Validation of Self-reported Periodontal Disease Status Among Subjects Seeking Dental Treatment in a Dental School

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ABSTRACT

Introduction: Periodontal disease and its relation with quality of life have made it necessary to know in detail regarding the disease. Hence, the aim of this study was to check the validity of self-reported periodontal status with clinical findings among subjects attending a dental teaching institution. Materials and Methods: A cross-sectional study was conducted on subjects with periodontitis attending a dental teaching institution. A questionnaire was developed after reviewing the relevant literature and participants were asked to complete the questionnaire. Information about signs and symptoms of periodontal disease was included, and subjects were examined for periodontal disease. Data were recorded and analyzed for sensitivity and specificity. Result: A total of 103 subjects answered the study questionnaire and underwent clinical examination. The sensitivity of question varied from 16.6% with need of periodontal or gum treatment to 57.1% in case of gingival swelling. In many questions, more than 90% of specificity was found. There was a difference in self-assessed periodontal status with clinically examined periodontal status. Conclusion: Self-assessed questionnaires were of low value in evaluating oral periodontal disease status. Periodontal perception of subjects was higher but does not reflect with clinical findings; this calls for educational programs to be conducted to improve knowledge and awareness about periodontal diseases.

KEYWORDS: Gum diseases, periodontal disease, periodontitis, self-assessment, validity of questionnaire

INTRODUCTION

Periodontal disease is one among the reasons for tooth loss.[1] Periodontitis is a chronic disease that slowly progresses from simple gingivitis to more severe irreversible pathological conditions. Usually it is associated with poor oral hygiene practices. Gingivitis can be seen as inflammation of gingival tissue and accumulation of dental plaque, whereas in case of plaque-induced periodontal disease, there will be loss of connective tissue and alveolar bone.[2] It also affects periodontal ligament and cementum, and is common in older age groups.[3]

The risk factors for periodontitis are dental plaque, smoking, and psychosocial conditions such as stress and impaired coping. The clinical symptoms that are evident in periodontal disease include gingival inflammation and the destruction of tooth-supporting tissues, which often have impact on daily quality of life.[4]

The clinical parameters to assess the severity of periodontitis are bleeding on probing, pocket depth, clinical attachment loss, and recession.[5] Periodontal diseases can be prevented if individuals are aware of

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the disease and symptoms, will get motivated and take appropriate steps, and adopt the appropriate behavior.

Comparing self-perceived assessment with clinical examination of individuals will help us to know their knowledge and awareness about disease and can act as a tool to educate the subjects. Self-reported questionnaire can be of use in this regard. But, studies evaluating self-reported measures for periodontal diseases have shown poor validity with inconsistent results.⁶⁻⁷ Hence, the purpose of this study was to check the validity of self-reported periodontal status among subjects attending a dental teaching institution at Prince Sattam Bin Abdulaziz University, Al Kharj, Saudi Arabia.

**Materials and Methods**

A cross-sectional study was conducted on 103 subjects who attended to take dental treatment at dental university, Saudi Arabia.

Ethical clearance was obtained from the institution review board. Study subjects were assured about the anonymity of the information collected. On the basis of a systemic review on validation of self-reported periodontal disease, a questionnaire was designed.⁸

The questions were written in English and then were translated into Arabic using a backward-forward translation method by two bilingual periodontists. Questionnaire consisted of eight questions with “yes/no” option [Table 1]. These questions were related to self-reported symptoms, diagnosis or treatment, smoking status, signs, and experience of periodontal treatment. The reliability of the questionnaire was measured using test–retest method. The research team consisted of two periodontists who are calibrated about periodontal examination methods. Before periodontal examination, the study participants were asked to complete a self-reported questionnaire.

**Periodontal examination**

After completion of self-reported periodontal questionnaire, all study participants were examined by two periodontists. The examiners who performed the periodontal examination were blinded to the responses of participants on the self-reported questionnaire. Periodontal examination was undertaken, with three teeth in each jaw using community periodontal index, gingival recession (GR), and probing depth (PD). The percentage of sites meeting the severity criteria for periodontal pocket depth and clinical attachment loss was calculated and recorded in the pro forma. Subjects on medication were excluded. Data were computed by summing the GR and PD measurements, and based on this subjects were categorized as disease present or absent.

**Statistical analysis**

All data were analyzed at 95% confidence interval, and categorical data were presented as percentages. Sensitivity and specificity were assessed for all periodontal symptoms. Results were analyzed using IBM SPSS Statistics for Windows, version 23 (IBM Corp., Armonk, NY, USA).

**Results**

A total of 103 subjects were included in the study, where all the subjects completed their questionnaires and underwent clinical examination.

Table 1 shows the questionnaire used for the study, which consists of eight questions.

Table 2 shows age- and gender-wise distribution of study participants. There were 77 male subjects and 26 female subjects. The age range varied between 18 and 55 years.

