Risk Factors Associated with Mental Disability on Oral Health Status and Treatment Needs of Children and Adolescents: A Case Control Study

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Abstract

Objective: The aim of this study was to assess the impact of mental disability on oral health status and to determinate treatment needs of children and adolescents of Manuba in Tunisia.

Materials and Methods: This study was conducted among 90 children and adolescents with mental disability and 90 case-controls, who are the residents of Higher Institute of Special Education (HISE) of Manuba in Tunisia. The two groups had not the same distribution regarding age and gender. Survey forms consist of two major components. Firstly, the questionnaire was used to gather general data related to mental handicap and data related to the oral hygiene. Secondly, the clinical examination was used to identify variables related to oral health status (decayed, missed and filled teeth index DMF, Plaques Index PI, Gingival Index GI, Occlusal disorders and Dental tooth brushing habits). The results were analyzed using the Statistical Package for the Social Science (SPSS Version 13.0) for Windows.

Results: Our study has identified results with a statistically significant difference between the group with mental disability and the control group on most variables: The mean DMF index for this population was (3.08 ± 2,84) vs. (1.42 ± 2.1) for the control group (p < 0.001), the mean PI was (1.38 ± 0.6) vs. (1.04 ± 0.58) for the control group (p < 0.001), the average GI was (1.5 ± 0.57) vs. (0,86 ± 0.63) for the control group (p = 0.03) and the percentage of occlusal disorders for this population was 55(61.1%) vs. 33(36.7%) for the control group (p = 0,001). On the other hand, the number of children brushing teeth was equivalent in both of the groups 87(96.6%) and the number of children who have treatment needs was 88 (97,77%) vs. 78(86,68%) in the control group.

Conclusion: Our study has revealed that mental disability can be considered as a risk factor for oral health status (dental caries, plaque formation, gingivitis and occlusal disorders).

Keywords: Mental Disability; Oral Health; Children and Adolescents

Introduction

In many countries, oral health has improved considerably over the past five to six decades, but some groups have not benefitted from these improvements and still experience suboptimal oral health. One of these groups concerns individuals with special health care needs.

Risk Factors Associated with Mental Disability on Oral Health Status and Treatment Needs of Children and Adolescents: A Case Control Study

106

Children with special health care needs (SHCN) refers to children with any physical, develop- mental, mental, sensory, behavioral, cognitive, or emotional impairment or limiting condition that require differentiated medical management, special health care intervention, and/or use of specialized services or programs [1]. They make up 12% to 18% of children worldwide [1].

Studies have reported that such children tend to have poorer oral hygiene than their normal counter-parts [2]. An increased risk of dental problems and significant unmet needs for medical and dental care has also been reported in this population. Some factors can contribute to these conditions such as impaired manual dexterity and physical challenges, intellectual disability (ID) resulting in reduced cooperation with treatment, xerostomia caused by drugs, radiation, therapy and/or the disease itself and lack of financial resources and access to routine preventive dental services [3]. The aim of this study was to assess the impact of mental disability on oral health status and to determinate treatment needs of children and adolescents of Manuba in Tunisia.

Materials and Methods

Sample selection and study design

A cross-sectional case-control study was performed with 180 children aged between 11 to 15 years, who are the residents of Higher Institute of Special Education (HISE) of Manuba.

Selected children were divided into two equal groups of mental disability and controls. The group who present mental disability (n = 90) included patients with only mental deficiency or physical deficiency and patients with both mental and physical deficiency with a good initial cooperation. The subjects forming the control group (n = 90), matched for age and gender, were selected from patients in good mental and physical health and living in the same area as the control group.

Questionnaires

The children's parents or legal guardians received information about the purpose of this study and informed consent was obtained prior to the clinical examination and information collection. Only children whose guardians had signed the informed consent were enrolled in this study. Questionnaires completed by parents and data from the patients' medical records provided information on socio-demographic, medical history, parents' education, family income, and oral hygiene practices: tooth brushing, age of beginning tooth brushing, tooth brushing regularity (tooth brushing every day), duration of tooth brushing, frequency of tooth brushing, method of tooth brushing (vertical, horizontal, circular, anarchic). For patients with mental disability, the information regarding the type of disability, the autonomy and etiology of mental handicap was obtained from their medical records.

