Original Article

Validity of a Self-reported Questionnaires for Periodontitis in a Kurdish Population of Sulaimani City/Iraq

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Abstract

Objective: Full-mouth clinical periodontal evaluations in large surveys may not be practicable. Therefore, the questionnaire can be used to reduce cost and time. Therefore, this study aimed to evaluate two previously used questionnaires to determine periodontitis and compare them in the Kurdish population.

Methods: The two different questionnaires used were previously examined in different populations. Full mouth periodontal examination of bleeding on probing, pocket depth, clinical attachment loss, furcation involvement, and recession were recorded. The case definition of periodontitis is based on the 2017 classification. The receiver operating characteristic curve, area under the curve (AUC), and logistic regression were used to examine the validity of each questionnaire.

Results: Self-reported questionnaires had a useful discriminative capability for detecting periodontitis patients. In questionnaire1, (Q1) has the uppermost true positive result (79.2%), and the strongest crude associations were seen for Q3 (17.72) and 4 (10.9). Whereas, in questionnaire 2, the most frequent positive response was to the Q12 (77.2%), and the strongest crude associations were detected for the Q2 (13.76%) and Q6 (20.78%). The combinations of questions revealed increasing the AUC.

Conclusions: The use of several self-reported questions revealed a good performance for screening periodontitis in the Kurdish population, especially those related to patient awareness about periodontal disease, bleeding of the gum, treatment, and diagnosis that had been carried out for patients previously by a dentist.

Keywords: *Periodontitis, Questionnaire, Self-reported, Sensitivity, Specificity.*

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Introduction

Periodontal diseases (PDs) are inflammatory diseases that affect the soft and hard tissues supporting teeth. Despite the fact that PDs can be prevented, they are the primary cause of poor oral health worldwide and tooth loss in older adults[1]. Severe periodontitis globally affected 734 million individuals (10.8%) in 2010, making it the sixth most common disease[2].

As long as a large number of affected individuals and a high disease burden, periodontitis must be monitored at various levels in the population over time in order to assess the development and use of preventative or therapeutic strategies to control and prevent the progression of this disease. Clinical examination is currently the standard and preferred approach for periodontitis surveillance as a gold standard[3]. Instead, it has proven to be a significant challenge for dentists and epidemiologists[2]. To start with, patients who have periodontal pathogens do not automatically develop periodontal disease; a susceptible host is also required for disease progression[4]. The determining elements for the onset and progression of PDs have been identified based on recent studies, systematic reviews, and consensus conferences focusing on individual results from previous years. Various classification systems have been developed to describe the clinical manifestations of periodontitis, which differ in case definitions and severity scale[5]. Furthermore, their implementation necessitates a large number of resources and is typically costly, time-consuming, and necessitates the use of specialized professionals[6]. Therefore, it will be difficult to implement the surveillance system in many countries, regions, and at various levels of the population[7].

The self-reported measures of PDs were applied before; PDs self-report items have been widely created for research and monitoring purposes[8,3], most of which have been clinically validated across varying and different populations[9-11].

The existence and use of a valid, low-cost, and low-resources self-reported PDs measure would be beneficial in various ways. For example, since 2003, the Centers for Disease Control and Prevention (CDC) and the American Academy of Periodontology have recommended using self-reported questionnaires as an alternative to clinical examination to evaluate the prevalence of periodontitis [12]. In addition, several self-reported oral health questionnaires have previously been suggested as an alternative to clinical PDs measurements[13]. However, even though many of the recently produced self-reported questionnaires have shown some validity[14], the unavailability of large samples from various areas and the clinical validity of individuals or a combination of these questionnaires are unequal and dependent on demographic variables[11].

The validity of self-reported questionnaires differs between studies, populations, and outcomes. For example, Slade et al.[15] found that a six-item questionnaire paired with recognized risk factors for PDs had 58% sensitivity and 81% specificity in predicting moderate/severe periodontitis in 2999 Australians above 15 years. Additionally, Eke et al.[8] evaluated the predictive efficacy of eight self-reported items versus clinically categorized periodontitis in the American population. The best performance in predicting periodontitis was the combination of demographic measures and responses to five self-reported questions with 85% sensitivity and 58% specificity.

This study aimed to evaluate the diagnostic performances of self-reported oral health questionnaires to develop a diagnostic model with additional risk factors to determine periodontitis in adults among Kurdish people in Sulaimani city in Kurdistan regional government/Iraq.

