

## DENTAL CARIES STATUS OF CHILDREN AND YOUNG ADULT WITH DISABILITIES ATTENDING SPECIAL NEEDS BOARDING SCHOOLS IN KUANTAN, PAHANG

Nor Asilah Harun

*Kulliyah of Dentistry*

*International Islamic University Malaysia, Kuantan Campus,  
Bandar Indera Mahkota, 25200 Kuantan, Pahang, Malaysia.*

Email: [norasilah@iium.edu.my](mailto:norasilah@iium.edu.my)

Norzaiti Mohd Kenali

*Kulliyah of Dentistry*

*International Islamic University Malaysia, Kuantan Campus,  
Bandar Indera Mahkota, 25200 Kuantan, Pahang, Malaysia.*

Email: [drzaiti@iium.edu.my](mailto:drzaiti@iium.edu.my)

Noorhazayti Ab. Halim

*Kulliyah of Dentistry*

*International Islamic University Malaysia, Kuantan Campus,  
Bandar Indera Mahkota, 25200 Kuantan, Pahang, Malaysia.*

Email: [zetty@iium.edu.my](mailto:zetty@iium.edu.my)

Sarah Syuhadah Mohd Sopia

*Kulliyah of Dentistry*

*International Islamic University Malaysia, Kuantan Campus,  
Bandar Indera Mahkota, 25200 Kuantan, Pahang, Malaysia.*

Email: [sarahsyuhadah@gmail.com](mailto:sarahsyuhadah@gmail.com)

Farah Aqilah Kamaluddin

*Kulliyah of Dentistry*

*International Islamic University Malaysia, Kuantan Campus,  
Bandar Indera Mahkota, 25200 Kuantan, Pahang, Malaysia.*

Email: [farahkamaluddin60@gmail.com](mailto:farahkamaluddin60@gmail.com)

---

### ABSTRACT

**Objectives:** The objective of this study is to assess the caries status of children with disabilities attending special needs boarding schools in Kuantan, Pahang. **Study design:** This cross-sectional study involved 270 children and young adult with hearing, visual or learning disabilities aged between 5 to 20 years old. The dental caries status was evaluated using the DMFT/dmft indices in accordance with the WHO criteria. **Results:** All children (100%) between 5-6 years old had caries, 38 (86.4%) children of the 7-12 age group had caries in mix-dentition while 152 (69.1%) children and young adult from the age group of 13-20 had caries in the permanent dentition. From the total number of 270 participants, 196 (72.6%) children and young adult had caries experience with only 74 participants who were caries free. According to the types of disability, the visually disabled group had the highest dmft mean of 4.00 whereas the learning-disabled group had the highest DMFT mean of 2.95. There were no significant differences across the types of disabilities ( $p>0.05$ ). **Conclusion:** This study suggests that the disabled student at the special needs boarding schools in Kuantan, Pahang have a high caries prevalence.

Keywords: Special needs, children, caries, disabilities

---

### INTRODUCTION

The World Health Organization (WHO) defines a child with a disability as a child, who, over a considerable period of time is prevented by physical or mental conditions from full participation in normal activities of their age group including those of social, recreational, educational and vocational nature. The Oral Health Division, Ministry of Health (MOH), Malaysia has recognized this group as one of the priority groups by publishing a guideline in oral health care for special needs children (MOH, 2004).

Several studies noted that people with disabilities have a higher percentage of caries experience and their oral health condition have been reported to be poor (Jain M et al., 2013, Al-Maweri SA & Zimmer S, 2015). Previous studies concluded that people with disabilities have worse oral hygiene status with higher plaque levels, more severe gingivitis and periodontitis cases, more untreated dental disease and higher number of extracted teeth compared to normal children (Jain M et al., 2008, Al-Haddad KA et al, 2010, Petrovic BB et al., 2016). In Malaysia, dental caries is still the most dominant oral health disease, especially in

children. Caries was prevalent among 6-year-olds at 74.5% in 2007 (NOHSS, 2007), 41.5% among 12-year-olds in 2005 (NOHSS, 2005) and 59.6% for 16-year-olds (NOHSS, 2007).

