

PREVALENCE OF DENTAL CARIES AND ORAL HYGIENE STATUS AMONG DOWN'S SYNDROME PATIENTS IN RIYADH — SAUDI ARABIA

¹THAMER A AL-KHADRA, BDS, Cert Pedo, Cert Ortho, MS, PhD

ABSTRACT

The objective of the study was to determine prevalence of dental caries and oral hygiene status among Down's syndrome patients attending rehabilitating centers in Riyadh, Saudi Arabia. Two hundred and twenty-four Down's syndrome individuals; 57, 3-6 years old, 116, 7-14 years old and 51, 15-22 years old from six rehabilitation centers were examined for dental caries (utilizing the WHO criteria for diagnosis of dental caries) and oral hygiene status. Out of the 224 patients examined, 131 were male and 93 female. The caries prevalence among the study group was 89%. The mean DMFT (decayed, missing and filled teeth) score among the males was 11.99 (± 3.91) and 12.07 (± 4.22) in females. In the 3-6 years age group, the mean dmft (decayed, missing and filled primary teeth) scores was 4.71 (± 0.27); in the 7-14 years age group, the mean dmft and DMFT scores were 6.09 (± 2.34) and 3.93 (± 1.64), respectively. And in the 15-22 years age group, the mean DMFT was 4.11 (± 1.77). Two thirds (66.0%) of the Down's syndrome patients had fair oral hygiene followed by 25% having good oral hygiene and 9% had poor oral hygiene. It can be concluded that the studied Down's syndrome patients had high caries experience; with only few having good oral hygiene.

Key words: Down's Syndrome, dental caries, oral hygiene status, Saudi Arabia

INTRODUCTION

Down's syndrome is an autosomal disorder caused by an extra chromosome 21. The syndrome is characterized by short stature, characteristic facial features with a protruding tongue, a wide range of learning difficulties, congenital heart disease, gastrointestinal disorders and other features.¹ Dental characteristics include abnormally rounded labial forms of tooth crown, partial anodontia, delayed eruption and malocclusion such as crowding, posterior cross bite and anterior openbite.¹

Periodontally, both the primary and the permanent dentitions are affected by a rapidly progressing and severe inflammation in more than 50% of patients with Down's syndrome.^{2,3} There are defects of chemotaxis of polymorphonuclear and other phagocytes which explain the high incidence of pocketing and marginal bone loss in these individuals.³

The oral flora is not different from other siblings.⁴ While the periodontal break down is more pronounced in Down's Syndrome patients,⁵ the studies of dental caries prevalence are less clear.⁶ A number of studies have revealed significantly low caries prevalence in Down's syndrome patients when compared to non-Down's Syndrome individuals,⁷⁻⁹ while others have

shown no difference in caries prevalence.¹⁰ Review of literature showed no study on caries prevalence and oral hygiene status among Down's syndrome patients in Saudi Arabia.

Truly relevant program in oral health could not be developed without the knowledge of disease levels and trends in various populations.¹¹ The need for a baseline data regarding dental caries prevalence in Down's syndrome patients is important to establish an adequate dental care program in these individuals.¹¹ Therefore, the purpose of this study was to determine caries prevalence and oral hygiene status of Down's syndrome patients in Riyadh City, Saudi Arabia.

METHODOLOGY

Following approval of the study by the College of Dentistry Research Center, permission to conduct the study was obtained from the Directors of all six rehabilitation centers for special children in Riyadh. Informed consent was obtained from the parents of Down's Syndrome children to participate in the study. The medical records of the Down's Syndrome children had earlier been reviewed with the help of the health care providers of the centers, and relevant information was extracted.

¹ **Correspondence:** Dr Thamer Al-Khadra, Assistant Professor, Department of Pediatric Dentistry and Orthodontics, College of Dentistry, King Saud University, P.O. Box 60169, Riyadh 11545, Saudi Arabia. Email: thamer@ksu.edu.sa

One examiner who was trained and calibrated by a senior faculty member of the College of Dentistry, King Saud University, carried out all the examinations. The WHO criteria¹² were utilized for diagnosis of dental caries. Each child was examined while seated on a portable chair under natural light using a disposable mirror and tongue blade. An explorer was sparingly used on doubtful surfaces. In case of doubt, the tooth was marked as sound. No radiographs were taken.

The oral hygiene status was recorded as good, fair or poor using the index of James et al.¹³ The data were entered into a computer and analyzed using SPSS (V. 10) to generate descriptive statistics for each variable.

RESULTS

A total of 224 Down syndrome patients (131 male and 93 female) were examined. Their ages ranged from 3-22 years. Upon examination of the medical records, it was revealed that 30 of them had history of cardiac surgery, 38 had history of mild asthma, 10 hypothyroidism and 18 had other medical conditions such as epilepsy, allergies, diabetes mellitus; 128 reported no medical conditions.