Patients and methods

A prospective diagnostic study was conducted on the adult of both sexes, male and female, with an average age of (20-60)years in Sulymania city/ Kurdistan region of Iraq. Data were collected from patients who attended the Dental Hospital from the University of Sulaimani, College of Dentistry, and Shorsh Dental center between November 2021- June 2022. The Ethics Committee approved the study of the College of Dentistry / University of Sulaimani (Ethical approval number: 501).

A Kurdish version of two self-reported questionnaires from Eke et al.[8] and Saka et al.[14] was used. The English version was translated into Kurdish by one native Kurdish-speaking certified translator and two other native-speaking Kurdish specialists in dentistry. The first self-reported questionnaire was a 16-items questionnaire and the second one was 20 items questionnaire.

Inclusion criteria were: a systemically healthy Kurdish adult (20-60 years old) who could understand and respond to a self-reported questionnaire and signed the informed consent to contribute to the study. Exclusion criteria were edentulous adults with <20 teeth and those with complete rehabilitation with osseointegrated implants, pregnant patients who use drugs that induce

gingival enlargement, patients with orthodontics appliances, and patients with prosthodontics appliances.

Participants were provided with two different self-reported questionnaires on the scheduled visit before the periodontal examination. First, it was a self-reading and self-answered questionnaire. Then, a calibrated dentist performed a full-mouth periodontal examination. The dentist was blind to participants' answers to the self-reported questionnaire, and participants were blinded to the results of the periodontal examination.

Periodontal examination was recorded with a William probe (Figure1). Each tooth was divided into six surfaces (mesio buccal, mid buccal, disto buccal, mesio lingual, mid lingual, disto lingual) for the full assessment. The Bleeding index was recorded as 0 if there was no bleeding and one if there was bleeding[16]. The Graduated William probe was used for periodontal pocket depth (PPD), clinical attachment loss (CAL), and gingival recession. The PPD was measured from the gingival margin to the base of the sulcus; CAL was measured from the cementoenamel junction to the base of the sulcus, and recession was measured from the cementoenamel junction to the gingival margin. Miller Classification (Class 1: < 1 mm (Horizontal), Class 2: >1 mm (Horizontal), Class 3: > 1 mm (Horizontal vertical mobility) was used for mobility[17].

Case definitions of periodontitis were according to the classification of 2017, and the severity was mild, moderate, or severe.

The severity of periodontitis regarding the classification of 2017 is primarily based on interdental CAL at the site of greatest loss and is classified in: stage I (initial periodontitis) with CAL 1 to 2 mm; stage II (moderate periodontitis) with CAL 3 to 4 mm; stage III (severe periodontitis) with CAL ≥5 mm and stage IV (advanced periodontitis) with CAL ≥8 mm[18].

All case diagnoses were performed by a single examiner who assessed all subjects. Agreement on the case definition of subjects with unclear status was reached by discussion between the examiner and the reference examiner.

Statistical analysis

Demographic characteristics were described according to their distribution in frequency and percentage. Associations between each question and the clinical definitions of periodontitis were carried out through the chi-square test and crude odds ratio (OR). Logistic regression models were used to estimate the most significant set of self-reported questions related to periodontitis. ROC curve analyses were used to examine the discriminatory capability (sensitivity and specificity) of the questions with their area under the curve (AUC) to estimate their validity and discriminative capability. Estimates were reported with 95% confidence intervals, a P-value < 0.05 was considered statistically significant, and all calculations were conducted using the SPSS software package (version 28; SPSS Inc., Chicago, IL, USA).

Figure 1(A and B): Full mouth examination using periodontal William probe.

Results

Participants' characteristics

A total of 350 adults (43.1% female and 56.9% male) aged between 20-60 years were involved in the study. The sociodemographic and relevant characteristics of the participants are shown in Table 1. According to the clinical classifications for periodontal disease, the incidence of periodontitis in the examined sample was 230 patients and 60 healthy and 60 gingivitis patients.

Self-reported periodontal disease questionnaire for periodontitis

The item response rate for all questions was 100%. The most frequent positive response in questionnaire one was questioned Q5 (79.2%). However, 189 participants of the 228 with a positive response had periodontitis (82.2%) (Table 2). Almost all of the self-reported questions from the questionnaire were significantly associated with periodontitis. The strongest crude associations were seen for Q3 and 4 (Table 2).