Children with disabilities may be partially or fully dependent on someone else to perform their daily care activities including their oral health care (Siklos S. et al., 2007). This will result in a higher prevalence and severity of oral disease when compared to the general population (Faulks D et al., 2000, Al-Maweri SA & Zimmer S, 2015). Thus, it is suggested that poor oral hygiene due to the lack of ability for self-care may have contributed to the serious health implications among special needs children. Severe oral diseases such as acute and chronic infections might affect children's quality of life such as pain, discomfort, disfigurement and a high chance of hospitalization. It may also disturb the eating and sleeping pattern as well as their school attendance (WHO, 2005, Jurgensen N & Petersen PE 2009). Studies have shown that dental treatment in a disabled individual is unattended due to the practical difficulties during the treatment session, poor socioeconomic status, communication problems and poor cooperation (Tan SH, 2015, Roberts T et al., 2016)

In Malaysia, there are special needs private and government schools, institution and community-based rehabilitation centre. Most of the schools and centre are in the city, thus to accommodate children with disabilities from the rural area, Ministry of Education has provided a special needs boarding school whereby the children will stay at the school hostel from as young as 7 years old and they will be taken care of by the school's warden. The data on the caries status of children with disabilities in Malaysia are scarce and the available data had shown that caries prevalence among children with disabilities is high (Mohd Mokhtar et al., 2016). There are no available data on caries status of children attending special needs boarding school in Malaysia. Therefore, the aim of this study is to assess the caries status of children and young adults with disabilities attending special needs boarding schools in Kuantan, Pahang. The findings of this study will be the baseline data for future plans and studies in order to increase the quality of life for children with disabilities in Malaysia, especially in special needs boarding schools.

## METHODS

A cross-sectional study was conducted from April to July 2017 using a voluntary non-probability sampling method. Ethical approval from the IIUM Research Ethic Committee (ID NO. 697) and permission from the Ministry of Education, Malaysia (Ref. no. KPM.600-3/2/3 Jld) were obtained prior to data collection.

The study population comprised of children and young adult with visual, hearing and learning disabilities attending the special needs schools in Kuantan, Pahang, Malaysia. There were two special needs schools in Kuantan City, one school is for children aged 5 to 12 and the other school is for children and young adult aged 13 to 20. Informed consent was achieved from the children's parents or guardian who were provided with detailed information of the study protocol. Oral examination was carried out on children whose parents or guardian consented to participate in the study and were present at the schools on the day of the visit.

Participants were divided into three groups according to their types of disability: 1. Visual; 2. Hearing; 3. Learning. They were also divided into three groups according to their age range; 5-6 years old, 7-12 years old and 13-20 years old. Dental caries examinations were conducted at the schools while participants were seated on a portable dental chair. The examination was performed by two paediatric dental specialist using an ordinary mouth mirror and a dental probe under a portable dental light for visible detection of dental caries. The total number of decayed, missing and filled primary and permanent teeth were recorded for each participant using the DMFT/dmft indices according to the WHO criteria. The DMFT index is used for the permanent dentition of the age group of 13-20, while the dmft index is used for the primary teeth of children aged between 5-6 years old, whereas, both the dmft and DMFT were used for the age group of 7-12 where the children were in a mix-dentition stage. The inter and intra examiner reliability were tested using the Cohen's Kappa where the reading was more than 0.8 showing a strong level of agreement.

The data was collected, summarized, coded and keyed into to the Statistical Package for Social Sciences (SPSS) program (version 24) on the computer. Means were used to describe the caries status (DMFT/dmft). The caries prevalence for all the age groups were counted. The Chi-square and Kruskal-Wallis tests were used to test the statistical significance of different associations between the type of disabilities and caries index. For all statistical tests, a *p*-value of less than 0.05 was considered as significant.

