Dental Health and the Type of Antipsychotic Treatment in Inpatients with Schizophrenia

Alexander Grinshpoon, MD, PhD, MHA,1 Shlomo P. Zusman, MD,2 Abraham Weizman, MD,3 and Alexander M. Ponizovsky, MD, PhD4

1 Sha'ar Menashe Mental Health Center, Hadera, Israel, and Bruce Rappoport Faculty of Medicine, Technion, Haifa, Israel
2 Division of Dental Health, Ministry of Health, Jerusalem, Israel
3 Geha Mental Health Center, Petah Tikva, Israel, and Sackler Faculty of Medicine, Tel Aviv University, Tel Aviv, Israel
4 Research Unit, Mental Health Services, Ministry of Health, Jerusalem, Israel

ABSTRACT

Aim: This study examined the association between dental conditions in hospitalized patients with ICD-10 schizophrenia and type of antipsychotic treatment. Based on the literature suggesting that atypical antipsychotics are thought to be more tolerable than typical antipsychotics, we hypothesized that hospitalized patients with schizophrenia treated with atypicals would have better dental health than those treated with typicals alone or with a combination of both (combined group).

Methods: A representative sample of 348 patients (69% males), aged 51.4 (SD=14.5, range 31-58) years, was assessed on the standardized criteria of the Decayed, Missing and Filled Teeth (DMFT) index and component scores. Data on medication were extracted from patients’ electronic medical records.

Results: Patients treated with typicals had significantly higher DMFT index scores than those who received atypicals (23.5±9.9 vs. 19.0±10.5; p<0.05), and higher Missing (20.2±11.6 vs. 13.5±11.2; p<0.01) and lower Filled (1.0±2.4 vs. 2.2±1.3; p<0.05) teeth component scores. No between-group differences in Decayed component scores were found (2.3±3.4 and 3.4±5.0, respectively; p>0.05). The combined treatment group was situated in between the typicals and atypicals groups on all measures.

Conclusions: The results suggest that patients with schizophrenia maintained on atypicals have better dental health than patients treated with typicals or with a combination of both. From an oral health perspective, monotherapy with atypicals is superior to both typical and atypical/typical treatments. Although the choice between typical and atypical antipsychotic agents is based mainly on clinical psychiatric efficacy, the benefit of atypicals with regard to dental health should be taken into consideration in clinician’s decision making.

INTRODUCTION

In recent years, there has been increasing interest in dental health among patients with schizophrenia and other severe mental illnesses. This is probably related to an interest in improving the physical health, integration in the community, quality of life and more tolerable and safe pharmacological treatment for this population. Psychiatric patients are exposed to a particularly high risk of dental diseases because of both patient-related and service-related factors, most of which are modifiable. Patient-related risk factors include heavy smoking (1, 2), neglecting oral hygiene (3-5), avoidant behavior (6), having a carbohydrate-rich diet (7, 8), and abusing alcohol and drugs (9). Service-related factors include lack of suitable dental clinics (10), lack of funds designated for dental services, poor accessibility to dental services (11), and insufficient concern of psychiatrists (12). An important, but understudied factor, is the impact of psychotropic medications that can cause dry mouth (5, 13, 14), or other side-effects that contribute to oral health problems (2, 15, 16).
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Typical antipsychotics (typicals or first-generation antipsychotics) and atypical antipsychotics (atypicals or second-generation antipsychotics) are used for treating various psychiatric disorders. Although both groups of antipsychotics block brain dopamine receptors and have comparable efficacy, atypicals differ from typicals in that they have a safer profile of neurological side-effects. They are less likely to cause extrapyramidal symptoms, such as Parkinsonism expressed by muscular rigidity, and involuntary and intentional tremors (17). Such impairments have a negative effect on fine motor movements and, consequently, on the patient’s ability to effectively brush his/her teeth and perform oral hygiene activities (2). Both types of antipsychotics can cause tardive dyskinesia, but atypicals compared to typicals are less likely to do so (3.9% versus 5.5%) (18). This para-functional activity of the oral, chewing and tongue musculature can have a negative effect on teeth and occlusion (19). Both typicals and atypicals have anticholinergic side-effects, including xerostomia (dry mouth). Saliva has a major role in preventing dental caries; therefore xerostomia is a major risk factor of dental caries. Patients with dry mouth drink carbonated drinks more frequently, which further increase the risk for caries (20). However, a systematic review and meta-analysis of the relevant literature did not find differences in dry mouth between typicals and atypicals over medium- and long-term (21). The prominent side-effect of atypicals is the metabolic syndrome that manifests with significant weight gain, dyslipidemia and diabetes mellitus (22). All listed side-effects of antipsychotics are considered risk factors for poor dental health (2).

