Original Article

Effect of Oral-Related Quality of Life and Sexual Function in Dentally Compromised Women: A Prospective Cohort Study

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Abstract

Background: Oral health and edentulism significantly impact quality of life (QoL). However, the relationship between oral health-related quality of life (OHQoL) and sexual function remains unclear. **Aim:** To assess OHQoL and the prevalence of sexual dysfunction (SD) in women before and after oral rehabilitation. **Methods:** The study involved 102 women (aged 40–70 years) scheduled for prosthodontic treatment with incomplete natural dentition. Assessments were conducted using the Oral Health Impact Profile (OHIP-14) and Female Sexual Function Index (FSFI) questionnaires at three timepoints: T0 (before treatment), T1 (1 month after), and T2 (3 months after prosthodontic treatment). Statistical analyses included Kruskal–Wallis, Friedman tests, and Spearman's rank correlation test ($P < 0.05$). **Results:** Significant differences were observed in total FSFI scores at T0 (18.1 ± 3.2), T1 (19.2 ± 3.4), and T2 (21.6 ± 3.7) ($P < 0.001$). The prevalence of SD was 89.6% at T0, 84.2% at T1, and 79.3% at T2. Scores in all FSFI domains improved significantly post-treatment ($P < 0.001$). Mean OHIP scores were 30.6 ± 2.7 at T0, 17.7 ± 4.1 at T1, and 10.2 ± 2.8 at T2 ($P < 0.001$). Scores in all OHIP-14 domains decreased significantly after dental treatment, reflecting improved OHQoL. Significant correlations were found between total OHIP-14 and FSFI scores at T0 ($r = -0.31$, $P = 0.01$), T1 ($r = -0.51$, $P = 0.021$), and T2 ($r = -0.80$, $P < 0.001$). **Conclusion:** OHQoL is associated with sexual function in women. Following dental treatment and oral rehabilitation, FSFI scores increased, and the prevalence of SD decreased.

Keywords: *Edentulism, FSFI, OHIP, prosthesis, quality of life, sexual function*

Introduction

Healthy and satisfying sex has a significant role in women's lives and is recognized by the World Health Organization (WHO) as a physical, mental, social, and emotional state of well-being.[1] Female sexual dysfunction (SD) is also described by the American Psychiatric Association as a disruption of the sexual response cycle or having pain related to sexual intercourse.[2] Recent studies have shown that approximately 30%–60% of women have experienced SD at least once in their lives due to serious anxiety[3,4] Sexuality is closely related to quality of life (QoL), which has become recognized over the years as an important factor in outcomes related to reproductive and sexual health.[5]

A strong positive relationship between health-related quality of life and sexual function has been reported in

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several studies.[6–8] Physical sexual function is not the only point to consider, but also whether the individual is satisfied with their social and emotional sex experiences. Therefore, psychological, interpersonal, social, and cultural factors must also be considered. When a woman presents with a new sexual problem, a thorough history should be taken using a biopsychosocial approach. History of any emotional, physical, or sexual abuse; past or current psychiatric disorders; medication use; beliefs and behaviors regarding sexual intercourse; menopause; aging; and body image concerns should be also evaluated.[9,10]

Rosen *et al*.[11] developed the Female Sexual Function Index (FSFI) to assess female sexuality in six domains, classified as desire, arousal, orgasm, lubrication, satisfaction, and pain. The items are rated on a Likert-type scale, and the domains are weighted and summed to yield a total FSFI score ranging from a minimum of 2 to a maximum of 36.[12]

Oral health is described as a healthy state of the oral structures that supports both physical and social well-being by enabling people to eat, speak, and socialize without physical discomfort or emotional distress. Oral health-related quality of life (OHQoL) is an individual's perception of how their oral health impacts their QoL and is affected by their ability to chew and speak well and have an esthetically acceptable smile, without pain or halitosis.[13,14] Various questionnaires have been developed to specifically assess OHQoL. One of the most commonly used is the Oral Health Impact Profile (OHIP), which is available in different versions and languages.[15] Edentulism has been shown to reduce OHQoL and is reported to be increasing at a rate of about 1% per year in most countries.[16] It was predicted that there would be nearly 38 million edentulous adults in the United States by the year 2020.[17]