## RESULT

Table 1 shows the age groups and types of disability distribution among the participants. Out of 298 special needs students, 270 (90.6%) participated in the dental screening. The majority of the participants (81.5%) are between 13-20 years old. Meanwhile, only six participants (2.2%) are 5-6 years old. Participants with learning disability made up the majority of the sample in this study with 218 participations (80.7%). However, only 4 (1.5%) participants were visually disable.

Pertaining to dental caries, all participants (100%) aged 5-6 had dental caries, followed by 38 (86.4%) participants aged 7-12 with caries in the mix-dentition and 152 (69.1%) participants from the age group of 13-20 years old had caries in the permanent dentition. Overall, 196 (72.6%) from the total number of 270 participants had caries while only 74 (27.4%) participants were caries free. The details of caries prevalence are exhibited in the Table 2.

Table 3 shows the distribution of the dmft/DMFT scores by the types of disabilities. The visual disability group had the highest dmft scores ( $4.00\pm 0.00$ ), whereas the learning disability group had the highest DMFT scores ( $2.95\pm 3.50$ ). In general, no significant difference was found ( $p>0.05$ ) when comparing the mean of the dmft/DMFT with the three types of disabilities. The youngest age group of 5-6 years old showed higher dmft scores compared to those in the 7-12 age group. Visual disability group shows the highest DMFT score followed by hearing and learning disabilities in the 13-20 age group (Table 6).

**Table 1: Age group and types of disabilities distribution among participants.**

Age group	Visual (n)	Hearing (n)	Learning (n)	Total (N)
5-6	0	2	4	6
7-12	3	25	16	44
13-20	1	21	198	220
<b>Total</b>	<b>4</b>	<b>48</b>	<b>218</b>	<b>270</b>

**Table 2: Caries prevalence according to the age group**

Age group (year)	Number of participants (N)	Number of participants with caries (n)	Caries prevalence (%)
5-6	6	6	100
7-12	44	38	86.4
13-20	220	152	69.1
<b>Total</b>	<b>270</b>	<b>196</b>	<b>72.6</b>

**Table 3: Distribution of dmft and DMFT mean scores by types of disabilities**

	Visual (Mean±SD)	Hearing (Mean±SD)	Learning (Mean±SD)	p-value
dmft	4.00±0.00	1.88±2.57	3.30±4.66	0.18
DMFT	2.40±2.61	2.64±2.58	2.95±3.50	0.98

**Table 4: Caries prevalence and dmft mean by types of disabilities in 5-6 years old**

	Hearing (Mean±SD) n = 2	Learning (Mean±SD) n = 4
Caries Prevalence (%)	100	100
dmft	10.00±0.00	10.00±3.65

**Table 5: Caries prevalence, dmft and DMFT mean by type of disability in 7-12 years old**

	Visual (Mean±SD) n=3	Hearing (Mean±SD) n = 25	Learning (Mean±SD) n = 16
Caries Prevalence (%)	66.7 (n=2)	92 (n=23)	81.25(n=13)
dmft	0.00±0.00	1.56±2.00	1.63±3.14
DMFT	1.50±1.92	2.16±2.43	2.30±2.11

**Table 6: Caries prevalence and mean DMFT by type of disability in 13-20 years old**

	Visual (Mean±SD) n=1	Hearing (Mean±SD) n=21	Learning (Mean±SD) n=198
Caries Prevalence (%)	100 (n=1)	76.2 (n=16)	68.2 (n=135)
DMFT	6.00±0.00	3.33±2.67	3.07±3.60

## DISCUSSION

The present study provides information on the caries status of children and young adult with disabilities at special needs schools in Kuantan. The access to this group's individual dental examination is always a challenge, especially when it comes to identifying the best method of communicating with them. Oral health personnel should be trained and needs to have skills in managing these group of patients. Oral health promotion training and the necessary skills in managing special needs children must consider the nature of caries in the particular age group (S. Mohd Mokhtar et al., 2016).

