



Oral Health Status of Children with Disabilities: A Review of Literature

Eyman Abdalla^{1*} and Hanan Mohamed²

¹Dental Public Health Department, Sudan Medical Specialization Board (SMSB),
Council of Dental Public Health, Khartoum, Sudan

²Pediatric Dentistry Department, Faculty of Dentistry, Alexandria University,
Alexandria, Egypt

*Corresponding Author: Eyman Abdalla, Dental Public Health Department, Sudan
Medical Specialization Board (SMSB), Council of Dental Public Health, Khartoum, Sudan.

DOI: 10.31080/ASDS.2022.06.1486

Received: October 03, 2022

Published: October 08, 2022

© All rights are reserved by

Eyman Abdalla and Hanan Mohamed.

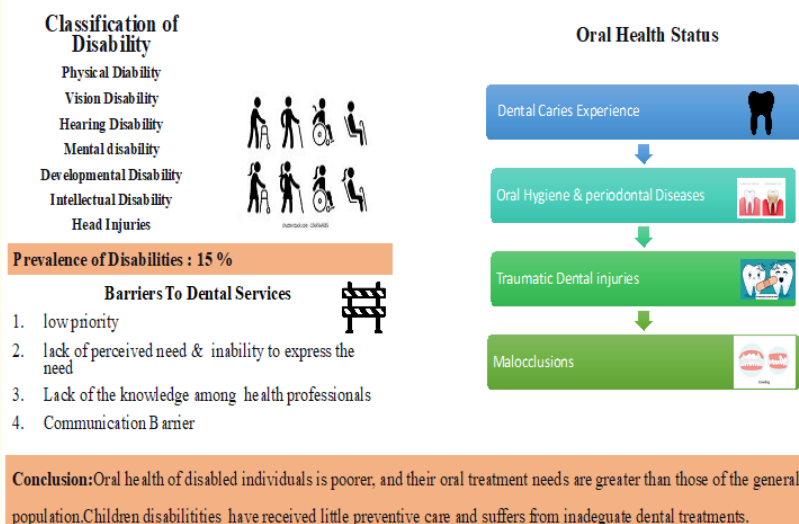
Abstract

Population with disabilities forms 15 per cent of the general population, and these disabilities could be Physical, Hearing, vision, mental, developmental, or intellectual disabilities. This review aims to determine the oral health status of disabled children to bring attention to this population for future research and program planning.

Children with disabilities are at high risk for experiencing oral diseases than the general population. Different studies recognized poor oral health indicators among disabled children, such as high dental caries, periodontal disease prevalence, missing teeth, and malocclusion. Different barriers to dental service were also observed in this group population. Barriers included underestimated priority, lack of physical access, lack of skilled staff and communications barriers. Consequently, poor oral health negatively impacts chewing ability, nutrition and digestion, facial characteristics, and speech. In conclusion, disabled children are at high risk of oral diseases accompanied by barriers to dental services. Preventive and treatment programs are required to improve the oral health of this group of the population.

Keywords: Disability; Oral Health; Caries; Periodontal Disease; Dental Injuries

Oral Health Status of children with Disabilities: A Review of Literature



Introduction

Background and definition According to WHO, "Oral health is the standard of health of the oral and related tissues, which enables an individual to eat, speak, and socialize without active disease, discomfort or embarrassment and contributes to general well-being". Oral health can be maintained and enhanced through the prevention of disease and the promotion of oral health.

As per WHO, a disabled individual is one who, over an appreciable time, cannot fully participate in activities at a level of his age group due to a physical or mental condition. The activities include social, recreational, educational and Vocational activities.

Children with chronic diseases or congenital or acquired conditions interfering with normal physical or mental development are often defined as disabled or handicapped [1]. Differentiating between the terms disability and handicap is a must. Handicap is the limitation or loss of opportunities to participate in the community's everyday life at the level of others due to physical and social barriers.

