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Presence and severity of Periodontal Diseases among Special Health Care Needs Individuals

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Abstract
Study's Aim: *to explore the distribution and severity of periodontal diseases among individuals getting daily care in an institution specialized in training individuals with special needs in Riyadh city.*
Materials and Methods
Statistical Analysis: *The data collection took an overall of 4 weeks to be obtained and the data were subjected to IBM SPSS (Statistical Package for Social Sciences) Statistics Windows version 10.*
Findings: *42 female individuals were examined, the mean age of these individuals was 24 years ranging from (14-40 years). The majority of these individuals that had been examined were mentally disabled (n=32), Down syndrome (n=9), and physically disabled (n=1). In Mentally disabled patients we found that 84% are having (Moderate gingival Inflammation), and 47% having (Mild plaque accumulation). While 89% of Down syndrome individuals are having (Moderate gingival Inflammation), and 44% are having (Mild- Moderate plaque accumulation).*
Conclusion: *This study observed that periodontal disease was a little bit greater among individuals with Down syndrome as compared to individuals with other disabilities, which may be due to many reasons such as shortage of oral health importance in the general blueprint of health management, or the overall parental indifference in relation to other essential health issues.*

Introduction

Special health care need individuals often have unmet, ignored complex health care needs as well as critical physical and cognitive limitations. Usually individuals with severe conditions are at risk with high dental needs and poor accessibility to healthcare. Intellectual and developmental disable individuals are usually ignored by the dental profession, because of many reasons such as caregiver's shortcomings, absence of cooperation by the disabled person, and inadequate background and experience to treat this community[11]. Furthermore, special needs individuals are living longer, demanding regular oral health care, especially with periodontal disease. Periodontal disease is the most common disease in dentistry. The prevalence rate is variable all over the world. In Saudi Arabia, study of Idrees et al, 2014 reported 100% prevalence of plaque induced gingivitis in normal adults[13]. The oral health condition of special health care needs individuals has been reported in previous literature to be affected by numerous sociodemographic factors, including living circumstances and severity of handicap[17]. According to the US Surgeon General's Report in 2000, special health care needs patients have an increased periodontal disease prevalence compared with the rest of the US population[6]. Periodontal pathology is the study of periodontal diseases. Periodontal disease can harm one or more of the periodontal structures such as: (periodontal ligaments, alveolar bone, and cementum)[7]. Gingivitis and periodontitis are the most common plaque induced inflammatory conditions. The word "Disable" is called when an

individual with a mental, or physical disability that lasts for a long term, and preventing the individual from performing daily activities[20]. Disability mostly based on social much more than the medical aspects, and it has been reported that 10% of the world population suffers from social, mental, and physical disabilities. In 1866, John Langdon-Down, has discovered a syndrome which is called "Down syndrome". Lejune et al, (1959) found out that Down's syndrome is a genetic disorder caused by an extra chromosome 21 (Trisomy), mongolism[14]. Mental disability lack of cognition causes impaired functioning, in 1845, Esquirol (quoted in Scheerenberger, 1983) categorized mental disability into two divisions according to speech and language tasks. Seguin (1866) revealed that the main characteristic of mental disability is a serious impairment in moral development[16]. The aim of the present study is to explore the distribution and severity of periodontal diseases among individuals getting daily care in an institution specialized in training individuals with special needs in Riyadh city.

Materials & Methods

The study received ethical approval from the research center of Riyadh Colleges of Dentistry and Pharmacy: RC/IRB/2016/527 The targeted population was all the mentally disabled, physically disabled and Down syndrome individuals (n=100). The sample comprised 42 (42%) individuals, whose age ranged from 14 to 40 years, the mean age being 24 years. Individuals suffering from the following conditions were selected for the study: mental disabilities (n=32) with the mean age of 24 years, physically disable (n=1), Down syndrome (n=9) with the mean age of 25 years. For each participant a full diagnostic chart has been recorded (name, age, and classification of disability), along with clinical examination including:

1. Plaque index Loe & Silness 1964 (PI)
2. Gingival Index Silness and Loe, 1964 (GI)
3. Probing pocket depth measurement using UNC Probe (PD)
4. Detection of clinical attachment loss (CAL)

Using Mouth mirror, Explorer for detecting the Plaque accumulation, and the UNC probe for detecting the (PD), and the Gingival inflammation. Gingival index (GI) allows detecting the intensity of gingivitis, and its presence in four areas: mesio-facial papilla, facial margin, disto-facial papilla, and the lingual margin. Results were numbered as 0: normal gums, 1: mild swelling, with slight color change; 2: moderate edema, and there was hemorrhage; and 3: severe swelling, presence of ulcers, and spontaneous hemorrhage. As for the plaque index (PI) it evaluates the abundance of dental plaque in the gingival area of the tooth. Findings were obtained with values ranging from 0: absence of plaque in the gingival area, 1: a film of plaque was attached to the gingival margin but it was only visible with the use of a periodontal explorer, 2: the presence of plaque was visible to the naked eye and it was adhered to the gingival margin and pocket, or the adjacent areas to the tooth, and 3: there were large amounts of plaque in all the areas of the tooth. Missing teeth are substituted.

Statistical Analysis

The data collection took an overall of 4 weeks to be obtained and the data were subjected to IBM SPSS (Statistical Package for Social Sciences) Statistics Windows version 10.

Results

42 female individuals were examined, the mean age of these individuals was 24 years ranging from (14-40 years). Most of these individuals that had been examined were mentally disabled (n=32), Down syndrome (n=9), and physically disabled (n=1). In mentally disabled patients we found that 84% are having (Moderate gingival inflammation), and 47% having (Mild plaque accumulation). The number of patients, Total (GI), (PI) and their averages, (PD), (CAL) and their averages, along with the diagnosis of (Mentally disabled) patients are summarized in Tables I, II, III and IV.

Mentally Disabled

S#	GI	PI	Gingival Inflammation			Plaque Accumulation		
			Mild	Moderate	Severe	Mild	Moderate	Heavy
1	1.5	1.2		1			1	
2	1.45	2.08		1				1
3	1.29	1		1		1		
4	1.33	1.62		1			1	
5	1.7	0.95		1		1		
6	1.29	1		1		1		
7	1.66	2.37		1				1
8	1.62	0.7		1		1		
9	1.45	1.25		1			1	
10	1.2	0.91		1		1		
11	1.5	1.2		1			1	
12	1	1.66	1				1	
13	1.25	1.16		1			1	
14	1.2	0.5		1		1		
15	1.3	1.66		1			1	
16	1.83	1.25		1			1	
17	1.5	1.5		1			1	
18	1.12	1						
19	1.08	0.5	1			1		
20	1.5	1.4		1			1	
21	1.6	0.7		1		1		
22	1.3	0.7		1		1		
23	1.08	1.62	1				1	
24	1.5	0.7		1		1		
25	1.8	2		1				1
26	2.1	1.3			1		1	
27	1.5	1.75		1			1	
28	1.5	0.4		1		1		
29	1.08	0.8	1			1		
30	1.25	0.8		1		1		
31	1.29	1.25		1			1	
32	1.12	0.7		1		1		

Table 1.5: The number of patients, Total (GI), (PI) and number of patients having (Mild, Moderate, Severe) gingival inflammation, and number of patients having (Mild, Moderate, Heavy) plaque accumulation.

GI Average	1.402813	**Mild**	13%	4
		Moderate	84%	27
		Severe	3%	1

Table 2.5: (GI) average, number, and percentage of patients having (Mild, Moderate, and Severe) Gingival inflammation.

PI Average	1.175938	**Mild**	47%	15
		Moderate	44%	14
		Heavy	9%	3

Table 3.5: (PI) average, number, and percentage of patients having (Mild, Moderate, and Heavy) Plaque accumulation.