Table 3 shows self-reported versus clinically observed periodontal disease status among study subjects. The sensitivity of bleeding gum among subjects was 35.29% and the specificity was 66.66%. Maximum percentage of sensitivity was found with gingival swelling (57.14) and 100% specificity was found for gum disease. Least percentage of sensitivity was found with need of gum or periodontal treatment 16.66%, and least percentage of specificity was found with bleeding from gums. Teeth mobility and recession had a sensitivity of 44.44% and 34.78%, respectively.

| Table 1: Self-assessment questionnaire used in the study |
|----------|-------------------------------------------------------------|
| Sl no.   | Questions                                                    |
| 1        | Do you have gum bleeding?                                   |
| 2        | Do you think that you have gingival swelling?               |
| 3        | Do you have mobility in your teeth?                         |
| 4        | Do you think that you have gum disease?                     |
| 5        | Have you ever told by dentist/dental hygienist that you have gum disease? |
| 6        | Do you have gingival recession?                             |
| 7        | Are you a current or past smoker?                           |
| 8        | Have you ever had periodontal surgery?                      |

| Table 2: Distribution of study subjects according to age group |
|-----------------|-----------------|-----------------|
| Age (years)     | Males (%)       | Females (%)     |
| 18–24           | 27 (35.06)      | 8 (30.7)        |
| 25–34           | 25 (32.46)      | 14 (53.84)      |
| 35–44           | 18 (23.37)      | 2 (7.69)        |
| 45–55           | 7 (25.92)       | 2 (7.69)        |
| Total           | 77 (74.57)      | 26 (25.25)      |
Table 3: Self-reported versus clinically observed periodontal disease status among study subjects

| Self-reporting | Clinical observation | Total (%) | Sensitivity (%) | Specificity (%) |
|----------------|----------------------|-----------|----------------|-----------------|
|                | Present |Absent |            |                |
| Bleeding from gums | Yes | 06 | 36 (34.95) | 35.29 | 66.66 |
|                  | No | 12 | 67 (65.04) | 57.14 | 95.50 |
| Gingival swelling | Yes | 04 | 12 (11.65) | 44.44 | 98.68 |
|                  | No | 85 | 91 (88.34) | 90 (87.37) | 100.0 |
| Teeth mobility   | Yes | 01 | 13 (12.62) | 20.28 | 97.67 |
|                  | No | 75 | 90 (87.37) | 92 (89.32) | 97.5 |
| Gum disease      | Yes | 00 | 14 (13.59) | 16.66 | 97.67 |
|                  | No | 34 | 89 (86.40) | 92 (89.32) | 97.5 |
| Periodontal or gum treatment | Yes | 01 | 11 (10.67) | 16.66 | 97.67 |
|                  | No | 42 | 92 (89.32) | 92 (89.32) | 97.5 |
| Recession        | Yes | 02 | 10 (9.70) | 34.78 | 97.5 |
|                  | No | 78 | 93 (90.29) | 97.5 |

Table 4: Percentages of self-assessed and clinically diagnosed periodontal disease status

|                  | Self-assessed (%) | Clinically diagnosed (%) |
|------------------|-------------------|--------------------------|
| Bleeding from gums | 34.95 | 82.52 |
| Gingival swelling  | 11.65 | 90.29 |
| Teeth mobility     | 12.62 | 14.56 |
| Gum disease        | 13.59 | 66.99 |
| Periodontal or gum treatment | 10.67 | 58.25 |
| Recession          | 9.70  | 14.56 |

Table 4 shows the correlation of self-assessed and clinically evident periodontal disease levels among study subjects. There was a major discrepancy among many symptoms except teeth wobbling and recession, which indicates self-assessment was a poor indicator of disease status.

**Discussion**

There are various methods to measure and estimate the severity of periodontal disease levels such as clinical examination and radiographic interpretation; however, these are not applicable when population is large and also they require more resources in terms of manpower, money, and material.

Many studies are conducted to evaluate self-reported items about periodontal disease with a fair level of predicting accuracy.\(^9\)\(^-\)\(^12\) Epidemiological studies have shown that self-perceived oral health acts as a useful indicator of oral health status.\(^13\) Hence, this study was conducted to evaluate the association of self-perceived periodontal disease levels with clinically determined periodontal status. More than 50% of the study subjects’ periodontal disease status was poor.

Sensitivity and specificity are terms used to evaluate a clinical test. They are independent of the population of interest subjected to the test. A total of 103 dental subjects were subjected to a self-administered questionnaire followed by a periodontal examination to assess their periodontal status.

In this study, subjects’ perception about bleeding from gums was 34.95% compared to 82.52% when examined clinically. This showed low sensitivity but moderate specificity. Bleeding from gums was unknown to many subjects. This could be due to a periodontal probing by the expert who could easily identify the difference. This was similar to the studies conducted by Tervonen and Knuuttila\(^14\) and Kallio et al.,\(^15\) where bleeding from gums was poorly perceived by the subjects. But, this was in contrast to the studies of Gilbert and Nuttall\(^16\) and Buhlin et al.,\(^17\) who showed that self-reported bleeding from gums had a good validity.

This study showed 57.14% sensitivity for self-assessed swelling of gums, which is in contrast to study of Gilbert and Nuttall\(^16\) and Nagarajan and Pushpanjali\(^18\) who showed low sensitivity. This study was also in contrast with the others as most subjects could identify swollen gums. Pitiphat et al.,\(^19\) reported a low level of sensitivity to GR, which was similar to the results of this study. Self-assessed loose teeth showed good sensitivity in this study, which was in agreement to Gilbert and Nuttall\(^16\) and Glavind and Attström studies.\(^20\)

In this study, there was a difference of what subjects assume and what is clinically evident in relation to periodontal disease status. This calls for a necessity to educate subjects about symptoms of periodontal disease, so that early interventions can be undertaken by them before deterioration of periodontal tissues.

**Conclusion**

This study showed not all self-rated questions for periodontal disease status were reliable. They do have
an inherent individual awareness and perception, and self-assessment varies greatly. In this study, there was a clear difference between self-assessments of periodontal disease with professional clinical assessment. Hence, educating subjects regarding symptoms of periodontal disease is paramount importance.

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Conflicts of interest
There are no conflicts of interest.

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