Journal of Contemporary Issues in Business and Government Vol. 26, No. 2, 2020
https://cibg.org.au/

P-ISSN: 2204-1990; E-ISSN: 1323-6903
DOI: 10.47750/cibg.2020.26.02.003

Oral Health Evaluation in Children with Special needs- A Retrospective Study

KADAMBARI SRIRAM[1], JESSY P[2]*, SANTHOSH KUMAR M P[3]

[1]Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai 600077
[2]Senior Lecturer, Department of Pedodontics, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai 600077
[3]Reader, Department of Oral and Maxillofacial Surgery, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai 600077
*Corresponding Author
Email ID: 151501022.sdc@saveetha.com[1], jessyp.sdc@saveetha.com, santhoshkumar@saveetha.com

Abstract: Special needs children primarily refer to children whose physical or intellectual capacities have been affected to a certain degree. Oral diseases can be considered as a public health due to their high rate of prevalence and significant social impact. While oral problems considerably affect the general health status of normal children, children with special needs are at significantly higher risk. There is limited literature regarding the oral health status of children with special needs in the area under study.The aim of the study was to evaluate the oral health among pediatric patients with special needs in a Dental Hospital. A retrospective study was carried out using case records of patients who reported to the Department of Paediatric and Preventive Dentistry from June 2019 to March 2020. A total of 29 children with special needs were included for the study after considering the inclusion criteria. The age, gender,Simplified Oral Hygiene index scores,Gingival index scores,DMFT scores and Plaque index scores were observed from the case records and tabulated on a spreadsheet.The collected data was analysed by SPSS software version 20.0. The level of significance set at $p<0.05$.Chi-square test was used to compare the gender wise and age wise oral status of the patients. It was observed that significant association between gender and caries incidence ($p<0.05$). Within the limits of the study, it can be concluded that oral health in special children has an significant association with gender in regard to caries incidence.Males had poor oral hygiene with higher plaque and gingival scores. In regard to age 8 to 12 year and 13 to 17 year children had poor oral hygiene with high plaque and gingival scores. A preventive dentistry program should be undertaken in future involving parents, teachers, and specialized dental teams to look after the oral health needs of the disabled population.

Keywords: Caries incidence, Children, Gingival health, Oral hygiene, Special needs innovative technique

INTRODUCTION

Special needs children primarily refer to children whose physical or intellectual capacities have been affected to a certain degree which affects their participation in general situations and requires assistance(Westwood, 2015). Oral health may be defined as a standard of health of the oral and related tissues(Smyth, Caamano and Fernández-Riveiro, 2007; Azodo *et al.*, 2010). Oral diseases(Govindaraju, Jeevanandan and E. M. G. Subramanian, 2017b) can be considered as a public health due to their high rate of prevalence and significant social impact(Aggnur *et al.*, 2014). While oral problems considerably affect the general health status of normal children, children with special needs are at significantly higher risk.

Children with disabilities deserve the same opportunities for oral health and hygiene as those who are healthy. Unfortunately, oral health care is one of the greatest unattended health needs of the disabled people(Hennequin, Faulks and Roux, 2000).The quality of life of such mentally, physically or developmentally disabled children(Gurunathan and Shanmugaavel, 2016) may be further compromised by dental diseases(Somasundaram *et al.*, 2015; Nair *et al.*, 2018) and their associated complications(Brown, 2009; Kamolmatyakul, 2012; Ravikumar, Jeevanandan and Subramanian, 2017).

Many of the common oral diseases(Christabel and Gurunathan, 2015; Packiri, Gurunathan and Selvarasu, 2017) known to affect children with special needs include Periodontitis, Dental caries(Jeevanandan, 2017; Jeevanandan and Govindaraju, 2018), Mucosal ulcers, Candidiasis, etc.(Davidovich *et al.*, 2010; Subramanyam *et al.*, 2018) Dental caries and periodontal disease appear earlier in patients with physical and mental disabilities than in non-

disabled patients. Not only oral hygiene but also dietary habits have been known to influence dental health(Moynihan, 2002). A significant association has been found between the frequency of consumption of sweets and high levels of dental caries.Concerned about the disability of their children, parents and caregivers are more likely to allow consumption of sweets by them at smaller intervals between meals.

However, other conditions must be added to the intellectual deficit and impaired motor skills, such as mouth breathing, occlusion abnormalities, bruxism, cariogenic diet, mastication deglutition dysfunction, abnormal tension of orofacial muscles, reduced salivary flow, and effect from medications. Furthermore, these individuals usually belong to low socioeconomic status, which aggravates the situation(Schultz, Shenkin and Horowitz, 2001).