Clinical examination

The research protocol was approved by and carried out under the auspices of the Laboratory of Biostatistics, Clinical Research and Epidemiology, Faculty of Medicine and Pharmacy, Mohammed V University in Rabat, Morocco.

The oral examination was carried by a single examiner and was done using sterile instruments. Dental caries were assessed using DMFT/dmft index (decayed, missed and filled teeth index) and according to World Health Organization criteria [4]. A tooth was considered 'decayed' if there was frank cavitation on the surface, 'missing' if the extraction was due to caries and 'filled' if it had a restored carious lesion. Exfoliated, un-erupted teeth and those extracted for other reasons apart from caries were not included in the indices.

The biofilm index was measured by using the LOE and SILNESS Plaques Index (PI) obtained as a percentage of dental surfaces with visible plaque from the total number of examined surfaces. On this same occasion Gingival Index was also assessed using the LOE and SILNESS Gingival Index (GI). All of children, parents, caregivers and teachers received instructions about oral health maintenance and a toothbrush at the end of the clinical examination.

Risk Factors Associated with Mental Disability on Oral Health Status and Treatment Needs of Children and Adolescents: A Case Control Study

107

Statistical analysis

Data collection and statistical analysis were performed using "SPSS 13.0 for Windows". In order to describe the general characteristics of the population, quantitative variables were expressed as "mean ± standard deviation", "median/ quartile" and categorical variables were expressed as numbers and percentages. An evaluation association in categorical data between groups was using Chi-square, Student and ANOVA tests. Sample linear regression analyses were performed to explore the effect of independent variables (characteristics of the handicap) on DMFT/dmft index; Plaques Index (PI) and Gingival index (GI) as dependent variables and Logistic regression analyses were performed to determinate treatment needs regression between the study group and the group control. For all statistical analyses, a p-value less than 0.05 were considered statistically significant.

Results

Participant characteristics

The study sample consisted of 180 children, of who 90 presented mental disability with a median of age 15 (13; 15) years and 90 control group who present good mental and physical health with a mean age of 12,6 ± 0,86 years. The percentage of our study group by gender was 32 (33,5%) girls and 58 (64,4%) boys, and the percentage of the group control by gender was 48 (53,3%) girls and 42 (46,6%) boys.

Oral Health Status

The oral health status revealed significant a statistical difference between the group with mental disability and control groups.

The mean DMFT/dmft scores was 3,08 ± 2,84 in our study group and 1,42 ± 2,1 in the control group (p < 0,001). The mean PI score was 1,38 ± 0,6 in the study group and 1,04 ± 0,58 in the control group (p < 0,001), the mean GI scores was 1,05 ± 0,57 and 0,86 ± 0,63 in the study and control group, respectively (p = 0,03). The percentage of occlusal disorders in our study group was 55 (6,1%) and 33 (36,7%) in the study group (p = 0,001) (Table 1).

Variable	Mental Handicap		
	Yes N = 90	No N = 90	P value
DMFT/dmft index (M ± SD)	3.08 ± 2.84	1.42 ± 2.1	< 0.001
Plaque index (M±SD)	1.38 ± 0.6	1.04 ± 0.58	< 0.001
Gingival index (M ± SD)	1.05 ± 0.57	0.86 ± 0.63	0.03
Occlusal disorders (%)	55 (61.1)	33 (36.7)	0.001

Table 1: Oral health of children with and without mental disabilities.

According to this different results, a significant association was found between mental disability and DMFT/dmft, PI, GI scores and occlusal disorders (p < 0,001, p < 0,001, p = 0,03 and p = 0,001 respectively).

The study group was classified according to oral hygiene practices into different groups, depending: on the brushing technique, vertical 11 (12,8%), horizontal 63 (73,3%), circular 2 (2,3%), anarchic 10 (11,6%); on the frequency of brushing, once a day 12 (13,8%), twice a day 31 (35,6%) and trice a day 24 (27,6%), irregular frequency 20 (23%) and on the brushing times (morning, noon and evening respectively or not).

