

Oral hygiene practices and dietary habits among children with Down's Syndrome in Riyadh, Saudi Arabia

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تحدث الكسور عادةً في أجهزة الإستعاضة الصناعية المتحركة و المصنوعة من مادة الأكريل نتيجة لقوى إطباقية شديدة أو حوادث عارضة، تهدف هذه الدراسة إلى تحديد عدد و نوع الأجهزة المكسورة التي إستقبلها مركز طب الأسنان بالدمام خلال ستة أشهر، حيث تم توزيع إستبيان على ثلاثة أطباء لتعبئته عند مراجعة أي مريض لديه جهاز مكسور، و قد تبين بعد التحليل الإحصائي أن أكثر الأجهزة التي تعرضت للكسر هي أجهزة الفك السفلي الجزئية بنسبة ٤٦,٤% كما أوضحت النتائج أن ٥٣,٦% من الأجهزة المكسورة قد تم إستخدامها لأكثر من سنة و أقل من ٣ سنوات، أن السبب الرئيسي للكسور كان الأرتطام المفاجئ بنسبة ٨٠,٤% كما و أن انهيار قاعدة الأجهزة كان أكثر أنواع الكسور شيوعاً بنسبة ٧١,٤%، يوصي الباحثون بأن يتم تقوية أجهزة الإستعاضة الصناعية المتحركة ببعض المواد لزيادة متانتها و تحملها للقوى المختلفة كما أن الفحص المنتظم للمريض و حالته الفموية مهم جداً للحد من هذه المشاكل. ٤٦,٤% كما أوضحت النتائج أن ٥٣,٦% من الأجهزة المكسورة قد تم إستخدامها لأكثر من سنة و أقل من ٣ سنوات، أن السبب الرئيسي للكسور كان الأرتطام المفاجئ بنسبة ٨٠,٤% كما و أن انهيار قاعدة الأجهزة كان أكثر أنواع الكسور شيوعاً بنسبة ٧١,٤%، يوصي الباحثون بأن يتم تقوية أجهزة الإستعاضة الصناعية المتحركة ببعض المواد لزيادة متانتها و تحملها للقوى المختلفة كما أن الفحص المنتظم للمريض و حالته الفموية مهم جداً للحد من هذه المش

The objective of this study was to evaluate the oral hygiene practices and dietary habits among a sample of children with Down's syndrome in Riyadh, Saudi Arabia, and to determine whether the mother's educational level and occupational status are related to these practices and habits. Two hundred and fifty families of children with Down's syndrome were selected for this study. These children attended three institutions in Riyadh, Saudi Arabia. The data for the study was obtained through a self-administered questionnaire distributed by the institutions principal. Two hundred and twenty-five questionnaires were returned giving a response rate of 90%. The results showed that nearly 75% of the children brushed their teeth once or more daily and that about 90% used the toothbrush. Of the surveyed sample, 60% received parental help with tooth brushing, and 12% were helped by the nanny. Children of mothers with university education were found to brush their own teeth or depend on the nanny's help ($P=0.008$, $P=0.001$ respectively). Also children of working mothers were found to brush their own teeth or rely on the nanny's help ($P=0.034$, $P<0.0001$ respectively). Only 7.3% of the mothers gave their children sweets or sweet snacks three times a day or more and 7% gave them sweet drinks as frequent. Over half of the mothers gave their children sweets and sweet snacks occasionally, and 42.8% gave them sweet drinks occasionally. No statistically significant differences, in these practices, were found in relation to the mother's educational levels or occupational status. The practice of giving sweets as a reward was low among the surveyed sample and the highest percentage (55.7%) of the respondents gave their children in-between meal snacks once/day. Statistically significant differences were found only in the frequency of consumption of sweets and sweet snacks between the children of working and non-working mothers as non-working mothers gave their children sweets and sweet snacks more frequently ($P= 0.027$). This study demonstrated that the overall level of oral hygiene practices and dietary habits among Down's syndrome children was satisfactory and that assisting the children with tooth brushing would improve their oral hygiene. With regards to the relationship between the Child's oral hygiene practices and dietary habits with the mother's educational level and occupational status, statistically significant associations were found only with the person responsible for brushing the teeth and the frequency of consumption of sweet snacks.