The caries prevalence in the group was 89%. The mean decayed, missing and filled teeth scores were 11.99 ± 3.91 and 12.07 ± 4.22 in males and females respectively (Table I). Even though the mean caries scores were slightly high among the females; the difference was not statistically significant.

The patients were further divided into three age groups i.e., 3-6 years, 7-14 years and 15-21 years. The mean dmft score in 3-6 years-olds was 4.71 ± 1.27 . In the 7-14 years olds, the mean dmft and DMFT scores were 6.09 ± 2.34 and 3.93 ± 1.64 , respectively.

The corresponding figures in the 15-22 years-olds were 1.53 ± 0.54 and 4.11 ± 1.77 . The decay component was observed to be the major constituent of the decayed, missing and filled teeth scores (Tables 2 and 3).

TABLE 1: CARIES EXPERIENCE OF DOWN'S SYNDROME PATIENTS BY GENDER

	Male (131) Mean±SD	Female (93) Mean±SD	Total (224) Mean±SD
Decay	7.51 ± 3.12	8.41 ± 4.32	7.96 ± 3.72
Missing	3.87 ± 1.21	4.04 ± 1.45	3.95 ± 1.33
Filled	10.61 ± 4.42	10.22 ± 4.12	10.42 ± 4.27
DMFT (primary+ permanent)	11.99 ± 3.91	12.07 ± 4.22	12.03 ± 4.07

TABLE 2: CARIES EXPERIENCE BY AGE-GROUPS

	3 to 6 years (n=57) Mean±SD	7 to 14 years (n=16) Mean±SD	15 to 22 years (n=51) Mean±SD
Decay	3.61 ± 1.23	3.66 ± 1.42	0.61 ± 0.21
Missing	0.93 ± 0.021	2.14 ± 0.91	0.78 ± 0.31
Filled	0.17 ± 0.02	0.29 ± 0.01	0.14 ± 0.02
DMFT (primary+ permanent)	4.71 ± 1.27	6.09 ± 2.34	1.53 ± 0.54

TABLE 3: CARIES EXPERIENCE (DMFT) BY AGE-GROUP

	7 - 14 yrs (n = 16) Mean ± SD	15 - 22 yrs (n = 51) Mean ± SD
Decay	1.12 ± 0.61	3.59 ± 1.22
Missing	2.59 ± 1.01	0.19 ± 0.54
Filled	0.22 ± 0.02	0.33 ± 0.01
DMFT	3.93 ± 1.64	4.11 ± 1.77

TABLE 4: ORAL HYGIENE STATUS OF THE DOWN'S SYNDROME PATIENTS

Classification	Frequency	Percent %
Good Oral Hygiene	19	9 %
Fair Oral Hygiene	148	66 %
Poor Oral Hygiene	57	25 %

Table 4 summarizes the oral hygiene status among the study group. The majority (66%) had fair oral hygiene status, while 25% had poor oral hygiene with only 9% having good oral hygiene.

DISCUSSION

Down syndrome, a congenital autosomal anomaly also called trisomy 21, is a genetic alteration characterized by generalized growth and mental deficiency. Down syndrome patients have characteristic orofacial features. Some of the common oral findings in these children include open bite, macroglossia, fissured lips and tongue, delayed eruption of teeth, missing and malformed teeth, microdontia, crowding, malocclusion, bruxism, poor oral hygiene and a low caries experience.¹⁴⁻¹⁶

Low caries experience has been reported in Down's syndrome children in many countries.¹⁷⁻¹⁹ A number of studies on oral health status of healthy Saudi children

have shown a high caries prevalence in Riyadh.^{20,24} The present study also revealed a high caries prevalence and severity among the Down syndrome patients in Riyadh. This is not in agreement with studies on Down's syndrome patient in other countries that showed a low caries prevalence as well as a high number of caries free Down's syndrome patients.^{5,25,26} The low caries prevalence in Down syndrome children appears to be due to immune protection caused by the elevated salivary *S. mutans* specific IgA concentrations and a simpler occlusal morphology.²⁷ However, it seems as sub-optimal oral hygiene status among the study population has neutralized the above stated advantages.

Oral hygiene plays an important role in the initiation and progression of dental caries and periodontal diseases.^{28,29} In the present study majority of the patients had fair to poor oral hygiene. This could be attributed to their reduced manual dexterity and lack of oral health education in these individuals and their care-takers.

The present study has provided baseline data regarding caries prevalence and oral hygiene status in Down's syndrome patients of Riyadh. It is expected that the results of this study would help in planning of restorative and preventive dental care, especially oral health education of Down's syndrome individuals and their care-takers.

CONCLUSIONS

- The caries prevalence and severity was very high among Down's syndrome patients in Riyadh.
- There was no statistically significant difference in caries experience between male and female Down's syndrome patients.
- Majority of the Down's syndrome patients had fair oral hygiene.