Increased social, psychological, and esthetic problems in coping with mastication and speech impairments are the result of the chronic nature of edentulism.[18] The WHO has defined edentulism as a poor public health outcome that substantially influences both general and oral health status.[19] According to various studies, tooth loss can affect general health in several ways, and edentulism is becoming a major problem worldwide.[19,20] Individuals need a minimum number of natural teeth to have a sufficient dental function without prosthetic replacements, which is known as having functional dentition.[21] People can chew more foods when they have more than 20 teeth, and if 21 or more teeth are present, these people are defined as having functional dentition.[22] Previous research has shown that adults who are edentulous or have fewer natural teeth have lower diet quality.[13] The treatment of edentulism is also disturbing and can affect the patient's QoL as well.

Edentulism is more prevalent in women[21] and is an important factor in their physical, emotional, and social experiences that can influence sexual performance.[10] Turgut *et al*.[15] reported that OHQoL was significantly associated with sexual function in men, and correcting the problem of edentulism improved OHQoL and sexual function. However, a search of the literature yields little information about the relationship between women's oral health and sexual function. Therefore, the aim of this study was to assess the sexual function and prevalence of SD in women in relation to their OHQoL before and after (at 1 month and 3 months) undergoing dental treatment. Our hypotheses in this study were that 1- There is a significant association between FSFI and OHQoL; and 2- FSFI scores would improve after completing dental treatment.

Materials and Methods

This longitudinal cohort study was carried out at the Department of Prosthodontics of Karadeniz Technical University and the Department of Urology of Medical Park Hospital. Medical Park Hospital Ethics Board approval (no: 2019/266) was obtained before the initiation of the study.

Women aged 40–70 years who were scheduled for prosthodontic treatment in the prosthodontic department and have incomplete natural dentition (presence of 1–20 natural teeth and no replaced teeth) and no natural (no teeth and no replaced teeth) were invited to participate in the study, and a total of 102 patients were included. Six patients refused to participate in the study. Exclusion criteria included antidepressant drug use; alcohol use disorder; uncontrolled diabetes; history of treatment for cancers of the breast, ovary, or genital area; and history of surgery in the gynecological area. All patients signed informed consent forms.

The questionnaires were administered in face-to-face interviews before the patients' appointments in the outpatient clinic of the hospital, in a room separate from the clinic. The patients responded to the questionnaires at three timepoints: before prosthodontic treatment (T0) and at 1 month (T1) and 3 months (T2) after completing dental treatment and receiving their new dentures.

Female Sexual Function Index (FSFI)

The women's sexual function was evaluated using the Turkish version of the FSFI, which consists of 19 questions in six domains: desire (items 1 and 2), arousal (items 3–6), lubrication (items 7–10),

orgasm (items 11–13), satisfaction (items 14–16), and pain (items 17–19).[22] Each domain has a score between 0 or 1 and 6. The total score is obtained by summing the six domain scores and ranges from 2 to 36, with higher values indicating better sexual function. A total score of ≤26.55 points indicates SD.[12]

Oral Health Impact Profile (OHIP-14)

The Turkish version of the Oral Health Impact Profile (OHIP-14) was used to assess OHQoL.[23] The OHIP-14 is a self-administered, short version of the original questionnaire that includes 14 questions. The areas of impact are divided conceptually into seven dimensions: functional limitation, physical pain, psychological discomfort, physical disability, psychological disability, social disability, and handicap. The subjects were asked how often they had experienced the impact of that item in the last month. Answers are given on a 5-point Likert-type scale from 0 (never) to 4 (very often). Scores are added within each dimension (min–max: 0–8), and the total score is calculated by adding the dimension scores (min–max: 0–56), with higher scores representing lower OHQoL.[15]

Statistical analysis

All statistical analyses were performed using SPSS version 20.0 (IBM Corp, Armonk, IL). Continuous variables are presented as mean ± standard deviation. Normal distribution was analyzed using Kolmogorov–Smirnov test and histogram. Friedman test was used to evaluate the temporal changes in all continuous variables. Kruskal–Wallis and paired-samples *t*-test were used to assess the variables if there was a significant difference in the Friedman test according to normal distribution.