Risk Factors Associated with Mental Disability on Oral Health Status and Treatment Needs of Children and Adolescents: A Case Control Study

108

In regards to oral hygiene practices, the control group presented better conditions of oral hygiene; we observed a statistical significant difference between our study group and the group control concerning brushing techniques, brushing frequency and tooth brushing times (p < 0.001) (Table 2).

Variable	Mental Handicap		
	Yes N = 90	No N = 90	P value
Tooth Brushing (%)			0.65
Yes	87 (96.7)	88 (97.8)	
No	3 (3.3)	2 (2.2)	
Brushing Technique (%)			< 0.001
Vertical	11 (12.8)	33 (37.5)	
Horizontal	63 (73.3)	27 (30.7)	
Anarchic	10 (11.6)	22 (25)	
Circular	2 (2.3)	6 (6.8)	
Brushing frequency (%)			< 0.001
One/day	12 (13.8)	16(17.8)	
Twice/day	31 (35.6)	74(82.2)	
Trice/day	24 (27.6)		
Irregular Frequency	20 (23)	33(36.7)	
Brushing Times (%)			< 0.001
Morning	15 (17.2)	19 (21.6)	
Moon	3 (3.4)	1 (1.1)	
Evening	8 (9.2)	21 (23.9)	
Morning/Evening	31 (35.6)	46 (52.3)	
Morning/Moon/Evening	26 (29.9)	1 (1.1)	
Morning/Moon	2 (2.3)	0 (0)	
Moon/Evening	2 (2.3)	0 (0)	

Table 2: Oral hygiene practices of children with and without mental disabilities.

Sample linear regression analyses showed that type of handicap (mental handicap, physical handicap, mental and physical) (p = 0,74; p = 0,66; p = 0,85), handicap autonomy (complete autonomy, autonomy/tiredness, non-autonomy) (p = 0,84; p = 0,46; p = 0,65) and handicap etiology (congenital, neonatal pain, meningitis, unknown, others) (p = 0,95; p = 0,88; p = 0,28) were not significantly associated with DMFT/dmft score, plaque index (PI) and gingival index (GI) (Table 3).

Risk Factors Associated with Mental Disability on Oral Health Status and Treatment Needs of Children and Adolescents: A Case Control Study

109

Variable	DMFT/dmft index		Plaque index (PI)		Gingival index (GI)	
	M ± SD	p	M ± SD	p	M ± SD	p
Type of handicap		0.74		0,66		0,85
Mental handicap	2.11 ± 3.87		1.27 ± 1.64		1.53 ± 0.68	
Physical handicap	1.82 ± 3.83		1.34± 0.66		1.14± 0.56	
Mental and physical	4.33 ± 2.14		1.74± 0.63		1.25± 0.58	
Handicap etiology		0.95		0,88		0,28
Congenital	2.45 ± 2.28		1.43 ± 0.60		1.20 ± 0.66	
Neonatal pain	3.57 ± 3.08		1.46 ± 0.60		1.06± 0.53	
Meningitis	2.11 ± 2.57		1.30± 0.71		1.13± 0.66	
Unknown	3.20 ± 3.07		1.21 ± 0.58		0.89 ± 0.55	
Others	3.5 ± 2.12		1.45 ± 0.21		1 ± 0	
Handicap autonomy		0.84		0,46		0,65
Complete autonomy	3.11 ± 2.87		1.37 ± 0.64		1.03 ± 0.58	
Autonomy/tiredness	2.82 ± 2.83		1.34± 0.45		1.04± 0.56	
Non autonomy	3.33 ± 3.14		1.42± 0.63		1.35± 0.57	

Table 3: *Relationship between handicap characteristics and DMFT/dmft index, plaque index, gingival index.*

Treatments need

In the present study, only 2 (2.22%) child with mental disability and 12 (13.32%) child of the control group dont need any dental treatments. Logistic regression analyses show that the distribution of the study population and the control group in relation with the type of dental treatment needs is statistically not significant (Table 4).