For questionnaire 2, the most frequent positive response was to the Q12 (77.2%), although 187 participants, from the 223 who had a positive response, had periodontitis (81.3%). The strongest crude associations were seen for Q2 (13.76%) and Q6 (20.78%), as shown in Table 2.

Table 1: Demographic characteristics and prevalence of healthy, gingivitis, and periodontitis according to the clinical examination for questionnaires 1and 2.

Variables	Frequencies N=350 (%)	Diagnosis status		
		Healthy n=60	Gingivitis n=60	Periodontitis n=230
Age				
20-30	124 (35.4)	46	42	36
30-40	59 (16.9)	8	17	34
40-50	68 (19.4)	6	1	61
50-60	99 (28.3)	0	0	99
Sex				
Male	199 (56.9)	39	31	129
Female	151 (43.1)	21	29	101
Education status				
Without	29 (8.3)	0	1	28
Basic	47 (13.4)	0	0	47
High school	71 (20.3)	3	3	65
College	203 (58)	57	56	90
Diet				
Healthy	56 (16)	13	10	33
Regular	253 (72.3)	32	38	183
Unhealthy	41 (11.7)	15	12	14
Diabetes	54 (15.4)			
Yes	296 (84.6)	0	2	52
No		60	58	178
Monthly Income				
Low	84 (24)	1	5	78
Middle	233 (66.6)	55	48	130
High	33 (9.4)	4	7	22
Smoking status				
Current smoker	66 (18.1)	7	9	47
Ex-smoker	43 (12.4)	3	5	35
Never-smoke	242 (69.5)	48	46	148

Table 2: Frequency of positive responses to the self-reported questions and crude association to periodontitis in the clinical examination (Questionnaire 1 and 2).

Self-reported questions	Response (Yes) no (%)	True positive no (%)	Odd Ratio (95% CI)	P-value
Questionnaire 1				
Q1) Do you think you might have gum disease?	127 (43.8)	119 (51.7)	6.97 (3.17–15.32)	<0.001
Q2) Have you lost teeth in recent years because of mobility?	65 (22.4)	61 (26.5)	5.05 (1.76 – 14.52)	0.001
Q3) Overall, how would you rate the health of your teeth and gum?	114 (39.3)	111 (48.3)	17.72 (5.40 - 58.22)	<0.001
Q4) Have you ever had any teeth become loose on their own, without any injury?	67 (23.8)	65 (28.8)	10.90 (2.58 – 46.03)	<0.001
Q5) Have you ever had a treatment for periodontal disease, such as scaling and root planning, sometimes called (deep) cleaning?	228 (79.2)	189 (82.2)	2.25 (1.18 – 4.28)	0.012
Q6) Have you ever been told by a dental professional that you lost bone around your teeth?	66 (23.5)	66 (29.7)	$	<0.001
Q7) During the past three months have you noticed a tooth that doesn't look right?	113 (40.4)	97 (43.3)	1.91 (1.01 – 3.61)	0.044
Q8) In the last 7 days did you use floss or any other interdental aids?	156 (58.6)	109 (52.9)	0.31 (0.16 -0.61)	<0.001
Q9) Did you use mouthwash that use to treat dental problems?	73 (32)	48 (28.6)	0.56 (0.30 – 1.03)	0.062
Questionnaire 2				
Q1) Have you lost teeth in recent years because of mobility?	59 (20.3)	57 (24.8)	9.56 (2.26 – 40.37)	<0.001
Q2) Do you have a gum disease?	118 (40.7)	114 (49.6)	13.76 (4.83 – 39.19)	<0.001
Q3) Have you been diagnosed by professional with periodontal disease?	97 (33.4)	92 (40)	7.33 (2.83 – 19.01)	<0.001
Q4) Do you think you have a gum disease?	134 (46.2)	128 (55.7)	11.29 (4.67 – 27.30)	<0.001
Q5) In the years have you noticed that some of your teeth move or are looser than normal?	77 (26.6)	73 (31.7)	6.51 (2.27 – 18.63)	<0.001
Q6) Have you ever have been told by the dental professional that you have a bone loss or that you have a deep pocket?	98 (33.8)	96 (41.7)	20.78 (4.95 – 87.14)	<0.001
Q7) In the last years have you noticed that your teeth are longer or that have a receding gum?	107 (36.9)	107 (46.5)	$	<0.001
Q8) In the last years have you notice that you see several roots of teeth?	99 (34.1)	99 (43)	$	<0.001
Q9) Have you felt pain in your gum during the last month?	118 (40.7)	112 48.7)	8.54 (3.54 – 20.64)	<0.001
Q10) Do you use a stick or interdental brush to clean your teeth?	137 (47.2)	109 (47.4)	1.03 (0.58 – 1.82)	0.92
Q11) Have you ever visited a specialist to treat a gum disease?	105 (36.2)	92 (40)	2.41 (1.24 – 4.70)	0.009
Q12) Have you ever had a treatment such as scaling or root planing?	223 (77.2)	187 (81.3)	2.78 (1.50 – 5.16)	0.001
Q13) Do your gum usually bleed when you chewing or brushing?	127 (43.8)	125 (54.3)	34.52 (8.24 – 144.73)	<0.001