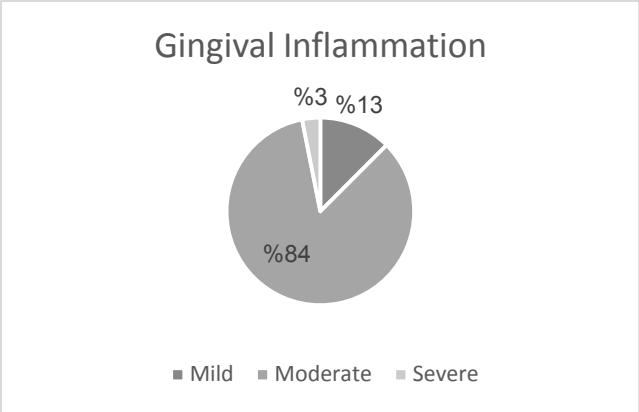

Figure 1.2 Gingival inflammation.

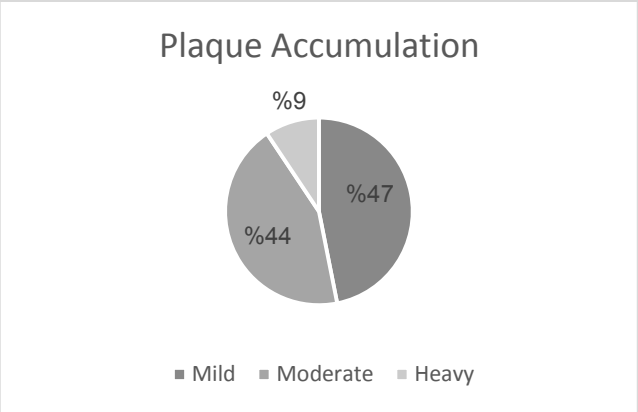

Figure 2.2 Plaque accumulation.

S#	CAL						PD (mm)
	T1	T2	T3	T4	T5	T6	
1	1	1	1	1			4
2	1_2	1_2	1_2	1_2	1_2	1_2	4.5
3	1	1					4
4	1_2_3	1_2_3	1_2_3	1_2_3	1_2_3	1_2_3	4.5
5	1_2	1_2					4.5
6	1	1					4
7	1_2	1_2	1_2	1_2	1_2	1_2	4
8	1	1					4
9	1	1	1	1			4
10	1	1	1				4
11	1	1	1	1			4
12	1	1					4
13	1_2	1_2	1_2	1_2	1_2		4
14	1	1					4
15	1	1	1	1			4
16	1	1	1	1			4
17	1_2	1_2	1_2	1_2	1_2	1_2	5
18							
19							
20							
21							
22							
23							
24							
25	1	1	1	1	1	1	4

S#	CAL						PD (mm)
	T1	T2	T3	T4	T5	T6	
26	1	1	1	1	1		4
27	1	1	1				4
28	1_3_7	1_3_7	1_3_7	1_3_7	1_3_7		4
29							
30							
31	1_2	1_2	1_2	1_2	1_2		4
32	2						5

Table 4.5: (CAL) and (PD) in mm on 6 teeth (T).

		Deep pockets	PD Average(mm)
CAL	T1	23	4.152173913
	T2	22	
	T3	16	
	T4	14	
	T5	9	
	T6	5	

Table 5.5: number of patients having (CAL), deep pockets (PD) and it's average in (mm).

In Down syndrome individuals we found 89% (Moderate gingival Inflammation), and 44% are having (Mild-Moderate plaque accumulation). The number of patients, Total (GI), (PI) and their averages, (PD), (CAL) and their averages, along with the diagnosis of (Down Syndrome) patients are summarized in Tables I, II, III and IV.

Down Syndrome

S#	GI	PI	Gingival Inflammation			Plaque Accumulation		
			Mild	Moderate	Severe	Mild	Moderate	Heavy
1	1.62	2.1		1				1
2	1.4	1.5		1			1	
3	1.2	1.3		1			1	
4	1.25	1.6		1			1	
5	1.25	1		1		1		
6	1.45	1.29		1			1	
7	1.5	0.95		1		1		
8	1.125	1.08	1			1		
9	1.4	0.7		1		1		

Table 1.5: The number of patients, Total (GI), (PI) and number of patients having (Mild, Moderate, Severe) gingival inflammation, and number of patients having (Mild, Moderate, Heavy) plaque accumulation.

