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Investigating the Relationship Between Gingivitis and General Health in Women with Multiple Sclerosis

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Abstract

Background: Multiple sclerosis is a chronic inflammatory disease characterized by demyelinating lesions in the brain, spinal cord, and optic nerve.

Objectives: Due to the high prevalence of MS, this study aimed to investigate the relationship between gum health and general health in women with MS.

Methods: This study was conducted under the ethical approval code IR.MEDILAM.REC.1404.015. Patients diagnosed with MS were recruited after obtaining informed consent from all participants. Data collection instruments: A demographic checklist was used, Gingival indices were graded as follows, General Health Questionnaire (GHQ-28) and Oral Health Impact Profile (OHIP-14) was employed. The researchers collected data through face-to-face interviewing for questionnaire completion and clinical examinations for gingival inflammation assessment. Data analysis was performed using SPSS software version 19.

Results: The findings showed that the overall M(SD) score of general health of patients in non-pregnant women was 60.48 (6.73), in pregnant women it was 62.85 (4.18), and the overall score of women with MS was 15.35 (2.19). Also, regarding the M(SD) score related to the OHIP-14 score tool, it was shown that in non-pregnant women it was 35.03 (6.68), in pregnant women it was 35.71 (7.22), and the overall score of women with MS was 35.09 (6.69). also, the overall gingivitis status of patients in the normal range was 27.6%, in the mild range it was 49.4%, in the moderate range it was 18.4%, and in the severe range it was 4.6%. Also, in the pregnant women group, 17.5% had moderate inflammation and in the non-pregnant women group, 28.6% had moderate inflammation.

Conclusions: it is proposed that faculty members from the Reproductive Health department conduct necessary educational interventions for the prevention of oral and dental diseases. Furthermore, in the event of any existing pathology in these patients, the Periodontology department should undertake the requisite diagnostic and therapeutic measures in this regard.

Keywords: Gingivitis, General health, Multiple sclerosis

1. Background

Multiple sclerosis (MS) is a chronic, progressive disease of the central nervous system that causes sensory disturbances, muscle weakness, spasticity, visual impairment, cognitive dysfunction, fatigue, tremor, urinary and fecal elimination disorders, sexual dysfunction, balance impairment, memory loss, hearing reduction, numbness, blurred vision, and diplopia. Approximately 62% of men and 78% of women with MS identify balance dysfunction as one of the most challenging and disabling symptoms of the disease (1–4).

Balance disturbances are particularly problematic among these patients, often leading to difficulties in transitioning from one position to another. Patients with MS not only suffer from motor impairments but also experience cognitive difficulties that further aggravate their physical limitations (5, 6). Cognitive impairments in MS mainly affect memory. Damage to the primary cortical regions is associated with slowed information processing and deficits in short-term, long-term, prospective, and working memory (7, 8).

Multiple sclerosis is a chronic inflammatory disease characterized by demyelinating lesions in the brain, spinal cord, and optic nerve. It is one of the most prevalent neurological disorders, typically diagnosed between the ages of 20 and 40, and occurs more frequently in women than men (9, 10). The course of the disease is unique and unpredictable, and its exact cause and definitive treatment remain poorly understood. Due to its disabling nature and uncertain progression, patients experience a high degree of uncertainty regarding their future health and wellbeing. Elevated levels of uncertainty are particularly evident during sudden events or the chronic unpredictable phase of the disease (11–14).

Chronic illnesses such as MS can have negative effects on oral health, particularly periodontal health. Therefore, maintaining gum health in these patients is of critical importance (15, 16). Unfortunately, due to physical, emotional, and social challenges, patients often neglect certain aspects of personal hygiene. In fact, the multitude of physical and psychological difficulties faced by individuals with MS often leads to neglect of oral and periodontal health (17–19).

Periodontitis is a common chronic disease that affects teeth and their supporting soft and hard tissues, and if left untreated, may lead to alveolar bone loss and eventually tooth loss. Alterations in the bacterial plaque composition and the host immune response are major contributing factors. Various elements reduce tissue resistance, which can generally be divided into local factors and systemic factors (20–23).

Gingival health has a substantial impact on patients' quality of life and can lead to functional limitations and reduced social and emotional wellbeing. In patients with gingival inflammation, factors such as pain, difficulty in toothbrushing, fear of eating, and problems using dentures can exacerbate the disease and discourage proper oral hygiene practices (24, 25).

Regarding gum health assessment, self-reporting cannot provide complete or precise information to researchers. Therefore, professional dental examinations are essential for accurate evaluation (26, 27).

2. Aim:

Due to the high prevalence of MS, this study aimed to investigate the relationship between gum health and general health in women with MS in Ilam city in 2025.

3. Methods:

This study was conducted under the ethical approval code IR.MEDILAM.REC.1404.015. Patients diagnosed with MS were recruited after obtaining informed consent from all participants.

Inclusion criteria consisted of informed consent, female gender, confirmed diagnosis of MS, residence in Ilam province, and the ability to visit for oral and dental examinations.