INTRODUCTION

Down's syndrome is a birth defect which is caused by a chromosomal abnormality and is associated with mental retardation.^{1,2} For some unexpected

reason, an accident in cell development results in 47 instead of the usual 46 chromosomes. This extra chromosome is responsible for changes in the orderly development of various organs of the body especially the brain, during the different stages of life.² Down's syndrome occurs at a rate of around 1 in 700 to 1 in 900

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Several studies have explored the occurrence of dental caries and periodontal diseases in Down's syndrome children.⁷⁻¹² However, very limited studies have addressed preventive dental health practices among these children.^{5,13} Oral hygiene practices are voluntary physical activities that have at least two requirements: motivation and manual dexterity.¹³ Thus, poor oral hygiene is perhaps more prevalent among mentally retarded persons compared to other individuals.¹⁴ Studies found that the standard oral hygiene for Down's syndrome children in general is very poor, because they are unable to carry out proper oral hygiene measures by themselves, and they pose a management problem to those who assist them.^{3,4} Other reports have found an inverse relationship between the levels of mental retardation and oral hygiene status; the lower the I.Q score, the higher the oral hygiene index score.^{15,16} The provision and or supervision of oral hygiene by parents have been reported to be lower for disabled children than for non-disabled children.⁶

Not only the oral disease and oral hygiene relationship have been recognized, but also dietary habits have been known to influence the dental health.¹⁷ Several studies have shown that sugar consumption and eating patterns are essential factors in the etiology of dental diseases.¹⁷⁻¹⁹ A significant association was found between the frequency of at- and between- meal consumption of sweets and sweet drinks and high levels of dental caries.^{18,19}

In Riyadh, Saudi Arabia, no previous studies assessing the socio-dental factors, in relation to the oral health of Down's syndrome children have been reported. The aims of this study were to evaluate the oral hygiene practices and dietary habits among a sample of children with Down's syndrome in Riyadh, Saudi Arabia,

and to determine whether the mother's educational level and occupational status are related to these practices and habits.

SUBJECTS AND METHODS

Families of children with Down's Syndrome were included in this study. These children attended the three institutions in Riyadh, Saudi Arabia, which provided education to children with mental disabilities.

In these institutions, children attended from 7:00 AM to 2:00 PM for educational purposes only. They bring their food and snacks from their homes. There are no preventive dental programs of any sort available in any of the institutions. The children's mothers were asked to participate in the study by filling a questionnaire which was distributed by the principals of the institutions.

The aim of the study was explained to the mothers and confidentiality of the provided information was assured by an explanatory letter sent to each mother. All the data were obtained through self-administered questionnaires. The questionnaire was tested earlier on a group of parents who did not participate in the main study and appropriate modifications were made. The following areas were covered in the questionnaire:

- Demographic information such as age, gender, nationality of the child and age of parents.
- Socioeconomic status which was measured by the educational level and occupational status of mothers. Three categories of education were defined as illiterate, high school or less and university education. With regards to the occupation²⁰, five categories were defined as higher professions (doctor, dentist, pharmacist, lawyer, engineer), intermediate professions (teacher, accountant, government employee,

journalist, translator) and others (laborer, cook, nanny, housekeeper, retired and housewife).

- Dental health practices which included the frequency and method of tooth brushing, use of toothpaste, person responsible for brushing the child's teeth, and if any instructions on tooth brushing method were provided.
- Dietary habits, including the frequency of consumption of sweets, sweet snacks and sweet drinks, frequency of giving sweets as a reward, and the number of in-between meal snacks a day.

All the information was entered into a computer utilizing FoxPro program for windows. Statistical Package for Social Sciences (SPSS version 10) was utilized for all the statistical computations. Frequency distribution was used for the descriptive analysis and Chi-square test at 5% significance was used for the statistical relationship between the variables.

RESULTS

Socio-Demographic Background

Out of the 250 questionnaires distributed, only 225 were returned giving a response rate of 90%. The age of the children ranged between 1 and 19 years with a mean age of 7.24 (\pm 4.11) years (Table 1). The majority of the children (91%) were Saudis.

Nearly 35% of mothers had university education and only 12.7% of the mothers were illiterate (Table 2). With regard to the mothers' occupation, around 29% of the mothers had an intermediate profession, whereas 68.5% were not working. Due to the small percentage in 3 of the categories [higher professions (1.9%), laborer (0.5%), retired (1.4%)] it was decided to use data from two categories only (working and not working) and to use them in the rest of the data description and analysis.