GI Average	1.355	Mild	11%	1
		Moderate	89%	8
		Severe	0%	0

Table 2.5: (GI) average, number, and percentage of patients having (Mild, Moderate, and Severe) Gingival inflammation.

PI Average	1.28	Mild	44%	4
		Moderate	44%	4
		Heavy	11%	1

Table 3.5: (PI) average, number, and percentage of patients having (Mild, Moderate, and Heavy) Plaque accumulation.

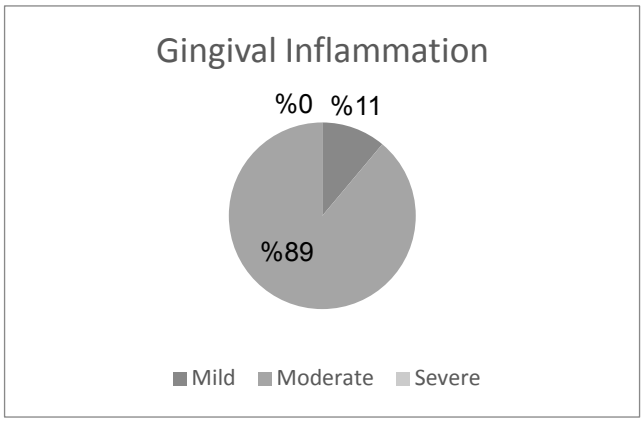

Figure 1.2 Gingival inflammation.

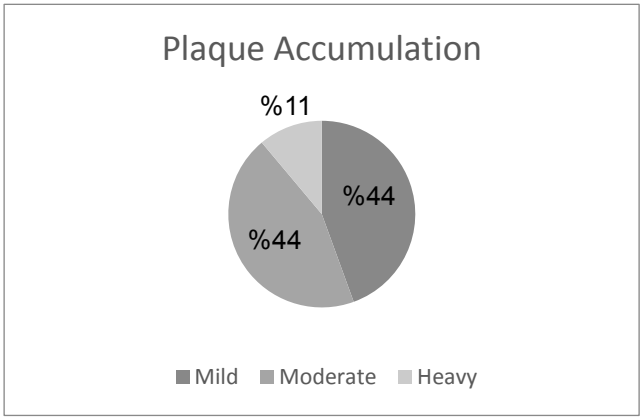

Figure 2.2 Plaque accumulation.

S#	CAL						PD (mm)
	T1	T2	T3	T4	T5	T6	
1	1	1					4
2	1						4
3							
4	1	1	1				4
5	1						4
6	1	1	1	1			4
7	1	1	1	1			4
8							
9	1						4

Table 4.5: (CAL) and (PD) in mm on 6 teeth (T).

		Deep pockets	PD Average(mm)
CAL	T1	7	3.11111
	T2	4	
	T3	3	
	T4	2	
	T5	0	
	T6	0	

Table 5.5: number of patients having (CAL), deep pockets (PD) and it's average in (mm).

In physically disabled patients and dwarfism we only got one patient in each. The number of patients, total (GI), (PI), (PD), and (CAL), along with the diagnosis of these patients are summarized in Tables I.

Physically Disabled

S#	GI	PI	Gingival Inflammation			Plaque Accumulation			CAL						PD
			Mild	Moderate	Severe	Mild	Moderate	Heavy	T1	T2	T3	T4	T5	T6	
1	1.62	2.25		1				1	1_2	1_2	1_2	1_2	1_2	1_2	5

Table 1.1: The number of patients, Total (GI), (PI) and number of patients having (Mild, Moderate, Severe) gingival inflammation, and number of patients having (Mild, Moderate, Heavy) plaque accumulation. having (CAL), deep pockets (PD) and it's average in (mm).