Exclusion criterion included withdrawal of informed consent at any stage of participation.

Data collection instruments:

A demographic checklist was used, including daily toothbrushing frequency (once, twice, three times), number of pregnancies (one, two, more), educational level (illiterate, diploma, bachelor's, master's), occupation (homemaker, administrative), history of chronic diseases (yes/no), gingival status (normal, mild inflammation, moderate inflammation, severe inflammation), daily flossing frequency (never, once,

twice, three times), preference for sweets (low, moderate, high), and dental visit frequency (never, occasionally, regularly).

Gingival indices were graded as follows:

score 0 = normal, 1 = mild inflammation, 2 = moderate inflammation, and 3 = severe inflammation.

General health assessment was performed using the General Health Questionnaire (GHQ-28). This instrument examines various dimensions of mental health and contains 28 items across four subscales: somatic symptoms (items 1–7); anxiety and insomnia (items 8–14); social dysfunction (items 15–22); and severe depression (items 23–28).

Each subscale is scored between 0–21, with a total possible score of 0–84, where higher scores reflect poorer general health (28–30).

For oral health evaluation, the Oral Health Impact Profile (OHIP-14) was employed. It includes 14 items, where the “never” response is scored 0, and “very often” is scored 4. The total score ranges from 0 to 56, with higher scores indicating poorer oral and dental health (31–33).

The researchers collected data through face-to-face interviewing for questionnaire completion and clinical examinations for gingival inflammation assessment.

Ethical considerations included informed consent, voluntary participation, and absence of financial burden on the patients.

Data analysis was performed using SPSS software version 19.

4. Result:

According to the findings, 43.8% of patients used a toothbrush once a day, 52.5% of patients had a high school diploma, 62.5% of patients were unemployed, 67.5% of patients did not floss, 42.5% of patients had a low desire to consume sweets, and 97.5% of patients did not visit the dentist regularly. According to the findings in Table 1, the M(SD) of the OHIP-14 score was reported as 38.33 (5.20) in people who did not use a toothbrush during the day, 35.95 (7.16) in patients with a diploma education, 36.45 (6.43) in unemployed patients, 37.22 (6.84) in patients who used dental floss once a day, 38.21 (6.87) in patients with a low tendency to consume sweets, and 35.18 (6.67) in patients without regular visits to the dentist (Table 1).

Table 1- Demographic characteristics of patients with MS

Variable		N (%)	GHQ Score	OHIP-14 score
Number of times you brush your teeth per day	Never	26(32.5)	63.46(3.81)	38.33(5.20)
	Once a day	35(43.8)	60.14(9.40)	33.03(7.56)
	Twice a day	9(11.3)	59.72(5.38)	35.11(6.62)
	Three times a day	10(12.5)	61.44(2.29)	35.77(4.63)
Education	Illiterate	23(28.7)	59.59(5.37)	33.77(6.42)
	Diploma	42(52.5)	60.97(7.27)	35.95(7.16)
	Bachelor's degree and above	15(18.8)	61.73(6.49)	34.86(5.57)
Job	No job	50(62.5)	61.36(7.34)	36.45(6.43)
	Work history	30(37.5)	59.50(4.87)	32.75(6.55)
	Never	54(67.5)	59.31(5.06)	34.10(6.66)

Number of times you floss during the day	Once a day	19(23.8)	63.5(9.56)	37.22(6.84)
	Twice a day	7(8.8)	63.14(1.46)	36.57(5.19)
	Three times a day	0(0)	-	-
Desire to consume sweets	Low	34(42.5)	63.60(6.38)	38.21(6.87)
	Moderate	29(36.3)	59.53(5.89)	33.09(5.76)
	High	17(21.3)	56.29(5.24)	31.88(4.99)
Visiting the dentist	Never	78(97.5)	60.7(6.63)	35.18(6.67)
	Sometimes	2(2.5)	59.5(4.94)	31.00(8.48)
	Continuous	0(0)	-	-

The findings showed that the overall M(SD) score of general health of patients in non-pregnant women was 60.48 (6.73), in pregnant women it was 62.85 (4.18), and the overall score of women with MS was 15.35 (2.19).

Also, regarding the M(SD) score related to the OHIP-14

score tool, it was shown that in non-pregnant women it was 35.03 (6.68), in pregnant women it was 35.71 (7.22), and the overall score of women with MS was 35.09 (6.69) (Table 2).

Table2- Comparison of general health and OHIP scores in pregnant and non-pregnant women

Variable	Non-pregnant women M(SD)	Pregnant women M(SD)	Women's overall score M(SD)
General health	Physical symptoms	14.6(1.99)	15.00(1.41)
	Anxiety and insomnia symptoms	16.26(4.05)	15.85(1.46)
	Social functioning symptoms	14.37(2.48)	15.42(0.78)
	Depression symptoms	15.25(2.18)	16.57(2.07)
	General health	60.48(6.73)	62.85(4.18)
Oral and dental health	OHIP-14 score	35.03(6.68)	35.71(7.22)
			35.09(6.69)

According to the findings, the overall gingivitis status of patients in the normal range was 27.6%, in the mild range it was 49.4%, in the moderate range it was 18.4%, and in the severe range it was 4.6%. Also, in the pregnant

women group, 17.5% had moderate inflammation and in the non-pregnant women group, 28.6% had moderate inflammation (Table 3).

