

ORAL HEALTH CARE IN PATIENTS WITH SPINAL CORD INJURIES: AN UPDATE

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ABSTRACT

Patients with spinal cord injuries (SCIs) often have poor oral hygiene due to restricted mobility and dependence on caregivers. This review presents an update on oral health care and hygiene for patients with SCIs. Recent findings suggest that patients with SCIs have high prevalence of dental caries, gingival bleeding, and dental plaque. Patients with SCIs experience barriers to oral health care and hygiene and receive lesser preventative care screenings compared to nondisabled individuals. Patients with SCIs should be provided access to all the dental care to improve and maintain their quality of life. Barriers to access of dental services should be identified and removed in dental clinics if adequate oral health care and hygiene is to be provided for patients with SCIs.

Key Words: Spinal cord injury, dental care, oral care, dental hygiene, dental services

INTRODUCTION

The prevalence of spinal cord injuries (SCIs) is gradually increasing globally.¹ The incidence of traumatic SCIs is between 3.6 to 195.4 patients per million worldwide.² A slightly higher incidence of traumatic SCIs in the developing countries has been reported (25.5/million/year).³ Only few studies have been conducted on SCIs in Saudi Arabia as compared with Western countries, however, the prevalence of traumatic SCIs in Saudi Arabia is high.^{4,5}

Promotion of a healthy lifestyle and prevention of secondary complications are important goals for individuals with SCIs. Unlike, prevention and promotion of general health, little emphasis has been given to oral health of these individuals. A strong association between oral health and general health is already well known.⁶ In addition, a link between dental hygiene and markers of cardiovascular disease has also been established.^{7,8}

Patients with SCIs often have poor oral hygiene practices due to restricted mobility and dependence on caregivers.⁹ Use of certain drugs to reduce muscle spasms and neurogenic bladder disorders in these patients may lead to dental plaque deposition and development of dental caries.¹⁰ In addition, these patients often avoid doing regular oral hygiene practices to avoid exertion and, due to lack of specialized equipment such as universal cuffs, arm supports, or splints.¹¹ There is lack of information on oral health and hygiene practices;

and barriers to access to optimal oral in SCIs patients. The current review provides an update about oral health care and hygiene in individuals with SCIs.

MATERIALS AND METHODS

Search strategy

The electronic databases PubMed, Medline, Web of Science, and Scopus were searched using the keywords: ("Spinal Cord Injury" OR "Paraplegia" OR "Quadriplegia") AND ("Dental care" OR "Oral care" OR "Oral hygiene") AND ("Barriers" OR "Restriction") AND ("Prevalence" OR "Incidence").

Eligibility criteria

The present review included all the literature published in English that qualified the following criteria: all cross-sectional and longitudinal studies on prevalence of dental problems, oral care and hygiene, and barriers to access of dental care in individuals with SCIs. Studies were excluded if they were published in languages other than English. In addition, case series and case report were also excluded due to high risk of bias.

Study selection and Data extraction

The author completed the data extraction and assessment of the risk of bias by using structured formats. Quality assessment and risk of bias in the selected studies were appraised using the critical review form for quantitative studies.¹³

Summary statistics and synthesis of results

Prevalence of dental problems in individuals with SCIs was extracted from the included studies. Factors

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responsible for poor dental and oral hygiene were also noted. Barriers to access of dental care by people with SCIs were also listed.

RESULTS

A total of five studies¹⁴⁻¹⁸ were included in this review to assess the prevalence of dental problems, oral care and hygiene, and barriers to access of dental care in patients with SCIs. Table 1 details participants' characteristics, daily oral habits, factors for poor oral health quality of life, and barriers to access dental care in patients with SCIs. Among five included studies,¹⁴⁻¹⁸ two were categorized as a cross-sectional studies,^{17,18} two as online surveys,^{15,16} and one as a case-control study.¹⁴ In all studies, the number of participants ranged between 92 and 203 with the mean age ranging from 41 to 58.6 years. Three included studies have defined participants as patients with SCIs.^{14,17,18} Other studies have defined participants as traumatic SCI patients.^{15,16} Three included studies reported oral health behaviors,^{14,15,18} four studies reported oral self-care behaviors or daily oral habits,^{14,15,17,18} three studies reported about the factors for poor oral health quality of life,^{14,15,18} two studies reported about hand-to-mouth ability,^{14,18} three studies reported about the oral health independence,^{14,17,18} and two studies reported barriers to access of dental care.^{15,16}

