Determinants of Poor Dental Care in Patients With Schizophrenia: A Historical, Prospective Database Study

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Background: Oral health status is poor and a disregarded health issue among patients with schizophrenia that is associated with the risk for additional social stigmatization and potentially fatal infections.

Method: A historical, prospective database study of dental visits, utilizing the Danish National Patient Registry, of 21,417 patients with *ICD-10*–diagnosed schizophrenia in the year 2006 and of 18,892 patients for the 3-year period of 2004–2006 was conducted. Multiple logistic regression analyses were used to identify risk factors for lack of dental care.

Results: Only 43% of patients with schizophrenia (9,263/21,417)—compared to an annual dental visit rate of 68% in the general adult Danish population (2,567,634/3,790,446)—visited the dentist within 12 months in 2006 (OR = 2.8; 95% CI, 2.7–2.9; $P < .0001$). Moreover, only 31% of schizophrenia patients complied with a regular annual dental check-up visit between 2004 and 2006. Nonadherence to annual dental visits was consistently predicted by substance abuse diagnosis, involuntary legal status, living in an institution, admission to a psychiatric facility for a minimum of 30 days, and male sex, whereas clozapine treatment, atypical antipsychotic treatment, at least monthly outpatient visits, and age > 50 years were associated with a lower risk for inappropriate dental care.

Conclusions: Patients with schizophrenia visit dentists much less frequently than the general population in the same country. Health professionals should pay more attention to the dental health care of patients with schizophrenia, actively encourage patients to regularly visit the dentist, and establish a formal collaboration with dentists to improve the dental health aspects of this disadvantaged patient group.

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Oral health status is poor and a frequently disregarded health issue among patients with schizophrenia.[1] Up to 50% of patients with schizophrenia never brush their teeth.[2] The use of dental services by patients with schizophrenia has been studied in only a few small surveys.[3–6] Data from 428 patients suggest less regular dental check-up visits in people with mental illness than in the background population.[1] Xerostomia (dry mouth) is a common side effect of psychotropic medication and can lead to bad breath, altered taste sensation, poor dental status, oral infections, and stigmatization.[7–9] Xerostomia might lead to excess intake of carbonated drinks, which further increases the risk of caries.[3] Up to 80% of patients with schizophrenia smoke, which also affects their dental status negatively.[10–12] Furthermore, poor oral health can increase the risk of infections, eg, endocarditis, that are potentially fatal.[13] All of these factors accentuate the need for regular dental care and treatment in patients with schizophrenia.

Using the Danish National Patient Registry, we investigated the use of dental services by patients with schizophrenia, with the aim of identifying predictors of poor dental care. Detection of variables describing a high-risk cohort for poor dental health could help the development of targeted education and intervention programs to improve the dental and overall health status of the frequently disadvantaged patients with schizophrenia.

METHOD

Sample

This historical, prospective study was given approval by the Danish Data Protection Agency, National Board of Health, and Statistics Denmark.

Data on use of dental services for the present study were obtained from the Danish National Health Insurance database, which includes data on all adult dental visits. The year 2006 was used to analyze the rate of patients visiting the dentist within 1 year. The years of 2004–2006 were used to identify patients visiting the dentist annually during a consecutive 3-year period.

Subjects for the analyses were identified by having an *International Classification of Diseases, Tenth Revision (ICD-10)* F20.0–F20.9 schizophrenia diagnosis in the Danish Psychiatric Central Research Register, which includes schizophrenia and all its subtypes.[14] Data from the Danish National Cause of Death Register were used to exclude patients if they died after 2004. For the year 2006, this yielded 21,417 subjects for analysis (female: 8,780 [41.0%], male: 12,637 [59.0%]). For the period of 2004–2006, this yielded 18,892 subjects (female: 7,722 [41.0%], male: 11,170 [59.1%]).

Legal status and substance misuse were identified from the Danish Psychiatric Central Research Register with the *ICD-10* codes Z04.61 and F1x.x, respectively. Age was divided into 3 groups: 18–29 years, 30–49 years, and 50 years or older, and odds ratios (ORs) were calculated with the 18- to 29-year-old age group as the comparator. Hebephrenic schizophrenia (*ICD-10* code F20.1) is associated with a poor

Table 1. Demographic Variables of the Patients With Schizophrenia

	2006 (n = 21,417)		2004–2006 (n = 18,892)	
Variable	Mean	95% CI	Mean	95% CI
Age at onset of schizophrenia, y	35.00	34.84–35.16	35.29	35.12–35.46
Actual age, y	42.53	42.35–42.71	41.70	41.52–41.89
Bed days per year	36.04	34.61–37.54	58.97	56.88–61.12
Outpatient contacts	10.69	10.47–10.92	20.75	20.27–21.25
Clozapine use (DDDs)	324.74	313.82–335.86	340.13	330.64–349.76
Anticholinergic use (DDDs)	86.46	83.46–89.51	117.94	115.13–120.78

Abbreviation: DDDs = defined daily dosages.