Table 3- Comparison of the rate of gingivitis in the patients studied according to pregnancy

Variable		Non-pregnant women M(SD)	Pregnant women M(SD)	Women's overall score M(SD)
Gingivitis	Normal	1(14.3)	23(28.7)	24(27.6)
	Mild	3(42.9)	40(50)	43(49.4)
	Moderate	2(28.6)	14(17.5)	16(18.4)
	Severe	1(14.3)	3(3.8)	4(4.6)

According to the findings in Table 5, moderate gingivitis was reported in 5 patients who did not use a toothbrush or used a toothbrush once a day, moderate gingivitis was

reported in 11 people with a diploma education, and mild gingivitis was reported in 22 people with a diploma education (Table 4).

Table4- Relationship between demographic characteristics and levels of gingivitis

Variable		Normal	Mild Gingivitis	Moderate Gingivitis	Severe Gingivitis
Number of times you brush your teeth per day	No toothbrush	5	15	5	1
	Once a day	11	18	5	2
	Twice a day	4	4	1	0
	Three times a day	4	6	4	1
Education	Illiterate	8	12	5	2
	Diploma	10	22	11	2
	Bachelor's degree and above	6	9	0	0
Number of times you floss during the day	Never	17	29	10	2
	Once a day	6	8	6	2
	Twice a day	1	6	0	0

	Three times a day	-	-	-	-
Desire to consume sweets	Low	10	15	11	2
	Moderate	8	19	3	2
	High	6	9	3	0
Visiting the dentist	Never	24	41	16	4
	Sometimes	0	2	0	0
	Continuous	-	-	-	-

5. Discussion

This study was conducted with the aim of investigating the association between periodontal health and general health in women with MS. In the study by Al-Gamal E et al., the Fatigue Severity Scale and the HRQoL questionnaire were completed for 130 men and 71 women. According to the findings, the mean (\pm SD) fatigue score for the patients was $5.59(\pm 1.18)$, and the patients' Quality of Life score was $43.69(\pm 25.97)$ (34). A study by Faraclas et al. in RRMS patients demonstrated that scores for mental health, quality of life, and social functioning were the lowest, with the depression score reported at 49% (35).

Consistent with the findings, the prevalence of depressive symptoms was reported to be high in patients with MS. Kiropoulos et al., in a meta-analysis study, reported that 50% of patients with MS suffered from depression, and the severity of depression in these patients is exacerbated by the increase in inflammatory proteins, including TNF- α and IFN- γ (36). Furthermore, in a study by Young et al. involving 5,633 patients, the prevalence of depression was 25.3%. The severity of depression increased when it was associated with comorbidities such as anxiety, disability, smoking, and fatigue (37). Depression is a common illness among people with MS (PwMS), with a prevalence ranging from 27% to 50%. Depression negatively affects quality of life and disease management, and if intensified, it can lead to suicide (37, 38).

Consistent with the findings, the mean (\pm SD) score for the Oral Health Impact Profile (OHIP-14) indicated an

inadequate status of oral and dental health in MS patients. In the study by Jahantash et al., 103 MS patients and 103 healthy controls were enrolled using the OHIP questionnaire. According to the findings, the mean (\pm SD) OHIP score in the case group, with an average score of $1.01(\pm 1.63)$, was lower than the mean (\pm SD) score of the control group patients, which was $0.68(\pm 1.10)$ (39). In a study by Covello et al., 47 men and 57 women with MS were examined using tools such as the oral hygiene test, IOHIP-14, and DYMUS. According to the findings, the muscular tension rate was 22%, and the rate of needing to change food to smaller pieces before swallowing was 21% (16).

5.1. Conclusions

Elevated prevalence of periodontal health problems has been reported in women with MS, and these issues have consequently impacted the general health status of these patients. Therefore, it is proposed that faculty members from the Reproductive Health department conduct necessary educational interventions for the prevention of oral and dental diseases. Furthermore, in the event of any existing pathology in these patients, the Periodontology department should undertake the requisite diagnostic and therapeutic measures in this regard.

Footnotes

- **Authors' Contribution:** M A and S T conceived the study, performed data analysis, wrote the manuscript, collected data, interpreted the results, and contributed to the study design, writing, and editing of the manuscript.

- **Conflict of Interests Statement:** The authors declare no conflict of interest.
- **Data Availability:** The data presented in this study are available to readers upon request.
- **Ethical Approval:** The Ethics Committee of Ilam University of Medical Sciences, Ilam, Iran approved the present study (IR.MEDILAM.REC.1404.015).
- **Funding/Support:** The present study received no funding/support.
- **Informed Consent:** Written informed consent was obtained from all participants.

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