Table 1. Distribution of children by age and gender

Gender	Age group in years				Mean age \pm SD	TOTAL
	1-5 N (%)	6-10 N (%)	11-15 N (%)	16-19 N (%)		
Male	52 38%	59 43%	20 14.6%	6 4.4%	7.27 \pm (4.08)	137
Female	36 42.4%	28 32.9%	17 20%	4 4.7%	7.20 \pm (4.17)	85
TOTAL	88 39.6%	87 39.2%	37 16.7%	10 4.5%	7.24 \pm (4.11)	222

Table 2. Distribution of mothers by level of education and type of occupation

Mothers' characteristics	N	(%)	
Mothers' educational level	Illiterate	28	12.7
	High school or lower	113	51.6
	University education	78	35
Mothers' occupational status	High profession	4	1.9
	Intermediate profession	61	29.1
	Labor	1	0.5
	Retired	3	1.4
	Housewife	141	67.1

Oral Hygiene Practices

Nearly 75% of the children brushed their teeth once a day or more (Table 3). About 90% of these children used toothbrush and only 2.2% of the children used miswak. A high percentage (92.8 %) of the children used toothpaste with or without a tooth brush.

Regarding the person responsible for cleaning the child's teeth, 60% of parents stated that they brushed their child's teeth, and 36.4% of the surveyed children brushed their own teeth (Table 3).

As much as 61% of mothers stated that they had received information about methods of tooth brushing.

Children's Dietary Habits

Fifty six percent of the mothers gave their children sweets or sweet snacks occasionally, whereas, only 7.3% of the mothers gave sweets three times a day (Table 4). Regarding sweet drinks, 42.8% of mothers reported that they occasionally

Table 3. Percentage of responses regarding oral health practices (N=225*)

Questions	Response	
	N	%
➤How many times per day do you brush your child's teeth?		
- Never	14	6.3
- Occasionally	40	17.9
- Once/day	63	28.3
- 2 times/day	85	38.1
- 3 times/day	21	9.4
➤What do you use to clean your child's teeth? **		
- Toothbrush	201	89.3
- Meswak	5	2.2
- Water only	38	16.9
- Piece of gauze	11	4.9
➤Do you use toothpaste to clean your child's teeth		
- Yes	205	92.8
➤Who is responsible for brushing child's teeth? **		
- Child	82	36.4
- Nanny & Nurse	28	12.4
- Older sibling	38	16.9
- Parents	135	60
➤Have you ever received any information about children's tooth brushing?		
- Yes	133	61
- No	85	39

*The total number per characteristic is different from the total number because some mothers did not answer all the questions.

**More than one response given

gave their children sweet drinks compared to only 7% of those mothers who gave their children sweet drinks three times a day.

With regard to providing sweets as a reward, 56.2% of mothers stated that they gave it occasionally and 41.6% were never given sweets as a reward. Up to 55.7% of the mothers provided their children with in-between meal snacks once a day and only 14.2% of the mothers never gave sweets as a reward.

Child's Oral Hygiene Practices and Mothers' Educational Level and Occupational Status

No statistically significant differences were found between the children of mothers with different educational

Table 4. Percentage of responses regarding children's dietary habits (N=225*)

Questions	Response	
	N	%
➤How many times per day does your child eat sweets or sweet snacks?		
- Occasionally	122	56.0
- Once/day	54	24.8
- Twice/day	26	11.9
- Three times/day	16	7.3
➤How many times per day does your child take sweet drinks?		
- Occasionally	92	42.8
- Once/day	67	31.2
- Twice/day	41	19.0
- Three times/day	15	7.0
➤Do you provide sweets as a reward to your child?		
- Never	91	41.6
- Occasionally	123	56.2
- Always	5	2.2
➤How many times per day does your child eat in-between meal snacks?		
- Never	31	14.2
- Once/day	122	55.7
- Twice/day	53	24.2
- Three or more/day	13	5.9

*The total number per characteristic is different from the total number because some mothers did not answer all the questions.

levels, and working status with regard to frequency of cleaning teeth (P = 0.811 and P=0.439, respectively) as shown in Table 5.