Table 2. Predictors for No Dentist Visits in 2006 Among Patients With Schizophrenia

Variable	n	%	OR	95% CI	*z*
Male sex	12,637	59.00	1.305	1.235–1.380	9.43
Age at onset of schizophrenia > 18 y	19,387	90.52	1.105	1.006–1.214	2.08
Age 18–29 y[a]	3,274	15.29	1.000	…	…
Age 30–49 y	10,940	51.08	0.826	0.763–0.893	−4.8
Age > 50 y	7,203	33.63	1.110	1.019–1.209	2.4
Living in capital (Copenhagen)	3,890	18.16	1.324	1.233–1.422	7.72
Early retirement pension	14,558	67.97	0.880	0.830–0.933	−4.25
Living in an institution	2,124	9.92	1.425	1.295–1.568	7.28
> 30 bed days in 2006	2,954	13.79	1.420	1.312–1.537	8.66
Outpatient contact minimum of once monthly	6,043	28.22	0.818	0.768–0.870	−6.36
Substance misuse	4,588	21.42	1.498	1.396–1.607	11.27
Legal status (sentenced to psychiatric treatment)	1,745	8.15	1.755	1.564–1.968	9.6
Clozapine use (> 250 DDDs yearly)	2,343	10.94	0.809	0.741–0.884	−4.68
Receiving atypical antipsychotics	11,678	54.53	0.714	0.675–0.754	−12.03
Living alone	17,928	83.71	1.099	1.019–1.184	2.45

[a]Reference group.
Abbreviation: DDDs = defined daily dosages.

prognosis and was tested against the rest of the subjects with an F20.x code.[15]

Prescription data were examined from January 1, 2004, through December 31, 2006, for all individuals. Clozapine was used as a variable due to its almost exclusive use in treatment-resistant patients. The prescription database does not contain information on antipsychotic dosage or treatment duration. Therefore, a working definition of clozapine treatment was created based on > 250 defined daily dosages (DDDs) per year. The World Health Organization (WHO) DDD for clozapine is 300 mg.[16] These data were corrected for hospitalizations because the prescription database contains data for outpatients only. Corrections were done by dividing the total yearly DDD by 365 days and multiplying the result by 365 minus the number of bed days. The number of outpatient contacts was corrected for bed days in a similar way. The type of antipsychotic was dichotomized into atypical or conventional antipsychotic according to the highest number of DDDs in 1 of the groups.

Anticholinergic medications can cause dry mouth, which increases the risk for dental complications. Receiving anticholinergic medication was defined as using more than 50 DDDs per year.

Table 3. Predictors for No Annual Dentist Visits During the Period 2004–2006 Among Patients With Schizophrenia

Variable	n	%	OR	95% CI	*z*
Male sex	11,170	59.13	1.188	1.112–1.269	5.12
Age 18–29 y[a]	3,103	16.42	1.000	…	…
Age 30–49 y	9,945	52.64	0.693	0.630–0.630	−7.55
Age > 50 y	5,844	30.93	0.865	0.779–0.960	−2.73
Living in capital (Copenhagen)	3,423	18.12	1.383	1.264–1.513	7.08
Living in an institution	1,887	9.99	1.609	1.431–1.810	7.93
> 30 bed days per year	838	4.44	1.916	1.552–2.365	6.05
Outpatient contact minimum of once monthly	2,319	12.28	0.801	0.728–0.882	−4.53
Substance misuse	3,949	20.90	1.823	1.663–1.999	12.77
Legal status (sentenced to psychiatric treatment)	1,506	7.97	2.524	2.124–3.000	10.51
Clozapine use (> 250 DDDs yearly)	1,340	7.09	0.707	0.626–0.798	−5.61
Receiving atypical antipsychotics	9,148	48.42	0.684	0.640–0.731	−11.14
Anticholinergic medication use (> 50 DDDs yearly)	3,393	17.96	0.877	0.806–0.954	−3.06

[a]Reference group.
Abbreviation: DDDs = defined daily dosages.

Statistical Analyses

Statistical analyses were performed with STATA 10 (StataCorp LP, College Station, Texas) at the Statistics Denmark server with remote access. The following variables were logarithmically transformed to achieve a normal distribution: age at illness onset, number of outpatient contacts, and age at time of the study. Clozapine DDDs and anticholinergic DDDs were square root transformed. Stepwise forward inclusion logistic regression was performed with a 10% significance level followed by a stepwise backward inclusion with a 5% significance level. Receiving no treatment from psychiatric hospitals at all or having a diagnosis of hebephrenic schizophrenia failed to show statistical significance, and, thus, these variables were not included in the multivariate logistic regression analyses. Living alone was included in the point incidence analysis only for the 2006 data because no statistical significance was found in the 2004–2006 data. Anticholinergic treatment was included in the period incidence analyses only for the 2004–2006 data due to nonsignificance in the 2006 data set.