Previous literature indicates that periodontal disease is a great concern for children with special needs as compared to dental caries(Govindaraju, Jeevanandan and E. M. G. Subramanian, 2017a; Govindaraju, Jeevanandan and E. Subramanian, 2017; Panchal, Jeevanandan and Subramanian, 2019) yet there is no concrete consensus which has been reached.

Our department is passionate about research we have published numerous high quality articles in this domain over the past years (Abraham *et al.*, 2005; Devaki, Sathivel and BalajiRaghavendran, 2009; Neelakantan *et al.*, 2010, 2015; Arja *et al.*, 2013; Ramshankar *et al.*, 2014; Sumathi *et al.*, 2014; Surapaneni and Jainu, 2014; Surapaneni, Priya and Mallika, 2014; Ramamoorthi, Nivedhitha and Divyanand, 2015; Manivannan *et al.*, 2017; Ezhilarasan, 2018; Ezhilarasan, Sokal and Najimi, 2018; J *et al.*, 2018; Ravindiran and Praveenkumar, 2018; Malli Sureshbabu *et al.*, 2019; Mehta *et al.*, 2019; Krishnaswamy *et al.*, 2020; Samuel, Acharya and Rao, 2020; Sathish and Karthick, 2020)

The present study aims to evaluate possible association between gender, age and oral health in pediatric patients with special needs.

MATERIALS AND METHODS

Study Design: Children with special health care needs below 18 years (3-17 years) were included in the study. Those patients who had other systemic complications were excluded from the study.

Study setting: It was a retrospective study conducted in a private institution. The study was commenced after approval from the Scientific Review Board of the institution with the ethical approval number-SDC/SIHEC/2020/DIASDATA/0619-0320.

Sampling: The data were collected from June 2019 to March 2020. A total of 6000 case sheets of patients who visited the Department of Paediatric and Preventive Dentistry of the institution were reviewed and from this 29 were included in the study after considering the exclusion criteria. Cross verification of the data for errors was done through photographic evaluation.

Data Collection: The data collected included records of patient age, gender,Simplified Oral Hygiene index scores,Gingival index scores,DMFT scores and Plaque index scores. Data was entered in a methodical manner in Microsoft Excel and was imported to SPSS and variables were defined. Incomplete or censored data was excluded from the study.

Statistical analysis:

The statistical analysis was done using SPSS software version 20.0 (SPSS Inc., Chicago, IL,USA). Chi-square test was used to compare the gender wise and age wise oral status of the patients.The significance level was set at $p<0.05$

RESULTS AND DISCUSSION

A total of 29 participants were included in the study of which 41% were female and 59% were male. Males are shown to have poorer oral hygiene scores(34.46%) when compared with females(Table 1,Figure 1). There is however no significant difference between gender and oral hygiene, $p>0.05$, (Figure 1).Females have been shown to have greater incidence of caries in comparison with males(Figure 2). Significant association was also found between gender and caries incidence, $p<0.05$, (Figure 2). On analysis the association between Gender and Plaque index was not statistically significant,$p>0.05$,however higher plaque scores were seen in males than females (Table 1,Figure 3). The association between gingival status and gender was also found to be statistically not significant with higher gingivitis prevalence seen in males(Table 1,Figure 4).Poor oral hygiene is seen 8-12 years and 13-17 years of age,however the association between age and oral hygiene however was not statistically significant,$p>0.05$ (Figure 5).Higher plaque scores seen in 8-12 and 13-17 years of age. Association of age with Plaque index was not statistically significant, $p>0.05$ (Figure 6). Higher Gingival index scores seen between 13-17 years of age, however association of age with gingival index was not statistically significant, $p>0.05$ (Figure 7).

In the present study we have found that there was significant association between gender and caries incidence in children with special care needs. The association between age and oral hygiene as well as caries incidence was

not found to be statistically significant. The association between gender and oral hygiene in special children was not found to be significant. The association between age and oral hygiene was not significant in our study which was in contrast with previous study by Kumar et al in special children, which revealed positive correlation between oral hygiene variables and age(Kumar *et al.*, 2008). In our study children the oral health conditions varied with age which was in agreement with previous studies by Alsanabani et al and Nokhostin et al(Alsanabani *et al.*, 2012; Nokhostin, Siahkamari and Akbarzadeh, 2013) due to less manual dexterity in special children for brushing at younger age groups.