Note:$ Odd ratio was not computable, all observation responses to the question were (No).

Performance of the self-reported questionnaires on periodontal disease for periodontitis

For the clinical classifications for periodontitis with the use of questionnaire 1, the questions with the higher sensitivity are Q5 (82.2%) (P < 0.001), and the question with the highest specificity is Q6 (100%). (P =<0.001) (Table 3).

For questionnaire 2, the questions with higher sensitivity are Q12) (81.3%) (P 0.001), and the questions with the highest specificity are Q 7 and 8 (both 100%) (P <0.001). The AUCs for questionnaire 1 showed the highest AUC for Q1, whereas the lowest AUCs are Q 8 and 9. The highest AUCs are Q 13 and Q7, and the lowest AUCs are Q 10 and Q11 in questionnaire 2 (Figure 2 and Table 3).

For questionnaire 1, from the 9-item questions, two questions (Q1 and Q8) are significantly associated with periodontitis with OR of 5.047 and 0.313, respectively. In questionnaire two, Q6, Q9, and Q13 are significantly associated with periodontitis with OR of 12.764, 5.095, and 26.59, respectively (Table 4). Furthermore, the combinations of questions were evaluated in both questionnaires (Table 5). It was apparent that combinations of Q1, Q4, and Q6 showed robustness in increasing the AUC in questionnaire 1. While Q6, Q9, and Q13 on one hand and Q6, Q7, and Q13 showed robustness in the rise of AUC (Table 5).