RESULTS

Demographics are shown in Table 1. Only 43% (9,263/21,417) of patients with schizophrenia visited the dentist within 12 months in 2006. This is significantly lower than the annual dental visit rate of 68% (2,567,634/3,790,446) in the general Danish population (OR = 2.8; 95% CI, 2.7–2.9; $P < .0001$).[17] Moreover, only 31% of patients complied with a regular annual dental check-up visit during the examined 3-year period. Odds ratios for predictors of nonadherence to annual dental visits are shown in Tables 2 and 3. Substance

abuse, involuntary legal status, living in an institution, admission to a psychiatric facility for a minimum of 30 days, and male sex were the major risk factors for not visiting the dentist. By contrast, clozapine treatment, atypical antipsychotic treatment, at least monthly outpatient visits, and age > 50 years were associated with a lower risk for inappropriate dental care.

DISCUSSION

This is the first study investigating the use of dental services in a large population of patients with schizophrenia. The major finding is that only 43% visited the dentist within 12 months and less than one-third of the patients with schizophrenia went annually for dental check-up visits during the examined 3-year period. Our data indicate an even lower rate of compliance with annual dental check-up visits than found in a smaller survey in the United Kingdom, in which 53% of patients with schizophrenia went to the dentist within a 12-month period.[1] In our sample, the patients, especially male patients with substance misuse and involuntary legal status, were at high risk for not receiving routine dental care. Illness chronicity and acuity seem to be added risk factors, indicated by the fact that patients living in an institution and those admitted for a minimum of 30 days were less likely to visit the dentist. In other studies, long-term hospitalization and dominance of negative symptoms have been associated with poor dental status,[6,18,19] suggesting further that chronicity and lack of dental care during hospitalization might contribute to the poor dental health status of patients with schizophrenia. The association of inadequate dental health care with living in an institution and of having been admitted to a psychiatric facility for a minimum of 30 days indicates that dental care does not seem to be appropriately recognized, facilitated, and organized by inpatient mental health providers. By contrast, patients with regular outpatient health care contact were also more likely to adhere to annual dental check-ups.

Furthermore, even though clozapine is reserved for chronically ill and treatment-resistant patients, treatment with clozapine was associated with a lower risk of nonadherence to dental care. This might be due to a prescription bias, in that clozapine is less likely to be prescribed to less-compliant patients due to the need for regular blood monitoring for the potentially fatal hematologic side effects. However, we do not think the better adherence to dental care in clozapine-treated patients is due to an increased contact due to the mandatory blood monitoring because patients living at board and care facilities with health professionals around them at all times showed an increased risk for not having any dental visits. Although the generally greater illness severity and chronicity of patients prescribed clozapine could be associated with worse dental status, prompting a higher frequency of visits, the presence of hypersalivation rather than xerostomia very likely compensates for this. Alternatively, the better adherence to dental visits could also be due to clozapine's unique benefits on overall functioning in this severely ill patient group or perhaps because the providers focus more on somatic side effects and complications in patients treated with clozapine.[20,21] The latter was suggested as a reason for the also seemingly contradictory finding in a recent study that reported a lower all-cause mortality and cardiac death rate with clozapine compared to other antipsychotics, despite its known effects of worsening cardiometabolic risk factors.[22] In addition to clozapine, patients receiving atypical antipsychotics were also more likely to visit the dentist. However, it is unclear if this finding might be due to a prescription bias rather than to unique effects of atypical antipsychotics. Curiously, schizophrenia onset prior to age 18 years was associated with better adherence to regular dental care, despite the fact that early-onset schizophrenia has been shown to be associated with poorer outcome.[23]

In Denmark, all inhabitants receive financial support, and health insurance is free. Therefore, dental health care of schizophrenia patients may be even worse in countries with less access to and coverage of dental care. However, while the Danish National Health Insurance covers part of dental treatment, patients have to pay a portion of the expense. Patients receiving early retirement pension, and thereby receiving more money, were more likely to go to the dentist. This underscores the importance of financial support. Increasing the financial support for dental treatment for this disadvantaged patient group might increase the chances for routine dental care because patients with schizophrenia might not recognize the importance of this aspect of their health care. Another possibility that should be considered strongly is to offer dental services as a routine part of psychiatric inpatient care, which would benefit the most severely ill patients. A more formal collaboration between dentists and psychiatrists could also strengthen the confidence of dentists in treating patients with schizophrenia and encourage them to motivate these patients for regular check-up visits.[24]

Limitations of this study include the fact that information on psychopathology and illness severity and questionnaire data from the patients were not available. This might have offered substantial knowledge about attitudinal and system-based reasons why patients with schizophrenia did not regularly visit the dentist. Moreover, Bonferroni correction for multiple testing was also not done, due to the explorative nature of the study. Further studies on a patient-based level that also explore the effect of relevant interventions are needed to ensure adequate dental care for patients with schizophrenia.

In conclusion, patients with schizophrenia visit dentists much less frequently than the general population of the same country. Because patients with schizophrenia generally have a low awareness of their own health problems and an associated low motivation to improve their own health,[25,26] mental health professionals should pay attention to the adequacy of dental health care, actively encourage patients to regularly visit the dentist, and establish a formal collaboration with dentists to improve the dental health aspects of this disadvantaged patient group.

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Drug name: clozapine (Clozaril, FazaClo, and others).

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