The aim of this cross-sectional study was to examine the association between dental conditions in long-stay hospitalized patients with schizophrenia and type of antipsychotic medication they received. Based on the literature suggesting that atypicals are thought to be more tolerable than typicals (17, 18, 22), we hypothesized that hospitalized patients with schizophrenia treated with atypicals could have better dental health than those treated with typicals alone or with a combination of both types of antipsychotics.

METHODS

SAMPLE
Fourteen psychiatric institutions (six government-owned and eight private), providing care for 98% of all chronic psychiatric inpatients in Israel were included in the present study. The study protocol was approved by the Ministry of Health (MoH) Institutional Review Board. Of all patients hospitalized for more than one year on July 1, 2005 (n=1,997), a sample of approximately 20% of the patients was randomly chosen for dental examination. Randomization used Israeli citizens’ unique 9-digit identity codes (ICs). Only inpatients whose ICs ended with the randomly selected digits (“5” and “7”) participated in the survey (n=348). Demographics (age and gender), information on the clinical diagnosis according to the International Classification of Diseases, 10th edition (ICD-10) (23) mental disorder category and history of psychiatric hospitalizations were extracted from National Psychiatric Hospitalization Registry of the MoH (24).

The sample consisted of 241 men (69%) and 107 women (31%) diagnosed with schizophrenia according to ICD-10 criteria. The mean age of patients was 51.4± 14.5 years (range 31-58). The mean age at onset of the disorder, as measured by age of first psychiatric hospitalization, was 25.5±9.4 years (range 14-29) and duration of the disorder was 28.0±13.4 (range 5–24). The mean number of psychiatric hospitalizations was 10.2±12.2 and cumulative length of hospital stay was 67.2±86.9 months.

ANTIPSYCHOTIC MEDICATION GROUPS
Data on medication were extracted from patients’ electronic medical records. All patients (n=348) were divided into three groups according to type of antipsychotic medication which they received from the onset of their illness to time of the dental examination: only typicals (n=163), only atypicals (n=40) and a combined group that received a combination of both (n=145). Patients in the typicals and combined groups were treated continuously for at least 60.2±41.0 and 63.1±45.4 months, respectively, whereas the mean duration of drug administration in the atypicals group was 48.2±38.0 months. The observed periods of antipsychotic medication were limited by approximately five years, because atypicals were introduced in Israel during the year 2000. The typicals included haloperidol (n=28, 25.0±20.6 mg/day), levomepromazine (n=25, 125.0±120.0 mg/day), perphenazine (n=24, 40.0±51.0 mg/day), zuclopenthixol (n=18, 36.0±16.0 mg/day), haloperidol decanoate (n=20, 6.7±3.8 mg/day), fluphenazine decanoate (n=19, 1.8±0.9 mg/day), zuclopenthixol decanoate (n=29, 10.0±7.5mg/day). Most of the patients treated with typicals received adjunctive anticholinergic agents for extrapyramidal side effects, whereas most of the patients treated with atypicals did not need this addition. The atypicals were clozapine (n=7, 300.0±95.0 mg/day), olanzapine (n=22, 18.0±5.0 mg/day), quetiapine (n=21, 25.0±12.0 mg/day), risperidone (n=14, 4.3±2.5 mg/day), ziprasidone (n=2, 45.0±35.0 mg/day).
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We did not find any differences between these groups in the use of adjunctive antidepressants, anxiolytics or mood stabilizers, which possess significant anticholinergic properties (data not shown).