There was no significant association between age and caries incidence. This was in contrast to a study by Kramer et al which claimed association between age and caries incidence(Kramer *et al.*, 2013). Bashirian et al and Shyama et al further found high caries incidence in children between 7-12 years of age which is in consensus with the present findings(Shyama, Al-Mutawa and Morris, 2001; Bashirian *et al.*, 2018).Significant association between gender and caries incidence was found in the present study. This result was found to be similar to other studies which have shown that there is significant variation in caries incidence with gender with females having higher caries incidence than males(Ferraro and Vieira, 2010; Vajawat and Deepika, 2012). The greater incidence of caries in females than in males can be attributed to both genetic(Patir *et al.*, 2008) factors as well as hormonal(Lukacs and Largaespada, 2006) factors.

No significant association was found between oral hygiene and periodontal health based on gender.Shapira et al found no statistically significant association between oral hygiene and gender in their study(Shapira *et al.*, 1989). However contrary to our study,Subramaniyam et al and Katge et al found higher microbial load in the biofilm and poorer periodontal health in children with special needs and a statistically significant difference with gender.(Shivakumar *et al.*, 2018) (Subramaniam and Gupta, 2013; Katge *et al.*, 2015)

The reason for this can be attributed to the fact that the oral hygiene maintenance of special children depends more on the maintenance procedures carried out by the caregivers than on the individual(Tesini and Fenton, 1994; Oredugba and Akindayomi, 2008). Age group of patients with special needs does not appear to be a major determinant for oral hygiene and caries incidence. Gender also significantly impacts caries incidence with regards to the current study. The limitations of the study include the fact that it is a single centre study with limited size and homogeneity of the sample. Future scope of the study includes expanding the sample size as well as implementation of awareness programs, modification of toothbrushes for people with poor manual dexterity and alternate treatment methods(Govindaraju and Gurunathan, 2017; 'Fluoride, Fluoridated Toothpaste Efficacy And Its Safety In Children - Review', 2018).

CONCLUSION

Within the limits of the study, it can be concluded that oral health in special children has a strong association with gender in regard to caries incidence. Males had poor oral hygiene with higher plaque and gingival scores. In regard to age 8 to 12 year and 13 to 17 year children had poor oral hygiene with high plaque and gingival scores. Though there was no significant difference in regard to other indices, the poor oral status was noticed among all age groups and gender. Knowledge on oral hygiene also should be implemented in early age for special children along with optimum dental care. Follow up also should be done by dental practitioners in order to monitor their oral status.A preventive dentistry program should be undertaken in future involving parents, teachers, and specialized dental teams to look after the oral health needs of the disabled population.

AUTHORS CONTRIBUTION

Kadambari Sriram contributed to the acquisition of data, analysis,literature collection, and in drafting the article and revising it critically for important intellectual content. Jessy P contributed in conception, study design,interpretation of data,formatting,manuscript preparation,supervision and guidance. Santhosh Kumar contributed to the editing, supervision and final approval of the submitted version of the manuscript.

Acknowledgements: Nil

Conflict of interest: The authors declare that there is no conflict of interest.

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TABLES AND FIGURES

Table 1: Table depicting the oral health of Special children based on gender; There was no significant association between gender and oral hygiene, plaque index and gingival index scores,however males were observed with poor oral hygiene, higher plaque and gingival index scores than females.

Index	Interpretation	Oral health of Special children based on gender		Statistical Values
		Male n(%)	Female n(%)	
OHI Index	Good	3(10.34%)	3(10.34%)	Pearson Chi-Square value=2.891[a] df=3; p value=0.409
	Fair	1(3.45%)	3(10.34%)	
	Poor	10(34.48%)	5(17.24%)	
Plaque Index	Excellent	3(10.34%)	3(10.34%)	Pearson Chi-Square value=1.637[a] df=3 p value=0.651
	Good	2(6.90%)	0(0%)	
	Fair	9(31.03%)	7(24.14%)	
	Poor	3(10.34%)	2(6.90%)	
Gingival Index	Mild gingivitis	14(48.28%)	10(34.48%)	Pearson Chi-Square value=0.005[a] df=1; p value=0.945
	Moderate gingivitis	3(10.34%)	2(6.90%)	