Oral health care and hygiene

Most of the studies reported that patients with SCIs had poor dental hygiene practices and higher dental problems.^{14,15,18} SCI patients showed high dental plaque, more gingival bleeding, and higher dental caries than the healthy controls.¹⁴ Additionally, dry mouth and smoking were significantly associated with dental problems.¹⁵ Perception of oral health status by patients with SCIs is one of the barriers that prevent the access of dental health care.¹⁷ Physical barriers such as wheelchair inaccessibility preventing access to dental care and dental fear were common and significant factors to prevent the access to dental health care.¹⁶

DISCUSSION

The present review has fielded information on prevalence of dental problems, oral health practices and barriers to access of dental care for SCI patients. It is hoped that the information would help in improvement of oral/dental health care in these patients.

Patients with SCIs often presented with poor oral hygiene practices due to restricted mobility and dependence on caregivers. Most of the studies reported poor oral health and high dental issues in patients with SCIs.¹⁴⁻¹⁸ Many patients with SCIs presented with dry mouth.^{14,15,18} A previous study suggested that the

TABLE 1: STUDY CHARACTERISTICS

Authors	Parti- cants	Sample size	Study design	Oral health variables Mean (SD)	Oral self- care be- haviours/ Daily oral habits	Factors for poor oral health quality of life	Hand- to- mouth ability	Oral health inde- pen- dence	Barri- ers to access dental care	Conclusion
Pakpour et al., 2016 [14]	Spinal cord inju- ry (SCI) patients	N=203 Male = 164 (80.8%) Female = 39 (18.2%)	A case- control study	Dry mouth = yes, 123 (60.6%); No, 80 (39.4%) Decayed teeth (DT) = 2.3 (1.9) Missing teeth (MT) = 9.9 (5.9) Filled teeth (FT) = 4.4 (1.2) Decayed missing and filled teeth (DMFT) = 17.2(8.7) Gingival index = 1.5 (0.7) Plaque index = 2 (0.9)	Brushing at least once or more = 105 (51.7%) Flossing at least once = 60 (29.6%) Mouth rinse = 26 (12.8%)	age (β = 0.024), dependence and disabili- ty (β = 0.31), paraplegia (β = -0.89), dry mouth (β = 0.37), DMFT (β = 0.06), CPI (β = .22), less frequent tooth brush- ing (β = 1.23), and smok- ing (β = 0.82).	Able= 182 (89.7%) Unable = 21 (10.3%)	OHIP-14 domains, overall score= 19.9 (12.7)	SCI patients showed poor dental hygiene prac- tices, high dental plaque, more gingival bleeding, and higher dental caries than the healthy controls.	

Authors	Participants	Sample size	Study design	Oral health variables Mean (SD)	Oral self-care behaviours/ Daily oral habits	Factors for poor oral health quality of life	Hand-to-mouth ability	Oral health independence	Barriers to access dental care	Conclusion
Yuen et al., 2009 [15]	Traumatic SCI patients Quadriplegia: 142 (75.5%) Paraplegia: 46 (24.5%) Age: 43.9±13.1	N=192 Male = 115 (59.9%) Female = 77 (40.1%)	Survey	Dry mouth symptoms = 59.9% Filling problems = 64 (33.3%) Cavities = 39 (20.3%) Tooth extraction = 22 (11.5%) Gum problems = 20 (10.4%) Loose or wobbly tooth = 15 (7.8%) Toothache = 12 (6.3%)	brushed their teeth daily = 87.5% brushing at least twice a day = 42.2% flossed their teeth at least once a day = 22.9% using mouthwash at least once a day = 45.4%	Level of injury (paraplegia) = OR, 2.469 Age = OR, 1.017 Gender (male) = OR, 1.675 Financial barrier to dental care = OR, 5.152 Dry mouth = OR, 2.462 Smoking = OR, 2.091 Not shown brushing techniques = OR, 1.972 Fear barrier to dental care = OR, 2.952 No dental cleaning last year = OR, 2.013		high cost = 40.1% physical barriers = 22.9% dental fear = 15.1%.	People with SCI reported high prevalence of dental problems. Dry mouth and smoking were significantly associated with dental problems. Dry mouth management, and smoking cessation as well as proper oral hygiene is vital to prevent dental problems in people with SCI.	
Yuen et al., 2010 [16]	Traumatic SCI patients Quadriplegia: 142 (75.5%) Paraplegia: 46 (24.5%) Age: 43.9±13.1	N=192 Male = 115 (59.9%) Female = 77 (40.1%)	Survey					high cost = 40.1% physical barriers = 22.9% dental fear = 15.1%.	Physical barriers such as wheelchair inaccessibility preventing access to dental care and dental fear are common and significant factors to prevent the access of dental health care in people with SCI.	

