Original Article

Oral health information from the dentist to the diabetologist

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Mohamed Ahdi [a,*], Wijnand J. Teeuw [b,1], Hedvig G.T.A. Meeuwissen [a,1], Joost B.L. Hoekstra [c], Victor E.A. Gerdes [a,d], Bruno G. Loos [b], Eelco W. Meesters [a]

[a] Department of Internal Medicine, Slotervaart Hospital, Amsterdam, The Netherlands
[b] Department of Periodontology, Academic Centre for Dentistry Amsterdam (ACTA), University of Amsterdam and VU University Amsterdam, The Netherlands
[c] Department of Internal Medicine, Academic Medical Centre, Amsterdam, The Netherlands
[d] Department of Vascular Medicine, Academic Medical Centre, Amsterdam, The Netherlands

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ABSTRACT

Background: Diabetes care includes annual evaluation of micro- and macrovascular complications, however, oral pathologies are not included. We studied retrieving oral health information, in particular periodontal disease, from the dentist and studied the association between the reported periodontal condition and variables of both diabetes and dental care.
Methods: During their annual comprehensive diabetes evaluation, patients were asked to deliver an oral health questionnaire (OHQ) to their dentist. Based on the returned OHQs, the process of retrieving oral health information from the dentist was analyzed. In addition, reported oral health measures with special emphasis to periodontitis, using a Periodontal Screening Index (PSI), were related to diabetes-related variables.
Results: We included 889 patients of whom 102 patients (11%) did not visit a dentist at all and 252 (28%) were edentulous. The response rate was <50% for oral information on patients with diabetes. For the second aim, OHQs of 207 patients could be further analyzed. A moderate to high PSI-score was found in 106 patients, of whom 65% were untreated for periodontitis. Furthermore high PSI-scores were associated with poor oral hygiene, soft tissue pathologies and periodontal treatment, but not significantly with glycemic control and presence of diabetes complications.
Conclusion: The transfer of information from the dentist to the diabetologist is far from optimal. An OHQ can be a valuable tool for the identification of patients with diabetes with poor oral health especially untreated periodontal disease, which is helpful for proper diabetes management.

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1. Introduction

Diabetes mellitus is a growing health problem with a prevalence of 9% worldwide [1]. The clinical complications of diabetes mellitus are well defined, and include retinopathy; nephropathy, cardiovascular disease, neuropathy and poor wound healing. Standard diabetes care includes annual evaluation of these complications [2,3].

For many years, studies on the association between diabetes and oral complications have in particular focused on periodontitis, as well as the effect of periodontal treatment on the level of glycemic control [4,5]. Periodontitis is considered to be a complication of diabetes mellitus [6,7] and therefore it has been suggested that dentists could help to screen for diabetes [8–11]. Periodontitis is a chronic multifactorial inflammatory

disease of the tooth supporting structures [10]. The prevalence of severe periodontitis of any global population ranges from 5% to 15% [11,12]. Clinically, patients suffer from loss of tooth attachment and alveolar bone leading to periodontal pockets, receding gums, loose teeth and eventually tooth exfoliation, resulting in bad breath, loss of masticatory function and consequently reduction in quality of life [10].

To date, there is no significant interaction between diabetologists and dental practitioners. Diabetologists (internists) are usually neither informed about the dental care visits of their patients, nor about the existence of oral pathologies. Patients with diabetes on the other hand, are often unaware of the possible negative effects of diabetes on oral health and vice versa [13,14]. Communication and/or collaboration between diabetes and dental care practitioners has been recognized as critical for providing optimal care for patients with diabetes [15]. A periodontal screening index (PSI) can be used by dentists for the evaluation of the periodontal condition and the determination of patients' periodontal treatment needs during routine dental check-ups [16].

In countries with adequate health care systems, it should be possible to incorporate the screening for periodontitis in an interdisciplinary approach for detection and treatment of diabetes-related oral complications. We questioned whether it is possible for the diabetologists to

obtain direct oral health information from the dentist to complete the health assessment on all potential diabetes complications. In the present study, we explored the utilization of dental care in a secondary care diabetes population and evaluated the process of retrieving oral health information from the dentist. Secondly, we evaluated whether the reported periodontal condition is associated with glycemic control, cardiovascular risk factors, other diabetes complications, and other reported measures of oral health.

2. Methods

2.1. Study population and setting

Consecutive patients with diabetes were recruited for this study during a period of 14 months (November 2008–January 2010). These patients visited the outpatient clinic of Slotervaart Hospital (Amsterdam, the Netherlands) for their annual comprehensive evaluation. Approval for the study was obtained from the local ethics committee.

The diabetes outpatient clinic serves a low- to middle-income population of about 140,000 inhabitants of which approximately 50% are ethnic minorities, most of them from Moroccan and Turkish descent. Approximately 1100 patients have three or four routine diabetes check-ups per year, depending on the number of referrals from primary to secondary care and vice versa, and have a comprehensive diabetes evaluation every year. However, for approximately 15% of the patients this examination is performed less frequently for several reasons (e.g. incompliance, intercurrent illness, logistical reasons).