Spearman's rank correlation test was used to analyze the correlation between two quantitative variables (non-normal distribution for at least one variable). The data analyses were evaluated at a significance level of $P < 0.05$. The strength of correlations was interpreted according to correlation coefficients (r) as follows: $r \geq 0.9$, very strong; $0.7 \leq r < 0.9$, strong; $0.5 \leq r < 0.7$, moderate; $0.3 \leq r < 0.5$, weak; and $r < 0.3$, very weak (negligible).[24]

Results

The demographic characteristics of the participants are presented in Table 1, which includes the percentage of the women's age, duration of marriage, education level, employment status, perceived income level, and teeth loss. The patients' mean age was 52.6 ± 9.2 years (range: 40–70 years). Mean total FSFI scores at T0, T1, and T2 were 18.1 ± 3.2 (range: 4–29), 19.2 ± 3.4 (range: 4–30), and 21.6 ± 3.7 (range: 5–32), respectively ($P < 0.001$). Using an FSFI total score cutoff of ≤26.55, SD was detected in 89.6% of the women at T0, 84.2% at T1, and 79.3% at T3. Mean scores in the FSFI desire, arousal, lubrication, orgasm, pain, and satisfaction subscales

Table 1: Demographic characteristics of the women in the study

Variables	Classifications	%
Age (years)	40–55	66
	55–70	34
Duration of marriage (years)	<10	6
	10–20	16
	>20	78
Education level	Primary level or lower	58
	High school	34
	University	8
Employment status	Unemployed	72
	Employed	12
	Retired	16
Perceived income level	Low	6
	Middle	94
Teeth loss	Incomplete natural dention	79
	No natural dentition	21

Table 2: Female Sexual Function Index domain scores before dental treatment (T0) and at 1 month (T1) and 3 months (T2) after treatment

	T0 Mean±SD	T1 Mean±SD	T2 Mean±SD
Desire	3.0±0.8[a]	3.2±0.6[b]	3.3±0.8[c]
Arousal	3.1±0.6[a]	3.2±0.6[b]	3.4±0.7[c]
Lubrication	2.8±0.7[a]	3.0±0.9[b]	3.2±0.6[c]
Orgasm	3.0±0.8[a]	3.2±0.7[b]	3.4±0.7[c]
Satisfaction	3.2±0.7[a]	3.3±0.6[b]	3.5±0.6[c]
Pain	3.0±0.9[a]	3.3±0.7[b]	3.4±0.8[c]

Different superscript letters show the significant median of differences between the columns (T_0; T_1; T_2) horizontally. The significance level is $P<0.05$

Table 3: Oral Health Impact Profile-14 domain values before dental treatment (T0) and at 1 month (T1) and 3 months (T2) after treatment

	T0 Mean±SD	T1 Mean±SD	T2 Mean±SD
Functional limitation	4.0±0.7[a]	3.4±0.6[b]	1.4±0.6[c]
Physical pain	3.5±1.1[a]	1.6±0.7[b]	1.0±0.5[c]
Psychological discomfort	4.2±1.1[a]	2.2±0.7[b]	2.0±0.0.7[c]
Psychological disability	4.6±0.9[a]	2.8±0.9[b]	1.1±0.4[c]
Physical disability	4.1±1.1[a]	2.8±0.8[b]	1.6±0.4[c]
Social disability	4.4±1.0[a]	2.2±0.6[b]	1.6±0.3[c]
Handicap	4.8±1.2[a]	2.6±0.7[b]	1.5±0.3[c]

Different superscript letters show the significant median of differences between the columns (T_0; T_1; T_2) horizontally. The significance level is $P<0.05$

Table 4: Correlation between OHIP with FSFI domains before dental treatment (T0) and at 1 month (T1) and 3 months (T2) after treatment