	Mental handicap		Odds ratio (IC 95%)	
Variable	Yes (N = 90)	No (N = 90)		p value
Dental decay treatments %	60 (67,04)	45 (50)	0.93 (0.6 - 1.4)	0.74
Periodontal treatments %	57 (63,36)	39 (43,58)	1.28 (0.5 - 3.2)	0.60
Orthodontics treatments %	57 (63,36)	48 (53,84)	1.00 (0.4 - 2.2)	0.99
Prosthetic treatments %	4 (4,54)	-	-	-
Dental extractions %	9 (11)	9 (11)	0.94 (0.6 - 1.4)	0.89

Table 4: *Type of treatments need in the study population and the control group.*

Chi-square test P < 0.05

Discussion

The current study revealed that patients with handicap disability suffer more from the two main oral diseases, caries and gingival disease, than subjects with good physical and mental health and supported the hypothesis that mental handicap may increase the risk of oral diseases [6]. In our study the difference was statistically significant in the caries indices (DMFT/dmft scores) between our study group and the control group (p < 0.001), but we did not observe a clinical difference as regards the mean DMFT/dmft scores. This finding can be explained by the fact that dental caries in general is highly prevalent in Moroccan children regardless of their medical situation. Our results are in agreement with a various studies, which have investigated oral health in individuals with mental disability [7,9]. Difficulties in accessing oral healthcare services for individuals who are severely mentally disabled may be explained by their non-autonomy and

Risk Factors Associated with Mental Disability on Oral Health Status and Treatment Needs of Children and Adolescents: A Case Control Study

110

non-comprehension of hygiene practices, which are often exacerbated by associated medical problems, the side effects of medication and the disability itself [10]. Another explanation may be the children's lack of cooperation during treatment. Our finding that only about 10% of the children behaved cooperatively or remained passive during a clinical examination supported this. Even experienced examiners had difficulties gaining access to the mouth [12].

According to the results of our study, there was a significant difference in the plaque index and the gingival index values between children with mental disability and the control group (p < 0.001; p = 0,03). Our results are in agreement with many studies examined the association between periodontal disease and mental disability [16]. Hence, there is a need to educate parents and teachers of this group of patients about their increased risk and the importance of proper plaque control. Various explanations have been put forward for why children and adolescents with mental disability have significantly more severe gingivitis than controls. It could be the result of non-autonomy of the child, non-comprehension of good brushing technique, frequency of brushing and brushing time.

The oral hygiene is a preventive measure that includes a set of practices for the conservation of dental and periodontal health. The results of our study showed a statistically significant difference in oral hygiene practices between the population with mental disability and the population with good mental and physical health. Our data are in agreement with the study by Waldman., *et al.* in 2008 and Purohita., *et al.* in 2012 [13,15].

In the present study, and using linear regression, the data showed that there was no significant association between the characteristics of deficiency (type of handicap, handicap autonomy and handicap etiology) and DMFT/dmft, PI or GI scores, which is in agreement with the observations by Hennequin., *et al.* in 2008 [7] and Klingberg., *et al.* in 2012 [11]. It has also been shown by others that mental handicap is a risk factor for dental caries and plaque formation and a regular follow-up of oral health status is important in this population, especially in children and adolescents.

Only 2 (2.22%) child with mental disability and 12 (13.32%) child of the control group dont need any dental treatments. The distribution of our study group and the control group in relation with the type of treatments need was: 60 (67,04%) Vs. 45 (50) (p = 0,74) for treatments of dental decay, 57 (63,36) Vs. 39 (43,58) (p = 0,60) for Periodontal treatments, 57 (63,36) Vs. 48 (53,84) (p = 0,99) for orthodontics treatments, 4 (4,54) vs. 0 for prosthetic treatments and 9 (11) Vs. 9 (11) (p = 0,89) for dental extractions (Table 4). These results showed that there was no statistically significant difference in the type of treatments need between the population with mental disability and the population with good mental and physical health. This finding can be explained by the fact that the size of our population study and the group control is modest.

Conclusion

Based on this study results, we can conclude that mental disability is a significant risk factor associated with oral health satuts. Furthermore, oral health training and awareness programs for the parents, caregivers, teachers, and healthcare professionals will contribute to the early prevention of oral diseases to a great extent and thus decrease its burden among disabled children and adolescents.

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Risk Factors Associated with Mental Disability on Oral Health Status and Treatment Needs of Children and Adolescents: A Case Control Study

111

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