The term disability has recently been defined as any impairment that restricts or limits daily activity. Disability is the functional limitation resulting from physical, mental, or sensory impairments and can be developmental or acquired [2]. Disability represents a departure from the norm regarding individual performance. At the same time, a handicap is a social phenomenon, representing the social and environmental consequences of impairment and disability. The medical model attempts to link the experience of disabled people with that of the professionals treating them [3].

The current shift from the 11 medical models to the social model, where the emphasis is more on the environment imposing disability on a person with impairment [4]. The Americans with Disabilities Act of 1990 identifies an individual as a disability if the person has a mental or physical impairment that significantly affects one or more activities, has a record of this impairment, or is regarded as having such an impairment [5]. Slade 1997 adapted the World Health Organization's classification of impairment, disability, and handicap into seven domains that impact the oral status of an individual: functional limitations, physical pain, psychological discomfort, physical disability, psychological disability, social dis-

ability, and handicap. Disabilities and impairments only become a handicap for a child if he/she cannot carry out the normal activities of the peer group.

Oral health care in people with mental disabilities is complicated by a physical, mental or social disability [6]. Children with special health care needs may be broadly defined as those at risk for or with ongoing physical, developmental, behavioural, or emotional disorders that require health care services beyond those needed by children without such a condition.

Reference Manual of the American Academy of Pediatric Dentistry (1999) defines the dentally handicapped. A person should be considered dentally handicapped if pain, infection or lack of functional dentition restricts the consumption of a diet adequate to support growth and energy needs, delays or otherwise alters growth and development, or inhibits the performance of any significant life activity, including work, learning, communication, and recreation.

Dentally handicapped refers to patients with some appalling condition or deficit in their oral cavities, necessitating special dental treatment consideration. By contrast, children who are 'handicapped for dentistry' have a physical, mental or emotional condition that may prevent them from being treated routinely.

Classification of disability [7-9]

Visual disability is a common disability worldwide, and visual impairment in childhood is often part of a multiple disability disorder [9]. Sensory impairment can have a noticeable impact on an individual's ability to live independently. Vision may be the most critical sense for interpreting the world around us. When sight is impaired in childhood, it can affect physical, neurological, cognitive, and emotional development. Visual impairments vary from total blindness to small size, colour, distance and shape limitations.

Visual disability is strongly related to age. Many become blind through eye diseases and disorders, such as cataracts and glaucoma. In childhood, the causes of blindness are many; and the most common congenital causes are intrauterine infections, such as rubella and toxoplasmosis and malformations. The other causes among children include malnutrition, infectious diseases and parasitic infestations.

Hearing disability primarily influences communication, which can have a devastating effect. The extent of psychological, emotional and social disturbances raise with the increase of functional loss, the age of onset, and the training and acceptance of the disability.

Hearing loss may result from prenatal and postnatal infections, anoxia, prematurity, exposure to ototoxic agents and trauma.

Physical disability is the loss of voluntary movement in any part of the body due to a disease or injury along the motor-nerve path. It may result from injury, poisoning, infection, haemorrhage, occluded blood vessels, or tumours, according to the British Society for Disability and Oral Health, 2000. Cerebral palsy is a movement and posture disorder caused by a non-progressive abnormality of the immature brain. This disability might involve muscle weakness, stiffness, paralysis; poor balance or irregular gait; and uncoordinated or involuntary movements. Individuals with physical impairment may have 13 reduced ability for self-care and mobility problems, affecting their ability to reach dental services and consequently their use of dental care.

Learning disability has been described as «a significant impairment of intelligence and social functioning acquired before adulthood» (Department of Health, 1998).

Developmental disabilities are conditions identified in early childhood and usually persist throughout an individual's life.

First recognized in 1866 by Langdon-Down, Down syndrome (Trisomy 21) is a congenital disability associated with an autosomal chromosome abnormality. Down syndrome is also an easily recognized congenital anomaly characterized by generalized growth deficiency and mental deficiency.

Along with anatomical abnormalities and physical and mental problems, orofacial problems significantly impact individuals with Down syndrome and their guardians. Learning difficulties, and abnormalities in immune response related to the increased prevalence of periodontal disease, short fingers, large palms, and small but broad feet, are also reported in patients with Down syndrome.