DENTAL STATUS ASSESSMENT

According to the MoH protocol based on the National Health Insurance Law [Israel], 1994 (25), each hospitalized psychiatric patient is entitled to an annual dental check-up. For this study, this examination was performed by two dentists who were calibrated prior to the study to an experienced examiner who serves as the “national standard” [coefficient of agreement (kappa) between the examiners was 0.88]. The dental examination was carried out with a mirror and a periodontal probe (Community Periodontal Index Treatment Needs) (26), with the patient sitting in front of a window, under natural light. Patients in closed wards who were not mobile and elderly bedridden patients were examined in the wards. Patients were checked for the state of their teeth and restorations, soft and hard tissues according to the WHO Oral survey methods, 4th edition, which details criteria for the examination (26). The DMFT index, which represents overall dental status and past caries experience, i.e., number of Decayed (D), Missing (M) or Filled (F) Teeth (T) in the permanent dentition, was calculated for each patient. The DMFT index score (DMFT) is a sum of its three components (26) and ranges from 0 (if the patient is caries-free) to a maximum of 28 (if all teeth are affected). It should be kept in mind that because the DMFT index is done without X-ray imaging, it might underestimate the prevalence of dental caries (27).

DATA ANALYSIS

All analyses were performed using the SPSS-14.0 for Windows (SPSS Inc., Chicago, IL). DMFT data are presented as mean score and SD. Differences in patients’ characteristics, categorical and continuous variables, were analyzed with Chi-square test and ANOVA, respectively. We tested our hypotheses about differences in DMFT index and component scores between the typicals, atypicals and combined medication groups using one-way ANOVA with Tukey HSD post-hoc comparisons. Potential confounding effect of gender on between-group differences was tested with paired t-tests. The level of statistical significance was set at p<0.05.

RESULTS

The typicals group was somewhat older (51.3±15.1 years) than the atypicals (49.0±12.2 years) and combined (48.9±13.9 years) groups, although these differences did not reach statistical significance (F=1.45; df=2,346; p=0.15). Likewise, significantly more female patients were in the typicals group (n=57, 35%) relative to the atypicals (n=9, 22.5%) and combined (n=41, 28.3%) groups (Chi-square=17.5, df=1, p<0.05).

To test our hypothesis, DMFT scores were compared across the study groups (Table 1). ANOVA results showed that the patients treated with typicals had significantly higher DMFT index scores (23.5±9.9 vs. 19.0±10.5; p<0.05), as well as higher Missing (20.2±11.6 vs. 13.5±11.2; p<0.01) and lower Filled (1.0±2.4 vs. 2.1±3.9; p<0.05) teeth component scores than those treated with atypical antipsychotics. No between-group differences in Decayed component scores were found (2.3±3.4 and 3.4±5.0, respectively; p>0.05). The patients treated with typicals did not differ significantly from those in the combined group in all DMFT scores, except for a higher mean number of missing permanent teeth (p<0.05). There were no statistically significant differences in all DMFT scores between patients in the atypicals group and those in the combined antipsychotic group.

To test a potential confounding effect of gender on dental status of patients treated with the different types of antipsychotics, we compared DMFT index and component scores between men and women within each treated group.

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Table 1. DMFT Index and component scores comparisons in patients with schizophrenia treated with typical versus atypical versus combined antipsychotic drugs

<table>
<thead>
<tr>
<th>Dental status</th>
<th>Antipsychotic drug group</th>
<th>ANOVA (df=2,347)</th>
<th>Tukey HSD post-hoc comparisons</th>
</tr>
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<tr>
<td></td>
<td>Typical (n=163)</td>
<td>Atypical (n=40)</td>
<td>Combined (n=145)</td>
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<tr>
<td>Decayed</td>
<td>2.3±3.4</td>
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<td>2.7±4.3</td>
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<tr>
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<td>17.2±12.4</td>
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<tr>
<td>Filled</td>
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</tr>
<tr>
<td>DMFT Index</td>
<td>23.5±9.9</td>
<td>19.0±10.5</td>
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</tr>
</tbody>
</table>
using paired t-tests. No gender differences in DMFT scores were found within each antipsychotic medication group (data not shown).

**DISCUSSION**

This study examined the association between type of antipsychotic medication and dental status among long-stay schizophrenia inpatients. As hypothesized, patients treated with atypicals had better dental health than patients treated with typicals. The overall decay level in the group treated with atypicals, as measured by the DMFT index, was significantly lower compared to the group treated with typicals, indicating that patients maintained on atypicals have significantly more treated (filled) teeth and significantly fewer extracted (missing) teeth. The results of the combined treatment group (typicals along with atypicals) fell in between the atypicals and typicals groups on all measures.