This study discovers a high caries prevalence among special needs children in Kuantan at 72.6% out of the 270 participants with the dmft+DMFT mean of  $2.89\pm 3.34$ . These findings are consistent with other studies which have identified an increased in the prevalence of dental caries among patients with disabilities (S. Mohd Mokhtar et al., 2016, Jain M et al., 2009). The physical abilities of these individuals and the difficulties in tooth-brushing may be related to these findings.

In this study, all children aged 5-6 had caries with a higher dmft score ( $10.00\pm 3.65$ ). Similar findings can be observed in a study in Negeri Sembilan, whereby the special needs children below 6 years old suffered from a specific dental caries, commonly known as the early childhood caries (ECC) (S. Mohd Mokhtar et al., 2016).

Other studies reported higher rates of DMFT than present study with values ranging from 3.5 to 12.5 in special needs children (Kamatchy KR et al., 2003, Ivancić Jokić N et al., 2007). This study also discovers that there is no significant statistical difference for dmft and DMFT index according to the types of disabilities which is parallel to another study (Al-Qahtani Z & Wyne AH, 2004). Al-Qahtani reported that a higher DMFT mean score of 5.12 in 11-12 years old deaf children compared to the DMFT mean score of 3.89 in blind children of the same age. Similarly, in present study, with a wider range of age group (7-12 years old), a higher DMFT mean score of 2.16 is reported in children with hearing problem compared to the same age group of visually impaired children with a DMFT score of 1.50.

The National Oral Health Plan for Malaysia 2011-2020 (NOHP, 2011) targeted that 50% of the 6-years-old children, 70% of the 12-years-old and 50% of the 16-years-old would be caries free by the year 2020. Considering the results of this study, the goal might take a longer time to achieve, especially in children with disabilities. All stakeholders, including healthcare personnel, carer/parent, teachers need to work hand in hand in order to achieve the goal.

High caries prevalence among special needs children requires immediate attention by all personnel to be highly involved in the efforts of prevention and treatment. The preventive measures that can be applied by professionals include oral hygiene instructions, dietary counselling, fluoride application, fissure sealant, and also atraumatic restorative treatment (S. Mohd Mokhtar et al., 2016). The implementation of the intensive preventive programmes have been shown to be successful in improving the oral health of those with disabilities (Desai M et al., 2001). Knowledgeable and efficacious caregivers and parents also play an imperative role in the oral health care of the children (Finlayson TL et al., 2005).

Educational programmes addressing the importance of preventive oral health services and dental treatment should be suggested to the caregivers to improve their oral health knowledge, attitude and practice so that it can be a beneficial to the children with disabilities under their care. Parents and caregivers need to be trained, have adequate knowledge and also the motivation to carry out oral hygiene practices in a proper way and efficiently. General dental practitioner should be trained and willing to treat selected special needs children and a continuous professional educational programme should include oral health care of children with disabilities.

In conclusion, this study shows that caries prevalence is high among children and young adult at the special needs schools in Kuantan, however, it is not associated with the type of disabilities of the children. Therefore, there is an absolute need for comprehensive specific oral health preventive program and treatment to ensure this disabled group will be prioritised. Wardens in the hostel need to have certain knowledge in preventing oral diseases because they are the ones who the children with disabilities rely on throughout their stay in the school's hostel. It is really hoped that the guideline and module on the prevention of oral diseases will be constructed to help the wardens and the school staff in its prevention.

## ACKNOWLEDGEMENT

We would like to thank the Malaysian Ministry of Education for giving us permission to conduct this study. Our warmest appreciation goes to the school authorities, the teachers, IIUM Dental Students and all the children who participated in this study. The publication of this study was funded by IIUM RIGS16-328-0492.