Autism spectrum disorder (ASD) is a complex developmental disorder characterized by persistent challenges with social com-

munication, restricted interests, and repetitive behaviour. ASD is a lifelong disorder, but its characteristics vary among individuals [10].

- Intellectual disability (ID) refers to significantly sub-average general intellectual functioning, existing concurrently with deficits in adaptive behaviour and manifested during the developmental period. American Association of Mental Deficiency (AAIDD) define ID as a condition characterized by significant limitations in intellectual functioning and adaptive behaviour that originates before age 22.
- Mental disability is a condition affecting the normal functioning of the mind, evidenced by behavioural changes.
- Head injury (HI) is a brain disability due to a brain injury that can range from mild to moderate and severe. HI includes two types of brain injuries; Acquired Brain Injury (ABI) and Traumatic Brain Injury (TBI). ABI degeneration occurs after birth, mainly because of external forces on the body, and TBI leads to emotional malfunctioning and behavioural disturbance.

Prevalence of disability

Disabilities affect 15 per cent population of all ages and social classes and the prevalence of individuals with disabilities varies throughout the world [11].

Discussion

Oral health status among children with disability

Researchers throughout the world have studied a wide range of disabling conditions. Although the level of oral health in western countries has increased, no comparable improvement has occurred in the disabled.

Dental caries experience

According to the Surgeon General's report, dental caries is childhood's most common infectious disease [12]. Dental caries is considered the first cause of tooth loss in individuals with physical and mental disabilities. Many studies revealed that disabled subjects have higher levels of caries, lower levels of care and a higher proportion of untreated lesions but less treatment than the average population. A high prevalence of dental caries and gingivitis was also noticed in children with intellectual disabilities [13].

Individuals with Down syndrome are susceptible to caries, even though the prevalence of approximal caries is low, mainly because subjects with Down syndrome have spaced teeth. Morinushi evaluated the status of dental caries and the relationship between dental plaque or caries experience and serum antibody titers against *S. mutans* and *S. mitis*, stating that it was unclear whether antibodies are protective and responsible for the reduced caries rate seen in Down syndrome.

The observations of lower caries prevalence in persons with Down syndrome have been questioned, and caries prevalence in patients with Down syndrome and non-Down syndrome patients with mental retardation was reported to be similar. Likewise, the dental caries rate in Down syndrome patients did not appear to be lower than in those without Down syndrome. Steinberg and Zimmerman found no difference in the number of decayed, missing and filled teeth [14]. In contrast, the number of decayed, missing and filled surfaces was significantly lower in children with Down syndrome compared to another group of children with mental retardation. No difference in caries experience has been reported among the three genotypes for Down syndrome. In caries experience of permanent dentitions, there were no significant differences between Down syndrome and normal children. Yarat, *et al.* studied subjects 6-24 years of age with and without Down syndrome and found no significant differences in caries prevalence between age groups [15]. A recent study concluded that the caries prevalence of children with Down syndrome was similar to that of healthy children.

Different factors are considered as the cause of low caries prevalence in Children with Down syndrome. Factors include; Living environment, dietary and hygiene habits, fewer erupted teeth due to a high frequency of hypodontia, later eruption patterns and different proportions of salivary components compared to normal children.

Oral hygiene and periodontal conditions

Oral hygiene and periodontal disease represent a significant problems for the disabled. However, the lack of conformity in using indices makes valid comparisons difficult. Children with disabilities tend to have poor oral hygiene and plaque control standards and a higher prevalence and severity of periodontal disease than normal children [16,17]. Most studies agree that children who are

disabled are in far greater need of treatment than normal children. Their lack of motivation, low concentration, and problems with manual dexterity make it extremely difficult to maintain the required standard of oral hygiene and gingival health.

Comparison between studies is difficult because of the lack of standard indices. However, oral cleanliness is generally compromised and deteriorates more with age in subjects with mental retardation, Down syndrome and cerebral palsy. Epidemiological studies reported that children with disabilities tended to have poorer oral hygiene and a greater prevalence and increased severity of periodontal disease than their regular counterparts. Despite improvements in dental caries with programs of enhanced service provision, there has been virtually no improvement in gingival health and periodontal conditions.