A higher percentage (32.1%) of children of illiterate mothers were found to use water only as a method of cleaning their teeth compared to other children and this difference was found to be statistically significant (P = 0.024). No statistically significant differences were found in the methods of cleaning between the children of mothers with different occupational status.

Children of mothers with university education were found to brush their own teeth or depend on the nanny or nurse's help (49.4 and 22.8, respectively) more than the other children and this difference was found to be statistically significant (P = 0.008 and P = 0.002, respectively). Children of working mothers were also

Table 5. Percentage distribution of children's oral hygiene practices and mothers' educational level and working status

Oral Hygiene Practices	Mothers' Educational Level			X^2 test P values	Mothers' Occupation		X^2 test P value
	Illiterate	High school or less	University education		Working	Non-working	
➤ Frequency of cleaning							
- Never	3.6	7.1	6.4		6.2	6.3	
- Sometimes	21.4	19.5	12.8		15.4	18.2	
- Once/day	35.7	28.3	25.6	0.811	24.6	28.7	0.439
- Twice/day	28.6	36.3	44.9		38.5	39.7	
- Three times / day	10.7	8.8	10.3		15.4	7.4	
➤ Methods of cleaning**							
- Brushing	89.3	87.6	91.1	0.742	90.9	88.2	0.373
- Meswak	-	2.7	2.5	0.688	1.5	2.8	0.498
- Water only	32.1	11.5	20.3	0.024*	22.7	13.9	0.083
- Gauze	-	6.2	5.1	0.404	4.5	5.6	0.527
- Toothpaste	7.1	7.2	7.8	0.987	92	93	0.507
➤ Person responsible for brushing**							
- Child	28.6	28.3	49.4	0.008*	43.9	29.9	0.034*
- Nanny & Nurse	-	8.8	22.8	0.002*	25.8	6.9	<0.0001*
- Sibling	21.4	20.4	11.4	0.223	10.6	20.1	0.063
- Parents	53.6	64.6	55.7	0.352	56.1	63.9	0.176
➤ Received information on tooth brushing							
	60.7	62.4	58.4	0.863	67.7	60.4	0.200

*Significant

**More than one answer given

Table 6. Percentage distribution of children's dietary habits and mothers' educational level and working status

Dietary Habits	Mothers' Educational Level			X^2 test P value	Mothers' Occupational Status		X^2 test P value
	Illiterate	High school or lower	University education		Working	Non-Working	
➤ Sweets, sweet snacks							
- Occasionally	48.1	61.5	48.1		45.3	60	
- Once/day	29.6	24.8	24.7		26.6	23.6	
- Twice/day	11.1	6.4	20.8	0.117	21.9	7.9	0.027*
- Three times/day	11.1	7.3	6.5		6.3	8.6	
➤ Sweet drinks							
- Occasionally	33.3	40.7	50.7		47.6	39.1	
- Once/day	33.3	31.5	29.3		31.7	31.2	
- Twice/day	22.2	21.3	14.7	0.672	17.5	20.3	0.363
- Three times/day	11.1	6.5	5.3		3.2	9.4	
➤ Sweets as a reward							
- Never	42.3	43.2	39		42.9	40.8	
- Occasionally	53.8	55	58.4	0.946	54.0	57.0	0.853
- Always	3.8	1.8	2.6		3.2	2.1	
➤ In-between meal snacks							
- Never	11.5	12.4	17.3		16.4	11.1	
- Once/day	46.2	56.6	57.3		60.7	54.9	
- Twice/day	23.1	27.4	20	0.085	19.7	27.1	0.373
- Three or more times/day	19.2	3.5	5.3		3.3	6.9	

*Significant

found to brush their own teeth or depend on the nanny or nurse's help compared to children of non-working mothers and the difference between the two groups was statistically significant at $P = 0.034$ and $P < 0.0001$, respectively.

Child's Dietary Habits and Mothers' Educational Level and Occupational Status

A lower percentage (6.5%) of children of mothers with university education was found to consume sweets and sweet snacks 3 times a day compared to children of illiterate mothers (11.1%) but the difference between the two groups was not statistically significant ($P = 0.117$) as shown in Table 6.