Authors	Partici- pants	Sample size	Study design	Oral health variables Mean (SD)	Oral self-care be- haviours/ Daily oral habits	Factors for poor oral health quality of life	Hand- to- mouth ability	Oral health inde- pen- dence	Barri- ers to access dental care	Conclusion
Sullivan, 2012 [17]	People with SCIs Age: 18-71 (Mean 41)	N = 92 Male = 72% Female = 28%	Cross-sectional study		Brush: 84% Floss: 14% Mouth rinse: 48% Tobacco use: 33% Mouthstick use: 13%		Can't do without help: 15% Needs help with set up or supervision: 12% Needs a special device or extra time: 8% Can brush w/o help: 65%			Perception of oral health status by people with SCIs is one of the barriers that prevent the access of dental health care.
Sullivan et al., 2013 [18]	People with SCIs Age: 18-71 (Mean 41)	N = 92 Male = 72% Female = 28%	Cross-sectional study	Dry mouth symptoms = 54%	Brush 84% Floss 14% Mouth rinse 48% Tobacco use 33% Mouthstick use 13%	Employed before SCI (yes-1, No-2) = OR, 15.98 Risky oral habits (number) = OR, -6.72	Able= 82 % Unable = 18%	Indepen- dent 65% Needs set up/ supervision 12% Needs special device/ extra time 8% Depen- dent 15%		People with SCIs showed limited oral health.

problem of dry mouth in patients with SCI could be due the side effects of various medications taken by patients with SCI.¹⁵

There are several factors responsible for poor oral hygiene practices among patients with SCIs. Oral health dependence and presence of systemic problems is the major factors for SCIs patients that prevent better oral hygiene practices.¹⁴ Additionally, financial barriers and low annual household income of patients with SCIs also significantly affect access to dental care.¹⁵ Moreover, high level of injury, for example patients with quadriplegia reported more oral problems than paraplegia.¹⁹

In the current review, physical barriers such as

wheelchair inaccessibility and dental fear were common and significant factors that prevent the annual dental visits.¹⁶ It has been reported that patients with SCIs have significantly lesser annual professional dental visits than the general population.²⁰ Similarly, another study reported that physical barriers to access to dental services such as dental chair and examination room, high costs, and dental fear are the major factors that prevent dental access in people with SCIs.²¹ In addition, dental fear and physical barriers independently prevent people with SCIs from visiting their dentist for oral health checkup.¹⁶ Among commonest barriers that prevent dental access among patients with SCI, physical barriers is under the control of dental practitioners and easiest to redress¹⁶ and should be facilitated

by the dentists for these patients.

Prevention of oral health problems is vital for the care of people with disabilities.²² Preventive care involves improving patient's education, caregiver's knowledge, regular professional dental cleaning, prevention of plaque deposition, use of fluoride and fissure sealants, and dietary counselling.^{18,23}

The studies included in this review were mostly surveys and cross-sectional studies. Study samples were not adequately described and were convenient; hence, external validity of the finding was limited. Nevertheless, it is hoped that important issues of oral health and oral health care in individuals with SCIs have been highlighted.

CONCLUSION

The prevalence of dental problems is high in SCI patients. These patients need access to dental care to improve and maintain their quality of life. Barriers to access of dental services should be identified and addressed.

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