Upper limb disability may affect an individual's ability to manage effective oral hygiene, where poor oral hygiene and periodontal disease have been reported [18]. With increasing age, the deterioration of gingival health and increased prevalence of gingivitis were observed in children with cerebral palsy with a mental disability. Oral hygiene was also poor, and periodontal disease was generally prevalent in institutionalized children with mental retardation [19].

Individuals with Down syndrome also demonstrate a high prevalence of periodontal diseases. A review of the literature concerning dental abnormalities and diseases in persons with Down syndrome consistently shows an increased frequency of periodontitis compared with that of other patients with mental retardation, as well as that of the population in general [20]. A higher prevalence and severity of periodontal disease were recorded by some studies in children of older groups.

Longitudinal studies indicated that the progression of the disease is incredibly rapid in the younger age groups, and even when a good standard of oral hygiene is maintained, gingivitis and periodontal disease are critically high in children with Down syndrome [21]. Another study concluded that a systemic factor related to the syndrome combined with an environmental factor increases the susceptibility of individuals with Down syndrome to periodontal disease [22]. The greater severity of periodontal diseases has been attributed to genetic and non-genetic factors such as lower resis-

tance to bacterial infection, malocclusion, traumatic occlusions, tooth morphology, and lack of normal mastication.

Malocclusions

The muscles of the face and oral cavity play a role in facial growth and occlusal development [23]. In their literature review, Brown and Schodel found that, except for Down syndrome and severe cerebral palsy, there was no evidence that malocclusion was shared amongst the disabled.

Several studies have reported a higher prevalence of malocclusion in those with disabilities than in the average population [24]. These malocclusions affect standard chewing patterns and may cause mouth breathing, leading to dry oral tissues.

Some investigators have found an increased prevalence of malocclusion in subjects with cerebral palsy. The frequency of malocclusions was higher in children and adults with neuromotor handicaps compared to healthy individuals. In a study, Cerebral palsy participants also had a higher prevalence of extreme maxillary overjet, Angle's class II malocclusion with crowding and cross bite. Factors such as hypertonicity, tongue thrust and constriction of dental arches contributed to these results. Pope and Curzon postulated that poor swallowing and other abnormal muscle activity might have contributed to the increased overjet in children with athetoid cerebral palsy [25]. As the tone and function of the orofacial muscles with cerebral palsy can be abnormal, these children's facial growth and occlusion may be outside normal limits.

The degree of malocclusion is influenced by the severity of the neuromuscular incompetence of the head and neck. Children with cerebral palsy tend to have increased overjet, overbite and incompetent lips. In children with athetoid cerebral palsy, there is often a class II division 2-type incisor relationship. The high frequency of malocclusions in the cerebral palsy group may be explained by differences in their fundamental neuromotor handicap and the predominance of more severely mentally disabled individuals.

An increased prevalence of malocclusion has been noted in subjects with Down syndrome. One of the characteristics of faces of children with Down syndrome is the relative under-development of the middle third of the face and the consequent tendency toward a class III skeletal-base relationship. Increased prevalence of mal-

occlusion in persons with Down syndrome has been reported previously and associated with under-development of the maxilla and Angle's Class III malocclusions. Many researchers cite a tendency toward Angle's class III malocclusion in subjects with Down syndrome, together with a posterior crossbite. Along with other intra-oral anomalies, a common finding is a high vaulted palate.

In subjects with Down syndrome, the prevalence of crossbite has been reported, as well as an open bite. Anterior and posterior crowding has also been reported previously.

Traumatic dental injuries

In a society that increasingly emphasizes improved dental health and awareness of appearance, injury to the anterior teeth of young children is an emotional and physical experience for both children and parents. Traumatic dental injuries are critical dental conditions due to the importance of oral functions in sensory, communication, digestion and psychosocial relationships. Fracture of the anterior teeth is a typical result of trauma to the face, and children most frequently sustain traumatic injuries to the anterior teeth for behavioural and anatomic reasons.