**HOW COULD THE FINDINGS BE EXPLAINED?**

Due to the cross-sectional correlational design of our study, most explanations for our findings are rather speculative. Theoretically, after caries begins to develop and cause pain, there are two principal strategies of behavior for the sufferer: immediate seeking of professional dental care or treatment avoidant behavior, such as taking analgesics to lower pain, an approach that results in treatment delay. The first strategy is reflected in an increase in the DMFT Filled teeth component, whereas the second strategy leads to progressing caries with decay and subsequent loss of the tooth reflected in the DMFT Missing teeth component.

Since the atypicals have fewer neurological side-effects (including less dyskinesia) compared with typicals, adherence to the former is better (28). Better adherence is associated with more stable remission and better judgment that contribute to the patients' adherence to oral hygiene practices and seeking adequate dental treatment in a timely manner, leading eventually to more dental repairs and fewer extractions. The group that received combined treatment scored between the groups treated with only typicals or only atypicals in all dental parameters except for the number of extracted teeth which was significantly higher in the group treated with only typical antipsychotics. This finding suggests that compared with the typicals group, patients treated with a combination of typicals and atypicals might be more cooperative with dental care and dentists should avoid extraction of the decayed teeth in that group when restorations are possible.

Our results suggest that the better dental status of the patients treated with atypicals might be related to changes in health-seeking behaviors in terms of dental care, perhaps because of better insight of these patients and more awareness of their dental health needs, better oral hygiene practices or owing to better cooperation with their dentists, or a combination of these factors. It is suggested that atypicals, relative to typicals, are to some extent more effective in reducing negative symptoms (29-31). Such negative symptoms may play a role in the poor oral health of mentally ill patients (32), likely due to social withdrawal that might reduce help-seeking behavior. Adjunctive anticholinergic agents for extrapyramidal side effects that cause dry mouth might be responsible for the poorer dental status of patients treated with typicals compared to those taking atypicals. However, there were no differences in the Decayed teeth component between the groups. Finally, age-sex differences, most commonly cited as risk factors for dental health (33-35), could account for the obtained findings, if these factors were not controlled for in our study.

**LIMITATIONS**

The findings of this study should be regarded as preliminary in view of the following limitations. First, our outcome measure (DMFT) reflects past and present caries activity and the way they were treated. Recent medication regimen does not influence past activity but this limitation is common to both groups, which differed only by the type of medication participants currently received. The cross-sectional design of our study precludes establishing causality for the current association. Future longitudinal studies could confirm our findings and determine the causal relationship between types of long-term antipsychotic treatment and dental status in schizophrenia patients.

Factors such as socioeconomic status (32), health habits (34), self-care and oral care (2), and diet (7) were not assessed in this study, although these factors seem irrelevant for a study on the impact of drug treatment on dental health. Nonetheless, independent of type of antipsychotic treatment, preventive dental care, including oral hygiene, healthy diet, fluoride utilization, etc., should be recommended and monitored by the hospital staff among psychiatric inpatients.

**CLINICAL IMPLICATIONS**

A recent systematic review and meta-analysis of comparative effectiveness of typicals versus atypicals for treating adults with schizophrenia concluded that the strength of
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evidence for advantages of typicals versus atypicals, as well as their comparative safety for major medical events is low or insufficient (22). Our findings demonstrate a possible benefit of atypicals over typicals at least with regard to the Missing teeth component of dental health. This benefit was less notable in the group treated with a combination of both medications. Hence, from the dental health perspective, the popular practice among clinicians to combine atypicals with typicals for enhancing treatment effectiveness should be avoided or at least minimized.

In conclusion, the results suggest that schizophrenia patients maintained on atypicals have better dental health than patients treated with typicals or with a combination of both. From the oral health perspective treatment with atypical antipsychotics only is superior to treatment with typicals and a combination of atypicals and typicals. Although the choice between typicals and atypicals is based mainly on their psychiatric efficacy, the benefit of atypicals with regard to dental health should be taken into consideration in clinical decision making.

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References