Variable		T0		T1		T2	
		OHIP					
		r	*P*	*r*	*P*	*r*	*P*
FSFI	Total Score	−0.31	0.018	−0.51	0.021	−0.80	<0.001
	Desire	0.30	0.013	0.40	0.042	0.58	<0.001
	Arousal	0.31	0.018	0.46	0.003	0.61	<0.001
	Lubrication	0.26	0.021	0.68	<0.001	0.70	<0.001
	Orgasm	0.28	0.011	0.29	0.026	0.49	<0.001
	Satisfaction	0.35	0.032	0.66	<0.001	0.60	<0.001
	Pain	0.21	0.008	0.60	<0.001	0.55	<0.001

P: The value of statistical significance; *r*: correlation coefficient. The significance level is $P<0.05$

at T0, T1, and T2 are given in Table 2. There were significant differences in all domains (desire, arousal, lubrication, orgasm, pain, and satisfaction) between T0, T1, and T2 ($P < 0.001$). All subscale scores increased significantly, representing improved sexual function. Mean OHIP-14 scores at T0, T1, and T2 were 30.6 ± 2.7 (range: 6–38), 17.7 ± 4.1 (range: 5–26), and 10.2 ± 2.8 (range: 1–18), respectively ($P < 0.001$). Mean scores of the OHIP-14 subscales (functional limitation, physical pain, psychological discomfort, physical disability, psychological disability, social disability, and handicap) are given in Table 3. The scores for all OHIP-14 domains decreased significantly after dental treatment, demonstrating an improvement in OHQoL ($P < 0.001$). Completing dental treatment correlated with all domains of both the FSFI and OHIP ($P < 0.05$).

Correlations between total OHIP-14 scores and FSFI total and subscale scores are presented in Table 4. Statistically significant correlations were found between total OHIP-14 and total FSFI scores at T0 ($r = -0.31$, $P = 0.01$), T1 ($r = -0.51$, $P = 0.02$), and T2 ($r = -0.80$, $P < 0.001$).

Discussion

SD is an important health problem worldwide and has been investigated in various studies.[25–27] Researchers have shown that SD can be affected by social, physical, anatomic, hormonal, psychological, and cultural factors. The present study aimed to determine the impact of oral health on the sexual function of old women. The first hypothesis of the study, that there is a relationship between the FSFI and OHQoL, was supported by our results as all six areas of sexual function were found to be associated with OHIP scores. Lower OHIP values reflect better OHQoL. Therefore, the correlation between FSFI and OHIP scores in our study showed that sexual desire, arousal, lubrication, orgasm, pain, and satisfaction improved as OHQoL increased.

Patients who need prosthodontic treatment score highly on OHQoL instruments, showing that they have decreased OHQoL.[28,29] Studies showed that before dental treatment, incomplete dentition causes oral discomfort, which translates to a higher OHIP score.[20,29,30] In the present study, the patients were evaluated with the FSFI and OHIP before treatment and at 1 and 3 months after completing dental treatment. OHIP scores decreased after dental treatment, with the greatest improvement in OHQoL after 3 months. In a study evaluating the effect of implant treatment for dental prostheses on OHQoL, the authors stated that the distress associated with treatment had a substantial impact on OHQoL.[30] The reason for the improvement in OHQoL over time may be that the patients in our study needed time to adapt to their new prosthesis.

Baran *et al*.[20] reported that denture status is a more powerful predictor of impaired OHQoL than sociodemographic facts. Patients encounter few problems after dental treatment and adaptation to their new dentures. Our findings also supported the second study hypothesis that FSFI scores would improve after completing dental treatment. Total FSFI values increased from 18.1 ± 3.2 at T0 to 19.2 ± 3.4 and 21.6 ± 3.7 at T1 and T2, respectively. There were also significant increments in all FSFI domains. Patients were assessed as having SD if the total FSFI score was ≤26.55, and we observed in our study that the prevalence of SD decreased from 89.6% to 84.2% at 1 month and 79.3% at 3 months after dental treatment was completed.