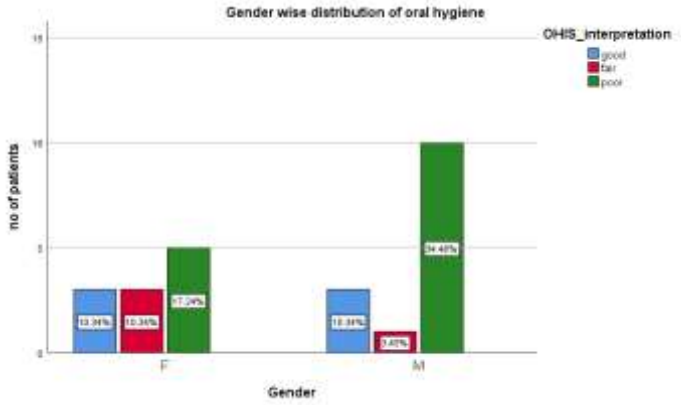

Fig.1: Bar graph depicting gender wise distribution of oral hygiene index scores: where blue denotes good oral hygiene, red denotes fair oral hygiene and green denotes poor oral hygiene.X axis denotes both Genders(Female and Male) and Y axis denotes the oral hygiene status(good,fair and poor).Poor oral hygiene is seen in boys when compared to girls..Association of Gender with Oral hygiene index scores found to be statistically not significant(Pearson Chi-Square value=2.891a,df=3, p value=0.409(p>0.05), not significant)

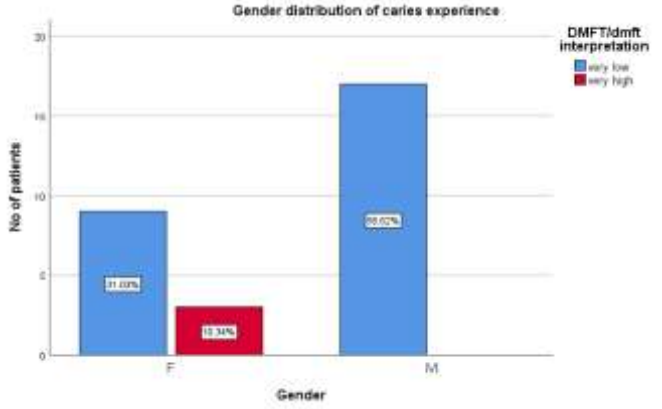

Fig.2: Bar graph depicting gender wise distribution of Caries experience(DMFT,dmft) : where blue denotes very low caries incidence, red very high caries incidence.X axis denotes both Genders(Female and Male) and Y axis denotes the caries incidence (very low,very high).Higher caries incidence is seen in females when compared to males.Association of Gender with Caries experience(DMFT,dmft) was found to be statistically significant.(Pearson Chi-Square value=4.740a,df=1, p value=0.029(p<0.05),significant)

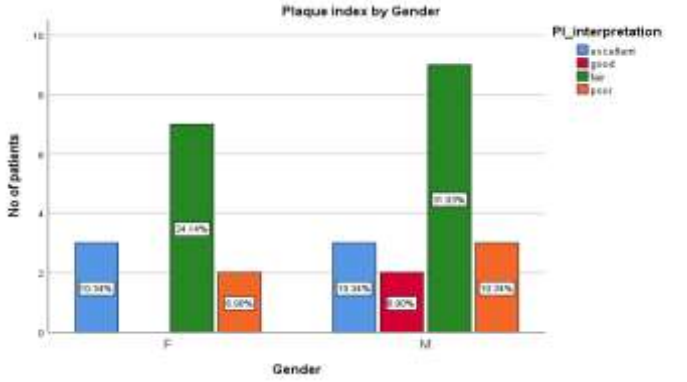

Fig.3: Bar graph depicting gender wise distribution of Plaque index: where blue denotes excellent scores, red denotes good scores, green denotes fair scores and orange denotes poor scores.X axis denotes both Genders(Female and Male) and Y axis denotes the number of patients. Higher plaque scores seen in males than females.Association of Gender with Plaque index was not statistically significant. (Pearson Chi-Square value=1.637a,df=3, p value=0.651(p>0.05),not significant)

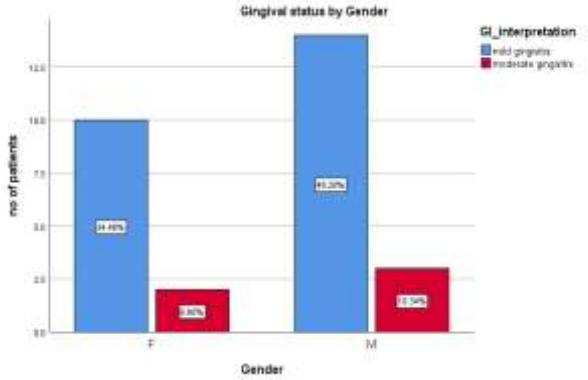

Fig.4: Bar graph depicting gender wise distribution of Gingival status: where blue denotes mild gingivitis, red denotes moderate gingivitis.X axis denotes both Genders(Female and Male) and Y axis denotes the number of patients. Higher Gingival index scores seen in males than females.Association of Gender with gingival index was not statistically significant. (Pearson Chi-Square value=0.005a,df=1, p value=0.945(p>0.05),not significant)