According to these tables and charts, there was no difference in the distribution of subjects according to age group but there was unequal gender distribution with females comprising 100% of the total sample. A major proportion of 53% and 94% exhibited poor plaque and gingival status, respectively. The greatest scores in Down syndrome was manifested in moderate gingival inflammation, whereas, mild and moderate plaque accumulation was 44%. In the mentally disabled individuals' moderate gingival inflammation took the highest score as 84%, and PI was 47% for mild plaque accumulation. From the previous researches it is evident that some population groups are more susceptible to periodontal diseases and call for special care dentistry. Nonetheless, the provision of dental care must be particularized to meet the patient's demands. Subjects care is detected, addressing the patients' case reports shown in Figs 1.1-6.6 that express the overall oral status, to accentuate the issues in implementing sufficient and comprehensive periodontal care to fit the demands of individuals with impairment or handicap (Table 1.1).

Abnormalities

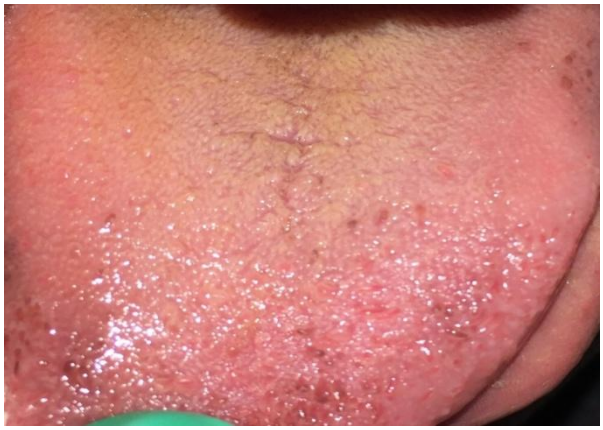

Figure 1.1 represents hairy tongue condition in a mentally disable indevedual

While examining these individuals there have been some notes, that we noticed during the clinical examination on each category, the mentally disabled, and Down Syndrome. Out of the 32 mentally disabled individuals we noticed 14 of them had missing teeth mainly the upper lateral incisors, first molars, lower first and second molars, and the premolars as well for both arches. Also, multiple rotated teeth along with crowding has been observed, and splinted lower anterior teeth. One of these individuals had a hairy tongue which was so obvious during examination For the Down Syndrome individuals again, we noticed that 7 out of 9 DS individuals had almost the same abnormalities that were present in the mentally disabled individuals. Missing upper lateral incisors, first, second molars, lower lateral incisors, lower first molars, and presence of a splint in the lower anterior teeth as well as missing first premolars in both arches.

Figure 1.6 extensive teeth decay, plaque accumulation, and racial pigmentation in a mentally disabled individual

Figure 2.6 significantly decayed teeth, severe overlap, and obvious plaque deposits

Periodontal Care	Issue to Consider
History	Communication with patient, privacy laws, literacy and consent. Oral hygiene habits, with or without assistance.
Examination	Examination and diagnosis should be comprehensive. Access to the exam table, assistance required (in some cases). Access to the oral cavity: enlarged tongue, and gag reflex (absent/exaggerated). Periodontal examination records shared with the patient management team (the center).
Diagnosis	Effect of the underlying medical condition on periodontal health and management. Dental manifestations of syndromes. Plaque-retentive elements. Presence of parafunctional habits and noncarious tooth-structure loss.

Periodontal Care	Issue to Consider
Preventive Phase	Individualized oral health education and preventive care. Use the visual images to educate the patient regarding oral health status: plaque-disclosing solutions; intra-oral. Photographs. Empower the patient to achieve and maintain oral hygiene. Select strategies to efficiently remove plaque: color-coded. Brushes; floss; high fluoride- concentration toothpaste.