2.2. Study procedures

Five clinicians performed the annual comprehensive diabetes evaluation during separate sessions every week. During this evaluation the medical history, current complaints, a thorough physical examination, laboratory results, microalbumin excretion, an electrocardiogram, and retinal photography are evaluated and registered in a standardized way using an electronic record form. Patients were asked by the clinician, whether they were visiting their dentist and if so, to ask their dentist to complete and return an oral health questionnaire (OHQ) (first round, Fig. 1). Patients not attending a dentist on regular base were advised to visit a dentist at least annually.

In February 2011, two investigators performed the second round, which was a comprehensive and systematic attempt to contact by telephone all patients of whom we did not receive the OHQ completed by the dentist. The second round was planned one year after the inclusion period to allow an equal opportunity for all patients to visit their dentist within a year after their annual diabetes evaluation. In this round, we also contacted patients who were (probably) missed during the first round. Patients who could not be reached after a second and third call were labeled as "no contact with patient". Finally, we contacted, with permission of the patient, the dentists to return the completed OHQ using a provided stamped return envelope. We documented the reason if either the patient or the dentist refused to participate (Fig. 1).

2.3. OHQ and PSI

We used a structured OHQ (Supplementary material) and asked dentists to give a summary on the patients' oral health status of the most recent dental check-up. Intra-oral health was evaluated by questions on oral hygiene, soft tissue problems, the number of teeth, the presence of a partial or full denture, the PSI, and whether the patient received any previous periodontal treatment.

A special emphasis was placed on periodontal disease. The used PSI is a modification of the "community periodontal index of treatment needs" (CPITN) and validated [16]. The PSI aims to screen for subjects with none or minor, moderate, and severe periodontal disease; the dentition is divided in sextants (Supplementary material). Per sextant, the

score can range from 0 to 5. Patients were assigned to a 'Low', 'Moderate' or 'High' PSI-category as follows: patients with all sextants having a PSI ≤ 2 were assigned to category 'Low', patients with at least one sextant with a PSI-score 3 but none of the sextants having a score 4 or 5, were allocated in category 'Moderate', and those with at least one score of PSI 4 or 5 were assigned to category 'High'.

2.4. Clinical data, measurements, and definitions

Demographics, diabetes type, duration, and complications, comorbidity, smoking status, body mass index (BMI), and use of medication were obtained from medical records. Glycemic control was classified as good (HbA1c < 53 mmol/mol), moderate (≥53 < 64 mmol/mol), or poor (≥64 mmol/mol). Hypertension was defined as systolic blood pressure ≥ 130 mm Hg and/or diastolic blood pressure ≥ 80 mm Hg, and/or the current use of antihypertensive medication. Obesity was defined as a BMI > 30 kg/m^2 and hyperlipidemia as total cholesterol ≥ 4.6 mmol/l and/or triglycerides ≥ 1.7 mmol/l, and/or current use of lipid-lowering medication.

Details on the measurement of blood pressure, the routine analysis of blood samples for fasting lipids, glucose, HbA1c, high-sensitivity C-reactive protein (hs-CRP), and (micro)albuminuria, and the clinical definitions for diabetes-related microvascular (nephropathy, retinopathy, and neuropathy) and macrovascular complications are described elsewhere [17].

2.5. Statistical analysis

A sample size of 900 patients was estimated based on the expected number of comprehensive diabetes evaluations in one year (as described above). An inclusion period of 14 (instead of 12) months was chosen to compensate for the decline in the number of scheduled evaluations during the summer months.

Categorical data were presented as absolute numbers with percentages, and because of a non-normal distribution (Kolmogorov–Smirnov test, $P < 0.05$), continuous variables were presented as medians with full or interquartile range (IQR). There was no predefined (primary) outcome measure, since the main objective was to evaluate the process of retrieving oral health information. However, special emphasis was given to the periodontal condition, based on the PSI reported by the dentist. Between groups comparisons were performed using the Pearson Chi-Square (χ^2) test for trend or the Kruskal–Wallis (K–W) test, depending on the type of data. All analyses were performed using SPSS 18.0 (SPSS Inc, Chicago, IL).

3. Results

A total of 889 eligible patients with diabetes entered the study (Fig. 1). Of these, 89% was clinically diagnosed with type 2 diabetes, 53% was male, and the median age was 62 (range 21–91) years. The median diabetes duration was 11 (range 0–75) years, the median HbA1c was 54 (48–64) mmol/mol, and 70% of the patients were treated with insulin. Fifty-eight percent of the 889 eligible patients had one or more microvascular complications and 28% suffered from macrovascular complications (data not shown). The question on participation in regular dental care revealed that 102 of 889 patients (11%) did not visit a dentist at all and that 252 of 889 patients (28%) were edentulous and had a total dental prosthesis (Fig. 1).

3.1. Retrieving oral health information from the dentist

During the inclusion period, 408 patients received the OHQs, 369 patients did not receive the OHQ (201 patients had a full prosthesis, 72 patients did not visit a dentist, 96 patients did not receive the OHQ for another reason), and for 112 patients it was uncertain (i.e. not registered by the internist) whether the OHQ was received (Fig. 1). From