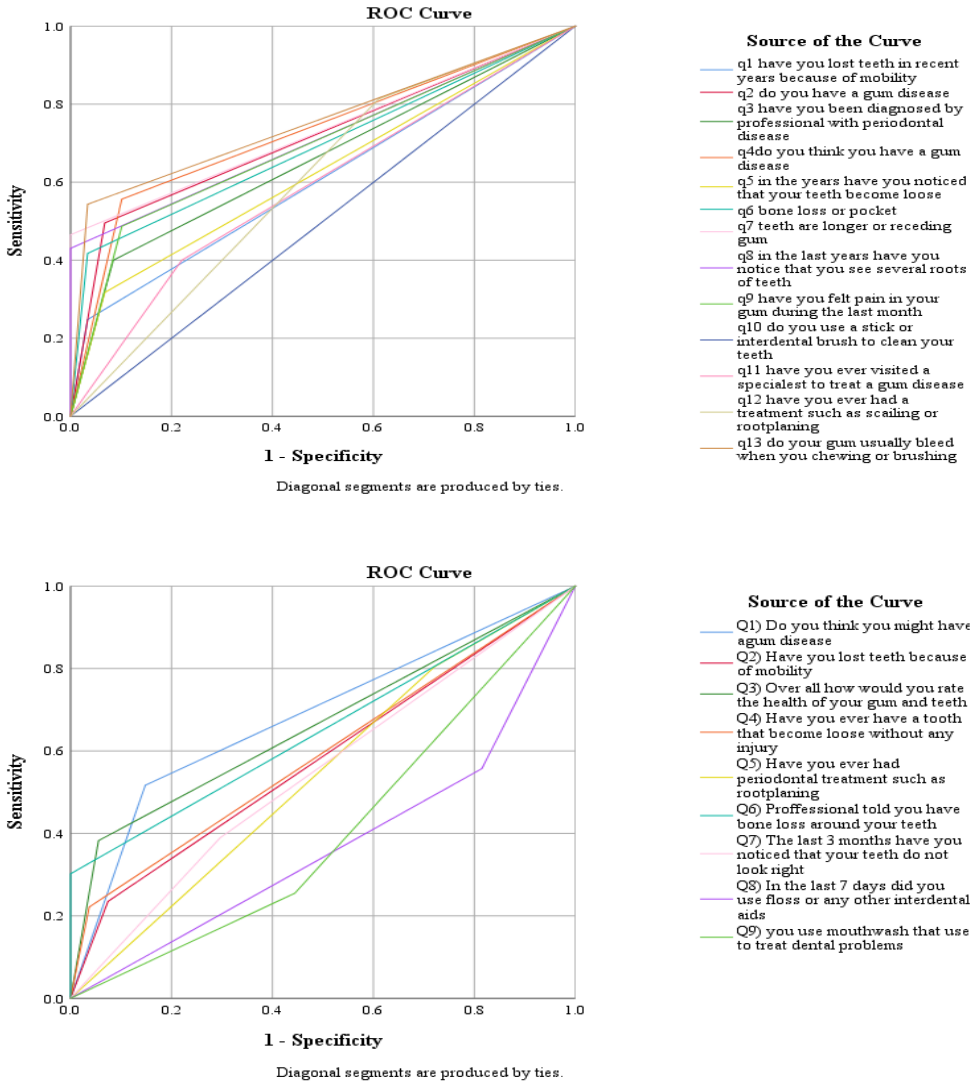

Figure 2: (A) ROC curve for questionnaire 1 and (B) ROC curve for questionnaire 2.

Table 3: Sensitivity, specificity, positive and negative predictive values of self-reported questionnaire according to the clinical examination (Questionnaire 1 and 2).

Self-reported questions	Sensitivity (%)	Specificity (%)	Positive Predictive values %	Negative Predictive values %	Area under the ROC curve
Questionnaire 1					
Q1) Do you think you might have gum disease?	51.7	86.7	93.7	31.9	0.684
Q2) Have you lost teeth in recent years because of mobility?	26.5	93.3	93.8	24.9	0.580
Q3) Overall, how would you rate the health of your teeth and gum?	48.3	95	97.4	32.4	0.663
Q4) Have you ever had any teeth become loose on their own, without any injury?	28.8	96.4	97	25.1	0.592
Q5) Have you ever had a treatment for periodontal disease, such as scaling and root planning, sometimes called (deep) cleaning?	82.2	32.8	82.9	31.7	0.542
Q6) Have you ever been told by a dental professional that you lost bone around your teeth?	29.7	100	100	27.4	0.651
Q7) During the past three months have you noticed a tooth that doesn't look right?	43.3	71.4	85.8	24	0.546
Q8) In the last 7 days did you use floss or any other interdental aids?	52.9	21.7	69.9	11.8	0.371
Q9) Did you use mouthwash that use to treat dental problems?	28.6	58.3	65.8	22.6	0.405
Questionnaire 2					
Q1) Have you lost teeth in recent years because of mobility?	24.8	96.7	96.6	25.1	0.607
Q2) Do you have a gum disease?	49.6	93.3	96.6	32.6	0.714
Q3) Have you been diagnosed by professional with periodontal disease?	40	91.7	94.8	28.5	0.658
Q4) Do you think you have a gum disease?	55.7	90	95.5	34.6	0.727

Q5) In the years have you noticed that some of your teeth move or are looser than normal?	31.7	93.3	94.8	26.3	0.625
Q6) Have you ever have been told by the dental professional that you have a bone loss or that you have a deep pocket?	41.7	96.7	98	30.2	0.692
Q7) In the last years have you noticed that your teeth are longer or that have a receding gum?	46.5	100	100	32.8	0.733
Q8) In the last years have you notice that you see several roots of teeth?	43	100	100	31.4	0.715
Q9) Have you felt pain in your gum during the last month?	48.7	90	94.9	31.4	0.693
Q10) Do you use a stick or interdental brush to clean your teeth?	47.4	53.3	79.6	20.9	0.500
Q11) Have you ever visited a specialist to treat a gum disease?	40	78.3	87.6	25.4	0.590
Q12) Have you ever had a treatment such as scaling or root planing?	81.3	39	83.9	34.8	0.601
Q13) Do your gum usually bleed when you chewing or brushing?	54.3	96.7	98.4	35.6	0.755

Table 4: Logistic of regression model to estimate the significant set of self-reported questions associated with periodontitis (questionnaire 1 and 2).