Acknowledgement

The author wishes to thank Drs M Alqhatani, N Alrashidi, and A. Almudaibari for their valuable contribution in the field work.

REFERENCES

- Hall RK. Pediatric Orofacial Medical Pathology. London: Chapman & Hall Medical Co. 1994.
- Svatun B, Gjermo P. Oral hygiene, periodontal health and need for periodontal treatment among institutionalized mentally subnormal persons in Norway. *Acta Odontol Scand* 1978;36:89-95.
- Sznajder N, Carraro J, Otero E, Carranza Jr F. Clinical periodontal findings in trisomy 21 (mongolism). *J Periodontal Res* 1968;3:1-5.
- Orner G. Post-eruptive tooth age in children with Down's syndrome and their sibs. *J Dent Res* 1975;54:581-87.
- Brown RH, Cunningham WM. Some dental manifestations of mongolism. *Oral Surg Oral Med Oral Pathol* 1961;14:664-76.
- Latner LE. The caries experience in three genotypes of Down's syndrome. *J Pedod* 1983;7:83-90.
- Wolf WC. Caries incidence in Down's Syndrome (mongolism). *J Wis State Dent Soc* 1967;43:3-7.
- Orner G. Dental caries experience among children with Down's syndrome and their sibs. *Arch Oral Biol* 1975;20:627-34.
- Steinberg AD, Zimmerman S. The Lincoln dental caries study: a three-year evaluation of dental caries in persons with various mental disorders. *J Am Dent Assoc* 1978;97:981-84.
- Cutress TW. Dental caries in trisomy 21. *Arch Oral Biol* 1971;16:1329-44.
- Barnes DE. Indicators for oral health and their implications for developing countries. *Int Dent J* 1983;33:60-66.
- WHO. Oral health surveys: Basic methods. Geneva: World Health Organization 1997.
- James P, Jackson D, Slack G, Lawton F. Gingival health and dental cleanliness in English schoolchildren. *Arch Oral Biol* 1960;3:57-66.
- Borea G, Magi M, Mingarelli R, Zamboni C. The oral cavity in Down syndrome. *J Pedod* 1990;14:139-40.
- Cheng RH, Leung WK, Corbet EF, King NM. Oral health status of adults with Down syndrome in Hong Kong. *Spec Care Dentist* 2007;27:134-38.
- Chan AR. Dental caries and periodontal disease in Down's syndrome patients. *Univ Tor Dent J* 1994;7:18-21.
- Stabholz A, Mann J, Sela M, Schurr D, Steinberg D, Shapira J. Caries experience, periodontal treatment needs, salivary pH, and *Streptococcus mutans* counts in a preadolescent Down syndrome population. *Spec Care Dentist* 1991;11:203-08.
- Johnson N, Young M. Periodontal disease in mongols. *J Periodontol* 1963;34:41-47.
- Morinushi T, Lopatin DE, Tanaka H. The relationship between dental caries in the primary dentition and anti *S. mutans* serum antibodies in children with Down's syndrome. *J Clin Pediatr Dent* 1995;19:279-84.
- Wyne A, Darwish S, Adenubi J, Battata S, Khan N. The prevalence and pattern of nursing caries in Saudi preschool children. *Int J Paediatr Dent* 2001;11:361-64.
- Al Dosari A, Abdellatif H, Al-Refai A. Oral health status of primary dentition among 551 children aged 6-8 years in Jazan, Saudi Arabia. *Saudi Dent J* 2000;12:67-71.
- Khan NB, Al Ghannam NA, Al Shammery AR, Wyne AH. Caries in primary school children: Prevalence, severity and pattern in Al-Ahsa, Saudi Arabia. *Saudi Dent J* 2000;13:71-74.
- AlDosari A, Wyne A, Akpata E, Khan N. Caries prevalence and its relation to water fluoride levels among schoolchildren in Central Province of Saudi Arabia. *Int Dent J* 2004;54:424-28.
- Wyne AH, Al-Ghorabi BM, Al-Asiri YA, Khan NB. Caries prevalence in Saudi primary schoolchildren of Riyadh and their teachers' oral health knowledge, attitude and practices. *Saudi Med J* 2002;23:77-81.
- Winer R, Cohen M. Dental caries in mongolism. *Dental Progr* 1962;2:217-19.
- Johnson N, Young MA, Gallios JA. Dental caries experience of mongoloid children. *J Dent Child* 1960;27:292-94.
- Lee SR, Kwon HK, Song KB, Choi YH. Dental caries and salivary immunoglobulin A in Down syndrome children. *J Paediatr Child Health* 2004;40:530-33.
- Sheiham A, Watt RG. The common risk factor approach: a rational basis for promoting oral health. *Community Dent Oral Epidemiol* 2000;28:399-406.
- Watt RG. Emerging theories into the social determinants of health: implications for oral health promotion. *Community Dent Oral Epidemiol* 2002;30:241-47.