Table 1.1

Multivariate Analysis

Education level of the parents was significantly linked with periodontal status. This could be interpreted by the results from a study among children with Down syndrome in Riyadh, which showed that a higher percentage of children of uneducated mothers were found to use only water as a way of cleaning their teeth in comparison to other children[2]. Furthermore, a high association was found between bad oral hygiene and the development and advancement of periodontal disease has been well recorded and the role of bad oral hygiene as a risk factor of periodontal diseases is well established[4].

Discussion

Special health care needs individuals are found to have oral health discrepancies. There is extensive literature accessible on the oral health of the special health care needs community, little research though has been conducted in Riyadh showing the severity and presence of periodontal diseases among these individuals. Subjects who did not contribute in the clinical examination procedures weren't cooperative, and had severe disabilities. The Down Syndrome subjects of this study had a little bit greater prevalence and more severe periodontal diseases than others found in other disabilities of comparable age groups. The mean gingival inflammation and plaque accumulation of the Down Syndrome individuals was 1.3 and 1.4, respectively. Whereas it was detected to be in the range of 1.2 and 1.4, respectively, among the other disabilities. This conduction proved previously reported data on the high prevalence of periodontal disease in Down Syndrome groups[310]. Furthermore, the proportion of subjects with no periodontal disease in this study was 0%.

Figure 3.6 participant with disclosing agent to guide oral hygiene education

Figure 4.6 mandibular arch showing malocclusion (teeth crowding)

Figure 5.6 canine completely displaced labially because of maxillary teeth crowding.

These results affirm the findings of other studies regarding the high prevalence of periodontal disease among individuals with disabilities [15,18]. The findings in this study showed that the overall GI of Down syndrome individuals of the study population was moderate with a prevalence rate of 11, 89 and 0% for mild, moderate and severe components, respectively. As for the PI of Down

Syndrome individuals it was mild to moderate, with a prevalence rate of 44, 44 and 11% for mild, moderate and severe, respectively. Whereas the overall GI of other disabilities was also moderate, with a prevalence rate of 13, 84 and 3% for mild, moderate and severe, respectively. Finally, for the PI it was mild, 47, 44 and 9% for mild, moderate and severe, respectively. With age, periodontal diseases severity increases; yet still few individuals younger than 35 years of age revealed evidence of periodontal destruction[8,12]. Altered resistance mainly would justify part of the increased prevalence of periodontal disease in Down syndrome individuals. Local determinants, as macroglossia, tooth morphology, lack of masticatory functions or malocclusion and harmful habits such as bruxism. Poor oral hygiene and host resistance are the main important causes of periodontal disease, but the examples mentioned before could be suggested as the aetiology of increased periodontal disease among Down syndrome individuals [5,19].

Figure 6.6 lower canine partially erupted into the lingual aspect of incisors due to teeth crowding.

The findings of this study revealed high BOP percentages and high GI rates displaying gingival inflammation as a prevalent finding, related to mild and moderate plaque levels in Down syndrome individuals compared to the other disabilities where the PI was mild. Without any bias toward previous studies there was no obvious reason behind these findings, except for the education level of the parents, environmental factors rather than genetic, and the type of disability itself. The state of good hygiene of oral cavity and periodontal diseases has a straightforward relation between them. The tendency of brushing teeth is greater with better education, occupation and income level. Behaviour and teeth brushing in this study revealed exceptional differences between individuals. Almost all of the subjects were cooperative; few of them were reluctant, but responded by continuous enthusiasm on oral hygiene education [1,9]. In a study by Martens *et al*. [15] it has been detected that children with severe mental disability showed lesser manual dexterity skills than the mildly mental disabled.

Conclusion

This study observed that periodontal diseases were a little bit greater among individuals with Down syndrome as compared to individuals with other disabilities, which may be due to many reasons such as shortage of oral health importance in the general blueprint of health management, or the overall parental indifference in relation to other essential health issues. Programs that promote oral health should be managed and specified at special needs centers and schools, which include the individuals' guardians/care givers. These programs should facilitate feasibility of access to regular use of oral health services, considering the many factors affecting the periodontal status of the current community.

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