Self-reported questions Questionnaire 1	Beta	P-value	Odd Ratio	95% CI
Constant	1.188	0.002	3.282	
Q1) Do you think you might have gum disease?	1.619	0.001	5.047	2.016 - 12.639
Q4) Have you ever had any teeth become loose on their own, without any injury?	1.360	0.109	3.895	0.738 - 20.555
Q6) Have you ever been told by a dental professional that you lost bone around your teeth?	19.847	0.997	416254104.037	0.000 - .
Q8) In the last 7 days did you use floss or any other interdental aids?	-1.161	0.008	0.313	0.133 - 0.735
Q9) Did you use mouthwash that use to treat dental problems?	-.717	0.074	0.488	0.223 - 1.071
Questionnaire 2				
Constant	**Beta**	**P-value**	**Odd Ratio**	**95% CI**
Q6) Have you ever have been told by the dental professional that you have a bone loss or that you have a deep pocket?	-1.220	0.003	0.295	
Q7) In the last years have you noticed that your teeth are longer or that have a receding gum?	-2.547	0.002	12.764	2.618-62.221
Q8) In the last years have you notice that you see several roots of teeth?	-18.669	0.995	>1000	0.000 - 0.
Q9) Have you felt pain in your gum during the last month?	-18.091	0.995	>1000	0.000 - 0.
Q12) Have you ever had a treatment such as scaling or root planing?	-1.628	0.003	5.095	1.750– 14.832
Q13) Do your gum usually bleed when you chewing or brushing?	-.744	0.1	2.105	0.868 – 5.103
	-3.281	0.000	26.590	5.927 – 119.279

Table 5: Sensitivity, specificity, positive and negative predictive values, and odds ratio for the most significant questions related to periodontitis.

Self-reported questions	Response Yes no (%)	Sensitivity (%)	Specificity (%)	Positive Predictive values %	Negative Predictive values %	P-value	The area under the ROC curve	Crude OR (95%)
Questionnaire 1								
Q1 OR Q9	168 (65.4)	70.6	51.7	82.7	34.8	0.002	0.590 (0.503-0.678)	0.39 (0.22-0.71)
Q8 OR Q9	172 (69.6)	66.3	20	72.1	16	0.045	0.409 (0.327-0.491)	2.03 (1.01-4.10)
Q1 OR Q4	148 (52.1)	60.5	82.1	93.2	33.8	<0.001	0.721 (0.647-0.795)	0.142 (0.07-0.30)
Q1 OR Q6	142 (49.1)	58.3	86.4	94.4	34.7	<0.001	0.739 (0.668-0.810)	0.11 (0.05-0.25)
Q4 OR Q6	108 (39)	48	96.4	98.1	32	<0.001	0.710 (0.642-0.778)	0.04 (0.01-0.17)
Q1 OR Q4 OR Q6	162 (57)	66.7	82.1	93.8	37.7	<0.001	0.748 (0.676-0.820)	0.11 (0.05-0.23)
Questionnaire 2								
Q6 or Q9	162 (55.9)	67	86.7	95.1	40.6	<0.001	0.767(0.703-0.831)	0.08 (0.03-0.17
Q6 or Q12	238 (82)	87.8	39	84.9	45.1	<0.001	0.634(0.548-0.720)	0.22 (0.11-0.42)
Q6 or Q13	168 (57.9)	71.3	93.3	97.6	45.9	<0.0.03	0.823(0.769-0.876)	0.03 (0.01-0.08)
Q7 or Q8	120 (41.4)	52.2	100	100	35.3	<0.001	0.761(0.706-0.815)	$
Q9 or Q13	172 (59.3)	73.9	96.7	98.8	49.2	<0.001	0.853(0.806-0.899)	0.01 (0.003-0.05)
Q12 or Q13	240 (83)	87.8	35.6	84.2	42.9	<0.001	0.617(0.531-0.703)	0.25 (0.13-0.49)
Q6 or Q9 or Q13	200 (69)	82.6	83.3	95	55.6	<0.001	0.828(0.766-0.890)	0.04 (0.02-0.09)
Q9 or Q12 or Q13	253 (87)	91.7	28.8	83.4	47.2	<0.001	0.603(0.516-0.690)	0.22 (0.11-0.46)
Q6 or Q7 or Q13	189 (65.2)	80.4	93.3	97.9	55.4	<0.001	0.868(0.820-0.917)	0.02 (0.01-0.05)

$ Odd ratio was not computable, all observation responses to the question were (No) in healthy group.

