

## Review Article

# Dental caries and access to oral health services among children and adolescents

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### **ABSTRACT**

There are many social, economic, political and cultural factors that affect the ability of developing and resource poor countries to provide adequate oral health care for its people, including children and adolescents. Untreated carious teeth are common findings in African children, and Restorative index and Met Need Index among children and adolescents are very low. This could be as a result of limited access to oral health services in terms of cost, accessibility, awareness, acceptability and availability. Access to oral health care service among children for preventive, restorative, rehabilitative and curative purpose is important for optimal oral health and wellbeing of a child. Access to oral health services is limited in African countries, and carious teeth are often left untreated.

The challenges associated with access to oral health care are common in African countries. They are faced with continuous oral health

care delivery and access problems with variation in the availability of dentists between countries and poor funding for oral health. Most of the dentists that practice in African region are mostly delivering oral health services to children and adolescents in urban areas than rural areas. This can contribute to oral health inequalities among children and adolescents in slum areas, riverine areas, rural and remote areas. After searching articles from electronic databases, the aim of this article is to review the burden of dental caries, the dentist to patient ratio, Restorative index and Met need index of children and adolescents.

**Key words:** Access, Adolescent, Children, Dental caries, Oral health, Oral health services

### **INTRODUCTION**

The oral health conditions and oral health needs of a community can vary between region, sub-region and countries due to different socio-cultural conditions and practices, awareness and acceptance of oral health practices and services, oral health seeking behaviours and attitudes towards oral health. Oral diseases like dental caries are a significant public health problem [1] in resource rich and resource poor countries. The presence of dental caries in children are considered an important evidence for assessing the oral health status of children and adolescents [1]. In the 2019 Global Burden of Disease study, dental caries of

permanent teeth was reported to be affecting 2.3 billion people and dental caries for primary teeth was reported to be affecting 560 million children [2]. Dental caries is a disease of significant global consequences with dental caries in the permanent and primary teeth being the first and tenth most predominant global health problem, respectively [3]. It is expensive to health care systems, accounting for  $\leq 10\%$  of health care budgets in industrialized countries, being the fourth most expensive disease to treat [4]. The cost of treating dental caries is estimated to be US \$3513 per 1000 children in most low-income countries, exceeding the total health budget of these countries [4]. The high level of untreated dental caries [3] in some region, sub-region, countries and communities could be as a result of limited access to dental services in terms of cost, accessibility, [5] awareness, acceptability and availability[5]. After searching articles from electronic databases, PubMed, Scopus and Google Scholar, the aim of this article is to review the burden of dental caries, the dentist to patient ratio in Africa, Restorative index and Met need index of children and adolescents in Africa. The inclusion criteria were articles from electronic database with information on access to oral health services, the social and economic burden of dental caries, level of untreated dental caries among children and adolescents in Africa, the dentist to patient ratio in Africa, Restorative index and Met need index of children and adolescents in Africa.

### **Dental caries and access to oral health services**

Children with dental caries in their primary teeth are more likely to have dental caries in their permanent teeth [1, 6]when compared to those who have never had dental caries in

primary dentition[1,6], if dental caries preventive measures are not instituted in a dental home. Untreated dental caries can leads to reversible pulpitis, irreversible pulpitis, acute apical periodontitis, dentoalveolar abscess and serious conditions such as facial space abscesses or Ludwig's angina. Access to oral health care includes the availability, accessibility, awareness, accommodation, affordability, and acceptability of oral health services. Access to quality oral health care services is a persistent oral health issue in most Africa countries, but the extent and seriousness of its impacts differ with each locality and sub-region. Access to oral health care is important in promoting and maintaining general health and quality of life. People who have access to oral health care are more likely to receive oral health preventive and curative services, and oral health education on oral health risks behaviours. They are also more likely to have oral diseases detected in the earlier stages and obtain restorative and curative care as needed. While lack of access to oral health care especially for children, adolescents and people in resource poor countries, slums areas, riverine areas, rural and remote areas can result in delayed diagnosis, [7] untreated oral diseases and conditions, and compromised oral and general health status.

Oral diseases like dental caries restrict activities in school, at work and at home causing millions of school and work hours to be lost each year [8]. The burden of oral diseases like dental caries is more expensive to treat consuming about 5–10% of healthcare budgets in developed countries [8] and a financial burden on the families. It can reduce work and recreational hours among youth and adults, reduce academic and recreational hours among adolescent; and loss of play and school hours among children.