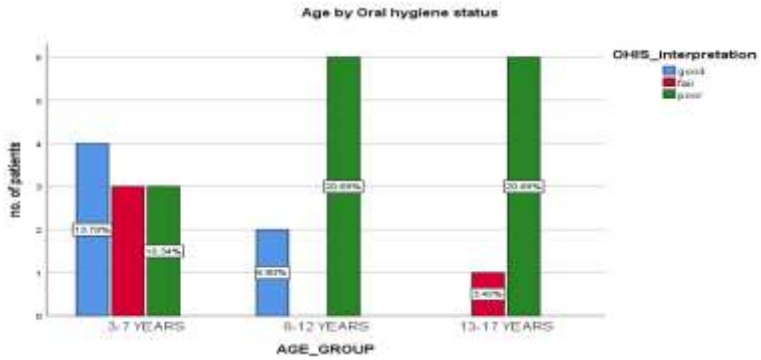

Fig.5: Bar graph depicting age wise distribution of oral hygiene index scores: where blue denotes good oral hygiene, red denotes fair oral hygiene and green denotes poor oral hygiene.X axis denotes the age group of patients and Y axis denotes the oral hygiene status by number of patients (good,fair and poor).Poor oral hygiene is seen 8-12 years and 13-17 years of age. Better oral hygiene is seen between 3-7 years of age.Association of age with Oral hygiene index scores found to be statistically not significant(Pearson Chi-Square value=8.509a,df=6, p value=0.203(p>0.05), not significant)

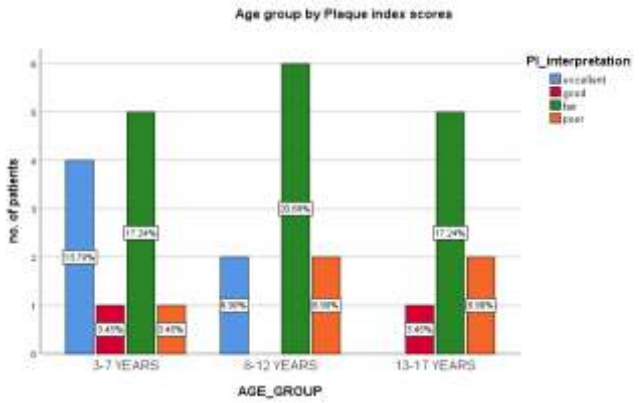

Fig.6: Bar graph depicting age distribution of Plaque index: where blue denotes excellent scores, red denotes good scores, green denotes fair scores and orange denotes poor scores.X axis denotes the age groups and Y axis denotes the number of patients. Higher plaque scores seen in 8-12 and 13-17 years of age. Association of age with Plaque index was not statistically significant.(Pearson Chi-Square value=5.150a,df=6, p value=0.525(p>0.05), not significant)

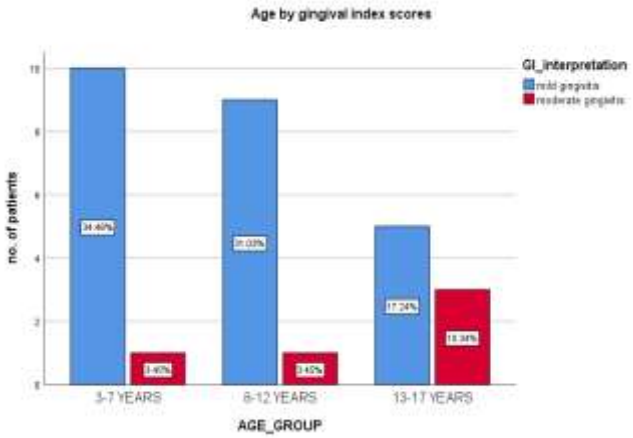

Fig.7: Bar graph depicting age distribution of Gingival status: where blue denotes mild gingivitis, red denotes moderate gingivitis.X axis denotes the age group and Y axis denotes the number of patients. Higher Gingival index scores seen between 13-17 years of age. Association of age with gingival index was not statistically significant. (Pearson Chi-Square value=3.181a,df=2, p value=0.204(p>0.05),not significant)