In a study investigating the relationship between women's sexual function and body image preoccupations, women with a positive body image had higher sexual function scores compared to women with a negative body image.[26] In that study, the total FSFI was 21.98 ± 6.79 among women with no concerns related to body image, 20.34 ± 6.15 for those with mild concerns, and 17.93 ± 5.44 for those with moderate concerns. Other studies also revealed that women who were satisfied with their body showed positive social interactions, sexual activity, and orgasm, and positive body image was also associated with total sexual satisfaction, which was a predictor of sexual activity.[31,32] The main factors contributing to sexual displeasure were physical appearance concerns, weight concerns, sexual attraction, physical conditions, and dissatisfaction during sexual activities.[31]

Dental rehabilitation can have a serious impact on patients. In our image-conscious world, dentures

give patients a sense of normality and allow them to interact comfortably with others. Unsatisfactory esthetics and phonetics problems are the most frequent complaints associated with dentures.[16] Evaluation of patient expectations and the effects of dental treatment procedures on patient satisfaction are important factors to consider.

Sexual health problems can impair family life and the social health of couples. Sexuality is generally thought of as private and not talked about in society or between patients and their healthcare providers. The male's role is also as significant as the female's as sexual intercourse is between couples. If a woman has SD, her male partner may feel refused and dissatisfied, which can result in secondary impotence in response to the woman's attitude.[33] Therefore, providing sex-related information and advice to edentulous women who feel ugly and unattractive during this period is crucial because dental treatment can sometimes take almost up to 1 year to complete. Physical outcomes of tooth loss include atrophy of the supporting alveolar structures, loss of facial muscle support, and protrusion of the lower lip and chin. These affect a person's appearance and make them look older.[16] Such physical complaints and changes can influence the quality of sex and reduce the frequency of sexual intercourse, leading to sexual problems that can persist in the long term.

In the present study, correlations between OHIP and FSFI values were statistically significant at all evaluated timepoints. Although the relationship between total OHIP and FSFI values was weak before treatment ($r = -0.31$), it was moderate at 1 month ($r = -0.51$) and strong ($r = -0.80$) at 3 months after dental treatments were completed. FSFI domain score also increased over time, resulting in a decrease in the rate of SD. The association between SD and descriptive characteristics has been studied previously, and the authors reported that the women's age posed a risk for SD, whereas the duration of marriage, number of children and mode of delivery, education level of the partners, employment status, and economic status did not affect the risk of SD.[34] In the present study, 89.6% of the women had SD before treatment, and this rate decreased to 79.3% at 3 months after treatment. The prevalence of SD in previous studies conducted in Turkey was reported as 41% at ages 18–30 years, 53.1% at ages 31–45 years, and 67.9% at ages 46–years.[35] The prevalence of SD may vary among the ages; however, the results of the present study clearly demonstrate that the rate of SD among women is higher if the OHQoL is low for women over 45 years old.

This study had certain limitations. First, all of the participants were women from one region of Turkey. This study could be conducted with larger samples in different countries and different cultures. Second, the included participants were those who sought treatment at the dental hospital. Further investigation of OHQoL and SD in women who did not present to the hospital but needed prosthodontic treatment is needed.

Conclusions

Within the limitations of the current study, the following conclusions were reached: OHQoL and sexual function were significantly correlated in women. OHIP scores decreased after completion of the dental treatments (T1 and T2) compared to before treatment (T0). Total FSFI scores differed significantly between T0, T1, and T2. FSFI domain and total scores increased at T1 and T2, showing improved sexual function. SD prevalence was highest at T0 and lowest at T2, 3 months after completion of dental treatment.

Author(s) contribution(s)

HT, ST and MS conceptualized and designed the study. HT and ST were involved in data collection/acquisition. FI, SA and EH were involved in statistical analysis. HT, ST and MS were involved in the writing and revising the manuscript for intellectual content. All authors (HT, ST, SO, SA, EH, FI, MS) read, and approved the final manuscript and agreed to be accountable for all aspects of the work.

Ethical approval

Trabzon Medikal Park Hospital Institutional Review Board gave the ethical approval (no: 2019/266).

Informed consent

Written informed consent was obtained from each participant before enrollment into the study.

Declaration of Helsinki

This study was conducted according to the principles of Helsinki Declaration.

Availability of research data

Authors are available and ready to supply the data upon any requests through the corresponding author.

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Conflicts of interest

There are no conflicts of interest.

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