Oral health problems continue to be among the most costly health problems to treat, resulting in high direct and indirect costs to individuals, families and governments. The global economic cost of dental caries was estimated to be 442 billion USD per year, of which, 298 billion USD was spent on the treatment costs [9] of dental caries and 144 billion USD was attributed to the lost working hours. In Africa, there are variations in the availability of dentists between sub region, countries, urban, semi-urban, slums and rural locality. In North Africa, one dentist to a population of 33,000 people was reported in Sudan,[10] while in Egypt, it was one dentist to a population of over 5,600 people [11]. In East Africa , one dentist to a population of 1,268,000 people in Ethiopia,[12]one dentist to a population of 360,000 people in Tanzania[13],one dentist to a population of 303,185 people in Eritrea were reported respectively[14]. In other East Africa countries, one dentist to a population of 158,000 people in Uganda ,[15] one dentist to a population of over 92,000 people in Rwanda[16] and one dentist to a population of 40,000 people in Kenya were also reported respectively [17]. Another finding from Kenya [18] reported one dentist to a population of 378,000 in the public sector, and only 20% of the dentists were in rural areas compared to 80% in urban environments [18]. Dentists are the head of the oral health professional team,(other members of the oral health team are Dental Therapists/Dental Hygienist, Dental Technologists, Dental Nurses, Dental technicians and Dental assistants) and they can offer preventive, restorative, rehabilitative and curative services in accordance with their training and working experience.

In South Africa, one dentist to a population of 8,817 people and one dental specialist per 118,947 people was reported [19]. Among the various dental specialists in South Africa, the ratio of dental specialist per population was one Oral Pathologist serving 2,700,100people,one Community Dentist serving 1,636,424 people, one Periodontist serving 1,038,500 people, one Prosthodontist serving 692,333 people , one Maxillofacial and Oral surgeon serving 403,000 people and one Orthodontist serving 394,175 people in South Africa [19]. The presence of a Dental specialist in an oral health facility would improve the range of basic and advanced preventive, restorative, rehabilitative and curative services needed for optimal oral health and wellbeing of children, adolescents and adults. In West Africa, one dentist to a population of 750,000 in Sierra Leone, [20] one dentist to a population of 104,000 people in Ghana[21], one dentist to a population of about 100,000 people in Cameroon,[22]and one dentist to a population of about 40,000 people in Nigeria were reported respectively [23-24]. In other countries in African Region, one dentist to a population of about 688,613 people in Chad [25],one dentist to a population of 419,000 people in Malawi [26], one dentist to a population of 150,000 people in Zambia, [27] one dentist to a population of 66,666 people in Lesotho,[28] and one dentist to a population of 43,460people in Angola were the reports from the countries [29]. The estimated average dentist to patient ratio across reported countries in Africa was 0.33 per 10000 people in African region, [30] with over 35000 dentists practicing in African region,[30]and it was the lowest among the World Health Organization reported average dentist to patient ratio in regions globally [30].

In Nigeria, among children and adolescents, Met Need Index and Restorative index are all very low [3,31]. Restorative dental care is extremely expensive and only 5-10% of health expenditure [24] goes into the provision of oral health in most countries. In Tanzania, The costs for a tooth extraction was equivalent to four times the average daily financial resources of a single person and restorations like fillings were even nine to ten times as high to the average daily financial resources of a single person [13]. Removable dentures were offered in only 32% of available dental facilities and root canal treatments in 46% of available dental health facilities in Tanzania [13]. Parents and children (including children and adolescents with special health care needs) who have access to available, accessible, accommodating and affordable oral health services are more likely to receive oral health preventive services and more likely to have oral diseases detected in the earlier stages and obtain restorative and curative care as needed. The increase in the burden of dental caries and other oral diseases in some resource-poor countries could be as a result of lack of a functional oral health care system, absence of dental equipment, dental materials and dental instruments for optimal oral health care. It also includes the absence of preventive oral health services in primary health care facilities, absence of universal health coverage for oral health services, level of awareness and acceptance of oral health preventive and curative services among the people, and practicing an oral health system that mostly focuses on curative care [5]. The presence of a functional oral health system in most developing countries, with adequate oral health funding and availability of universal health coverage can help to

improve access to oral health services and oral health of the populace.