Also, lower percentage (5.3%) of children of mothers with university education was found to consume sweet drinks 3 times a day compared to the children of illiterate mothers (11.1%) but this difference was not statistically significant ($P = 0.672$).

With respect to providing sweets as a reward, no statistically significant differences were found between the mothers of all educational levels ($P = 0.946$). In addition, no statistically significant differences were found in the frequency of consumption of in-between meal snacks per day among the children of mothers of different educational levels ($P = 0.085$).

Regarding the mothers' occupational status, statistically significant differences, were only found between the children of working and non-working mothers in the frequency of consumption of sweets and sweet snacks ($P = 0.027$).

DISCUSSION

This study provided an opportunity to assess the oral hygiene practices and dietary habits among a group of children with Down's syndrome in Riyadh, Saudi

Arabia. It showed that over three quarters of the children brushed their teeth once or more a day and nearly 90% used the tooth brush for that purpose. This is comparable to the findings of Randell et al.,⁵ who reported that nearly 80% of Down's syndrome children brushed their teeth at least once a day.

With regard to providing help with brushing, 60% of the children received parental help and 12.4% were helped by their nanny or nurse giving a total of 72.4% receiving help with brushing. This is higher than the 60% reported by Randell et al.⁵ However, it is still lower than 84% of non-disabled children receiving help during tooth brushing. This might reflect a parental belief of a reduced importance of oral health in comparison to the over all scheme of health management or maybe more time is devoted to assist these children in other daily activities which are seen to be more important compared to their non-disabled counterparts.

Allison et al.² also found that Down's syndrome children were less likely to have their teeth cleaned daily compared with their young non-disabled peers which may also reflect the parent's lack of understanding of the importance of oral health care for a child with Down's syndrome when forced to deal with other medical problems requiring treatment.

Although socio-economic factors are known to have a major impact on both general and oral health, no relationship was found between the oral health practices and the mothers' educational levels or occupational status among the surveyed sample. This is in agreement with the study of Tesini,¹⁴ who concluded that socio-economic status is not a determinant in the oral hygiene status of mentally retarded individuals.

Statistically significant differences were found only in the person responsible for cleaning the child's teeth, since children of mothers with higher educational levels

and of working mothers relied more on the nanny or nurse's help than the other groups, indicating the presence of a nanny or nurse which reflects the differences in socio-economic status. Also more children of mothers with higher educational levels and working mothers brushed their own teeth which might be a sign of the mother being too busy to assist her child with brushing of their teeth. This finding is in concurrence with the findings of Nowak.²¹

Children's eating behavior is affected by the parents' social and environmental influences such as the use of food as rewards and the withholding of food as punishment.²² This study demonstrated that the frequency of consumption of sweet snacks and drinks was lower among the surveyed sample compared to non-disabled children.²⁰ In addition, the use of sweets as a reward and the consumption of in-between meal snacks was found to be low. The reduced consumption and lower frequency intake of sweets is very important especially for children with Down's syndrome since they are unable to maintain proper oral hygiene.

No statistically significant differences were found in the children's dietary habits among mothers with different educational levels which contradict the findings of Clancy et al.,²³ who found a significant relationship between the parents' educational level and the child's dietary habits. In this study, differences were found only in the frequency of consumption of sweets and sweet snacks between the children of working and non-working mothers. This difference might be because working mothers are too engaged to follow what their children are consuming.

This study has demonstrated that the overall level of oral hygiene practices and dietary habits among Down's syndrome children was satisfactory. However, active assistance of the children with their tooth

brushing would help in achieving better results in improving their oral hygiene. Also mothers, especially the ones who are working, should be provided with more information regarding the importance of watching and controlling their children's dietary habits.

CONCLUSIONS

- Nearly three quarters of the surveyed children brushed their teeth at least once a day.
- Sixty percent of the parents assisted their children with tooth brushing.
- Children of mothers with higher education and working mothers were found to brush their own teeth or depend on the nanny or nurse's help.
- Over 40% of the mothers gave their children sweets, sweet snacks and drinks occasionally, but no statistically significant differences, in these practices, were found between the mothers in relation to their educational level or occupational status.
- The practice of giving sweets as a reward was low among the surveyed sample and no statistically significant differences were found in the use of sweets as a reward and in the frequency of in-between meal snacks in relation to the mothers educational levels.

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