Epidemiological studies of traumatic injuries are few, and the results of such studies vary greatly. Differences in the classifications of traumatic injuries account for the differences in the prevalence of traumatic injuries. It has been shown that traumatic injuries are more prevalent in the disabled than in normal children [26].

Barriers to oral health

People with mental disabilities have been described as those who encounter more barriers to the receipt of dental care than other people. They may have more significant problems accessing dental care or may be at increased risk from dental disease or its treatment. The barriers to oral health that people with disabilities experience vary according to age and the level of parental or social support received and change throughout life depending on problems associated with transitional periods.

Oral health is less prioritized than current illnesses and disabilities that are more life-threatening. Barriers to accessing and using dental services include lack of perceived need, inability to express the need, and lack of ability to provide self-care. Problems of physi-

cal access to health service premises, including dental surgeries, are reported in individuals with a physical impairment. Moreover, the attitudes to oral care and the knowledge of health professionals and health care workers are considered barriers to oral health for individuals dependent on others for oral hygiene. Most individuals with disabilities have poor verbal skills and are restricted in their ability to communicate their needs [27].

It may be harder to discuss and resolve fear and anxiety, which are these individuals' most common barriers to dental care [28]. The inability to cooperate with treatment needs leads to a greater need for behaviour management techniques, conscious sedation and general anaesthesia than for the general population.

Recommendations

Different studies revealed the urgent need for preventive and treatment programs to improve the oral health of children with special needs [29-31]. Other recommended health professionals should be aware of the impact of mental illness and its treatment on oral health; health personnel should receive training to support and provide all possible services to this population [32]. Other authors highlighted the importance of parental education on diet modification, improvement of oral hygiene practices and regular dental visits [33].

Conclusion

Many studies have shown that the oral health of individuals who are disabled is poorer, and their oral treatment needs are greater than those of the general population.

Children with a disability receive little preventive care. Epidemiological studies have indicated that persons with disabilities generally have more oral health problems than others and faces barriers to achieving good oral health and accessing appropriate dental services. It is recommended to enhance the awareness of the impact of disabilities and their treatment on oral health and general health. Moreover, health professionals should receive training to support and provide all possible services to this population.

Bibliography

1. Storhaug K., *et al.* "Dentistry with handicapped children". *Pedodontics: A Clinical Approach*. 3rd edition. Copenhagen: Munksgaard (1997): 349-364.
2. Tesini DA and Fenton SJ. "Oral health needs of persons with physical or mental disabilities". *Dental Clinics of North America* 38.3 (1994): 483-498.
3. Nunn JH. "Disability and oral care". FDI World Dental Press (2000).
4. Hutchison T. "The classification of disability". *Archives of Disease in Childhood* 73.2 (1995): 91.
5. Stiefel DJ. "Dental care considerations for disabled adults". *Special Care in Dentistry: official publication of the American Association of Hospital Dentists, the Academy of Dentistry for the Handicapped, and the American Society for Geriatric Dentistry* 22.3 (2002): 26S-39S.
6. Davies R., *et al.* "ABC of oral health: Oral health care for patients with special needs". *BMJ: British Medical Journal* 321.7259 (2000): 495.
7. Adesina M., *et al.* "Historical perspective and classification of disability". *Yenagoa Medical Journal* (2021): 17.
8. De Kleijn-De Vrankrijker MW. "The long way from the international classification of impairments, disabilities and handicaps (ICIDH) to the international classification of functioning, disability and health (ICF)". *Disability and Rehabilitation* 25.11-12 (2003): 561-564.
9. Australian National University. Different types of disabilities (2020).
10. American Psychiatric Association. "Diagnostic and statistical manual of mental disorders". 5th edition. Arlington: American Psychiatric Publishing (2013).
11. The World Bank. Disability Inclusion Overview. Understanding Poverty (2020).