## REFERENCES

- Al-Haddad KA, Al-Hebshi NN, Al-Ak'hali MS. (2010). *Oral health status and treatment needs among school children in Sana'a City, Yemen*. Int J Dent Hyg. May; 8(2):80-5. doi: 10.1111/j.1601-5037.2009.00398.x.
- Al-Maweri SA, Zimmer S. (2015). *Oral health survey of 6-14 year old of Children with Disabilities Attending Special Schools Yamen*. J.Clin Pediatr Dent. ; 39(3):272-6
- Dental Services Division, Ministry of Health Malaysia (2004). *Oral health care for Children with special needs: Guideline for Implementation*.
- Desai M, Messer LB, Calache H. (2001). *A study of the dental treatment needs of children with disabilities in Melbourne, Australia*. Aust Dent J.;46: 41–50.
- Faulks D, Hennequin M. (2000). *Evaluation of a long-term oral health program by carers of children and adults with intellectual disabilities*. Spec Care Dentist. 20:199-208
- Finlayson TL, Siefert K, Ismail AI, Delva J, Sohn W. (2005). *Reliability and validity of brief measures of oral health-related knowledge, fatalism, and self-efficacy in mothers of African American children*. Pediatr Dent; 27:422-8.
- Ivancić Jokić N, Majstorović M, Bakarčić D, Katalinić A, Szivovicza L. (2007). *Dental caries in disabled children*. Coll Antropol.; 31: 321–324.
- Jain M, Mathur A, Sawla L, Choudhary G, Kabra K, Duraiswamy P. *Oral health status of mentally disabled subjects in India*. J Oral Sci. 2009;51: 333–340.
- Jain M, Mathur A, Kumar S, Dagli RJ, Duraiswamy P, Kulkarni S. (2008). *Dentition status and treatment needs among children with impaired hearing attending a special school for the deaf and mute in Udaipur, India*. J Oral Sci. Jun; 50(2):161-5.
- Jain M1, Bharadwaj SP, Kaira LS, Bharadwaj SP, Chopra D, Prabu D, Kulkarni S.(2013). *Oral health status and treatment need among institutionalised hearing-impaired and blind children and young adults in Udaipur, India. A comparative study*. Oral Health Dent Manag. Mar; 12(1):41-9.
- Jurgensen N, Petersen PE (2009): *Oral health and the impact of sociobehavioural factors in a cross sectional survey of 12-year old school children in Laos*. BMC Oral Health, 9:29. 5
- Kamatchy KR, Joseph J, Krishnan CG. (2003). *Dental caries prevalence and experience among the group of institutionalized hearing impaired individuals in Pondicherry--a descriptive study*. Indian J Dent Res.; 14: 29–32.
- National oral health plan for Malaysia 2011-2020, 2011
- National oral health survey of schoolchildren (NOHSS 2007), Oral Health Division, Ministry of Health Malaysia, August 2010.
- Oral health, general health and quality of life (2005). *World Health Organization*. 83(9):641-720
- Petrovic BB, Peric TO, Markovic DLJ, Bajkin BB, Petrovic D, Blagojevic DB, Vujkov S. (2016). *Unmet oral health needs among persons with intellectual disability*. Res Dev Disabil. Dec; 59:370-377. doi: 10.1016/j.ridd.2016.09.020. Epub 2016 Sep 30.
- Roberts T, Chetty M, Kimmie-Dhansay F, Fieggen K, Stephen LX (2016). *Dental needs of intellectually disabled children attending six special educational facilities in Cape Town*. S Afr Med J. May 25; 106(6 Suppl 1):S94-7. doi: 10.7196/SAMJ.2016.v106i6.11006.
- S. Mohd Mokhtar, L. Abd Jalil, N. Muhd Noor, B. C. Tan, Z. Shamdol, H. Ali Hanafiah (2016). *Dental Status and Treatment Needs of Special Needs Children in Negeri Sembilan, Malaysia*. World Journal of Research and Review.;2: 64–70.
- Siklos S, Kerms KA. (2007). *Assessing the diagnostic experiences of a small samples of parents of children with autism spectrum disorders*. Res Dev Disabil.; 28:9-22.
- Tan SH (2015). *Unmet Health Care Service Needs of Children with Disabilities in Penang, Malaysia*. Asia Pac J Public Health. Nov; 27(8 Suppl):41S-51S. doi: 10.1177/1010539515592461..