Discussion

Clinical and radiographic measurements of periodontal health are routinely employed to determine the prevalence, extent, and severity of periodontitis in dental research. However, in terms of cost, time, and convenience, these techniques are impractical for monitoring periodontitis in a large population. In addition, the association between periodontitis and systemic diseases may require that periodontal status be evaluated by non-dental health practitioners who lack experience conducting clinical periodontal examinations. For these reasons, self-reported periodontal disease measurements are cost-effective for periodontitis surveillance and assessment by non-dental health practitioners[19,20].

In this study, two different self-reported questionnaires were used to assess periodontitis. Questions were used to assess self-reported symptoms, diagnosis of health professionals, or treatment provided for them. It was a self-reading and self-answered questionnaire; the first self-reported questionnaire was a 9 -items questionnaire, and the second one was 13 items. Participants responded to the self-reported questionnaires at the same appointment, and a dentist performed a full-mouth periodontal check to diagnose the case.

The questionnaires had a useful discriminative capability for detecting individuals with periodontitis. The questions significantly associated with periodontitis were Q1 (AUC= 0.684). This could be related to the fact that this question was easy to understand, and the patients were more familiar with the term (Gum disease) in the Kurdish population. Additionally, question Q6 from questionnaire two was significantly associated with periodontitis (AUC =0.692), reflecting the importance of patient awareness about their periodontal condition and periodontal health. However, no single question can reveal a periodontal condition of the patient since the term gum disease is a general term and periodontitis is a specific disease and needs evaluation of many risk factors to detect it, so the use of a combination of various self-reported questions might improve the sensitivity and specificity of that approach[9].

In the first questionnaire, the combination of the questions (Q1) and (Q9) had a sensitivity of 70.6% and specificity of 51.7%. Additionally, the combination of three questions (Q1), (Q4), and (Q6) had a 66.7% of sensitivity and 82.1% of specificity. Again, this reflects the nature of questions and periodontitis that a particular question cannot overcome. Eke et al.[8] evaluated the predictive efficacy of eight self-reported items versus clinically categorized periodontitis in the American population. The combined effects of demographic measures and responses to 5 self-reported questions in detecting mild or severe periodontitis were 85% sensitive and 58% specific in multivariable logistic regression modeling, yielding (an AUR of 0.81). Masanori Iwasaki[21] used the combination of four self-reported oral health questions (“have gum disease,” “loose tooth,” “bone loss,” and “bleeding gums”)for periodontitis screening, score generated by the responses to these four questions had an AUC, sensitivity, and specificity of 0.82, 73.1%, and 74.3%, respectively.

While for the second questionnaire, from the 13 questions, three questions significantly associated with periodontitis were (Q6), (Q13), and (Q9), with the area under the curve were (0.692), (0.755) and (0.693), respectively. Saka-Herrán[14] discovered that the self-reported questionnaire had a beneficial discriminative capability for detecting individuals with periodontitis (AUC = 0.88).

For second questionnaire, (Q2, Q3, Q4) had a high specificity (93.3%, 91.7%, 90%) and had a moderate sensitivity (49.6%, 40%, 55.7%). Painful gums from questionnaire 2 (Q9) had moderate sensitivity and high specificity (48.7% - 90%), respectively. For tooth mobility (Q4), questionnaire 1 had a low sensitivity (28.8%) and high specificity (96.4%). Luo[22] reported that the rate of self-awareness of periodontitis among US adults was low, showing that of those with a clinical diagnosis of periodontitis, 27% were aware of their condition.

According to Saka et al.[14], the combination of self-reported questions about tooth mobility and gingival migration has a high performance when compared to different clinical classifications of periodontitis and its severity, with sensitivity and specificity values greater than 80%, indicating high validity. However, in the multivariable models, the question concerning painful gums was not associated with periodontitis.

Conclusions

The self-reported periodontal disease measure is highly predictive and discriminative when tested against clinical definitions, especially with the second questionnaire. Therefore, several oral health self-reported questions could be a useful tool for screening

periodontitis in the population, specifically those associated with patient awareness about periodontal disease, bleeding of the gum, treatment, and diagnosis that had been performed for a patient previously by a dentist.

The combinations of self-reported questions from both questionnaires proved to increase the validity in a Kurdish population sample of adults, with high accuracy and high validity for screening periodontitis. However, substantial community-based research is required to validate its validity and predictive performance.

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