### **Untreated dental caries, restorative index and met need index of children and adolescents**

Untreated dental caries associated with pain [1] in children can impart on the quality of life, school attendance, eating practices, [8] growth, and the development of children. Children with severe untreated carious teeth do not thrive and they can weigh significantly less than their peers [1]. The level of untreated [32] dental caries in Eritrea, [14] Ethiopia [33], Uganda [34], Kenya [18], South Africa [35-36], Ghana [37] and Nigeria [31-32] was high, with 98.3% reported in Eritrea [14], about 90%-97% in South Africa [33-34], and ranging between 77.2% and 98.6% in the permanent teeth and 92% and 95.6% in the primary teeth in Nigeria [3]. In Eritrea, among 12 years old Eritrean children, 98.3% of the carious teeth were untreated [14], among 6 years old South African children, more than 90% of the children had carious teeth that were untreated [34]. In Ethiopia, among 6-15 years old Ethiopian children, 84.6% of the carious teeth were untreated [33]. In Ghana, among 9-15 years Ghanaian children, 80% of the carious teeth were untreated. [37] In Nigeria, among 3 - 6 years nursery school children, 92% of the carious teeth were untreated [32]. The high level of untreated dental caries [31] in children [14,32-37] indicates high restorative treatment needs [38] and very low restorative index [31,38] among children and adolescent, and can reflect limited access to oral care in terms of cost, accessibility, availability and awareness.

Met Need Index is an indication of treatments received by an individual, [39] while Restorative Index reflects the restorative care

of those who have suffered the disease [31,39]. In Kano state, North west, Nigeria, the Restorative index among 12-14 year old Almajiris children was 0% while the Met Need Index among 12-14-year-old Almajiris children was 0.08 [40]. The Restorative index among 12-14 year old private school children in Kano state, North west, Nigeria was 10.5 % while the Met Need Index among 12-14-year-old private school was 0.16 [40]. The Restorative index of private school children [40] was higher than that of Almajiris children, possibly because of better awareness and more oral health seeking behaviour among private school children. The Restorative index among 12 years old children in Ilorin, Kwara State, North central, Nigeria was 1.5%, [41] while among 12-14 year old school children in Ibadan, Oyo State, South west Nigeria, Met Need Index and Restorative index among 12 year old children were 0 and 0% respectively [39]. In Ibadan, Oyo State, among 13 year old, Restorative index was 0% and Met Need Index was 0.04, [39] while among 14 year old children, Restorative index was 3.45% and Met Need Index was 0.11. [39]. In Lagos State, South west, Nigeria, among 5 to 16 year old school in Lagos State, South west, Nigeria, the Restorative index was 0.3%, [42] while among 11-16 years old children, Restorative index was about 1% [43]. In Port Harcourt, Rivers State, South south, Nigeria among 12 - 15 year old secondary school children, the Restorative index was 6.3% [44]. A hospital-based study in South south, Nigeria, among 3-16 year old children, the Restorative index for children with Molar incisor hypo mineralization was 3.2%, [45] while the Restorative index for children without Molar incisor hypo-mineralization was 6.9%. The Met Need Index for children with Molar incisor hypo-mineralization was 0.06, and

0.09 for children without Molar incisor hypomineralization [45]. In Enugu, South East Nigeria, the Restorative index among 12 - 15 year old was 3% , [46] among 11-16 years old secondary school children in rural area, the Restorative index was 2.8% [38] and among 12 years old school children in Enugu, South East Nigeria, the Restorative index for both private and public school children was 0% [47]. The Met Need Index for private and public school children was 0.03 and 0.01 respectively [47]. Private school children had higher Met Need Index than public school children and could be as a result of more oral health seeking behavior and access to oral health care among private school children. Children and adolescents depend on their parents, guardians and caregiver to access oral health services and the oral health seeking behaviors of their parents can influence their access to oral health services.

## CONCLUSION

Untreated dental caries have impacts on children and adolescents. Improving access to oral health services through universal health coverage with a functional oral health system, and adequate funding for oral health could help to reduce the burden of untreated dental caries and oral diseases among children and adolescents.

## Financial support and sponsorship

None

## Conflicts of interest

There are no conflicts of interest.

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