12. US Department of Health and Human Services. Oral health in America: A report of the Surgeon General- Executive Summary. Rockville, MD: US Department of Health and Human Services, National Institute of Dental and Craniofacial Research, National Institutes of Health (2000).
13. Anusha D., et al. "Prevalence of Dental Caries and Gingivitis among children with Intellectual Disability in India". *Journal of Family Medicine and Primary Care* 11.6 (2022): 2351-2355.
14. Steinberg AD and Zimmerman S. "The Lincoln dental caries study: a three-year evaluation of dental caries in persons with various mental disorders". *The Journal of the American Dental Association* 97.6 (1978): 981-984.
15. Yarat A., et al. "Salivary sialic acid, protein, salivary flow rate, pH, buffering capacity and caries indices in subjects with Down's syndrome". *Journal of Dentistry* 27.2 (1999): 115-118.
16. Shyama M., et al. "Dental caries experience of disabled children and young adults". *Community Dental Health* 18.3 (2001): 181-186.
17. Al-Qahtani C and Wyne AH. "Caries experience and oral hygiene status of blind, deaf and mentally retarded female children in Riyadh, Saudi Arabia". *Tropical Dental Journal* (2004): 37-40.
18. Da Silva FC., et al. "Correlation between upper limb function and oral health impact in stroke survivors". *Journal of Physical Therapy Science* 27.7 (2015): 2065-2068.
19. Bennadi Darshana., et al. "Oral hygiene negligence among institutionalized mentally disabled children in Mysore city-A call for attention". *Journal of Family Medicine and Primary Care* 9.4 (2020): 2045.
20. Scalioni FAR., et al. "Periodontal disease in patients with Down syndrome: A systematic review". *The Journal of the American Dental Association* 149.7 (2018): 628-639.
21. Reuland-Bosma W and Van Dijk J. "Periodontal disease in Down's syndrome: a review". *Journal of Clinical Periodontology* 13.1 (1986): 64-73.
22. Fernández M., et al. "Genetic susceptibility to periodontal disease in Down syndrome: a case-control study". *International Journal of Molecular Sciences* 22.12 (2021): 6274.
23. Onyeaso CO. "Comparison of malocclusions and orthodontic treatment needs of handicapped and normal children in Ibadan using the Dental Aesthetic Index (DAI)". *The Nigerian Postgraduate Medical Journal* 11.1 (2004): 40-44.
24. Brown JP and Schodel DR. "A review of controlled surveys of dental disease in handicapped persons". *ASDC Journal of Dentistry for Children* 43.5 (1976): 313-320.
25. Pope JE and Curzon ME. "The dental status of cerebral palsied children". *Pediatric Dentistry* 13.3 (1991): 156-162.
26. França K., et al. "Prevalence of dental trauma in disabled persons seen at the dental clinic for special-needs patients of the Catholic University of Brasília (UCB)". *Revista de Odontologia da UNESP* 47 (2018): 12-17.
27. Faulks D and Hennequin M. "Evaluation of a long-term oral health program by carers of children and adults with intellectual disabilities". *Special Care in Dentistry* 20.5 (2000): 199-208.
28. Gordon SM., et al. "Dental fear and anxiety as a barrier to accessing oral health care among patients with special health care needs". *Special Care in Dentistry* 18.2 (1998): 88-92.
29. Eltilib EGK. "Oral health status among children with special needs in Khartoum State, Sudan" (2012).
30. Tagelsir A., et al. "Oral health of visually impaired schoolchildren in Khartoum State, Sudan". *BMC Oral Health* 13.1 (2013): 1-8.
31. Diéguez-Pérez M., et al. "Oral health in children with physical (Cerebral Palsy) and intellectual (Down Syndrome) disabilities: Systematic review I". *Journal of Clinical and Experimental Dentistry* 8.3 (2016): e337.
32. Solanki J., et al. "Dental caries and periodontal status of mentally handicapped initialized children". *Journal of Clinical and Diagnostic Research: JCDR* 8.7 (2014): ZC25.
33. Oredugba FA and Akindayomi Y. "Oral health status and treatment needs of patients and young adults attending a day centre for individuals with special health care needs". *BMC Oral Health* 8.1 (2008): 1-8.