Prevalence, Severity, and Secular Trends of Dental Caries among Various Saudi Populations: A Literature Review

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ABSTRACT
The prevalence of dental caries is increasing across different nations around the globe. A review of the literature shows that dental caries is adversely affecting the oral health of children, adolescents, adults and elderly populations in Saudi Arabia. The objective of this review is to report the prevalence, severity, and progression of dental caries in different age groups of Saudi communities. Digital databases such as PubMed, Medline, Google scholar, and the Saudi Dental and Medical Journals were searched to retrieve the published articles and reports on dental caries in Saudi Arabia. Search strategy included key words such as “dental caries,” dental decay, decayed missing filled teeth (dmft/DMFT), and oral health. Cross-sectional, retrospective and cohort studies (from 1982 to 2012) reporting the prevalence, incidence and severity of caries among children, adults and older individuals were included in the review. In children with primary dentition ages 3-7 years, the highest caries prevalence was almost 95% and maximum estimate of dmft was 7.34 during the last decade. Approximately, 91% was the highest caries prevalence and greatest DMFT value was 7.35 among the children/adolescents ages 12-19 years. The adults with a mean age between 30 and 45 years had maximum caries prevalence of 98% and DMFT of 14.53 while older individuals had greatest DMFT score of 24.3. Children, adults, and elderly populations demonstrate a higher prevalence and greater severity of caries, and secular trends also show a striking increase in dmft/DMFT and caries prevalence rates over the past few decades in Saudi Arabia.

Key words: Caries prevalence, dental caries, Saudi Arabia

INTRODUCTION
Dental caries is a worldwide pandemic.\[^1\] It affects about 60-90% of school children, and almost 100% of adults throughout the world.\[^2\] Contrary to the previous studies, lately the prevalence of dental caries is increasing across different nations around the globe.\[^3\] In Saudi Arabia,
significantly high prevalence of dental caries has been reported in children, adults and older individuals.\[4-7\] Evidence shows that most carious lesions remain untreated, and caries is the most common cause of primary tooth extraction in the Kingdom of Saudi Arabia (KSA).\[8\]

Dental caries is an infectious disease that can affect infants, children, adults and elderly. Caries can result in the inflammation of dental pulp and associated tissues which can ultimately lead to tooth loss, cellulitis and rarely to the brain abscess.\[9\] Oral streptococci are associated with systemic diseases such as endocarditis, meningitis, hepatic disease, and vertebral osteomyelitis.\[10\] Almost 50% of tooth loss occurs due to dental caries and its complications.\[11\]

Poor oral hygiene, high magnitude of cariogenic microorganisms, reduced saliva, inadequate exposure to fluoride, low socioeconomic status, and improper feeding habits in infants are risk factors for caries.\[12\] In children, the consumption of sugar containing food, socioeconomic status and poor perception about oral health of the mother are strongly associated with dental caries.\[6,13\] Caries can compromise health, however, its treatment can improve the growth, development and cognitive learning in the children.\[14\] Systemic diseases, higher use of medication, physical and mental inability to maintain oral hygiene and changes in diet predispose elderly population to the increased risk of dental caries.\[11\]

Dental caries, though preventable, is the most prevalent oral condition which can detrimentally affect different demographic groups, and can have huge public health impact on the oral and systemic health, social well-being, income of individuals and health care systems. Nonetheless, there appears no evidence based policy decisions to reduce the prevalence of dental caries and minimize the resulting social and health care costs in the country. Most of the research and published reviews are about the prevalence of caries among preschool and school children. For instance, a recent review on dental caries from different administrative regions of Saudi Arabia was also about caries prevalence and severity in children.\[15\] To the best of my knowledge, no review is available regarding the prevalence of dental caries among children, adolescents, adults and older individuals in Saudi Arabia.

The objective of this review is to report the prevalence, severity and progression of dental caries in different age groups of Saudi communities possibly from all walks of life and from all administrative regions of the country. This review, therefore, can help dental and other health care providers, public health managers, policy makers, and other stakeholders to better benefit the individuals and communities in preventing and controlling dental caries. This can also enhance further research on dental caries and related factors in different target populations from different geographical areas of KSA.

**METHODS**

Observational studies including cross-sectional, retrospective, and longitudinal studies conducted on different age groups from different regions of Saudi Arabia were considered. The initial selection of the published papers included the reading of their titles and abstracts, and then selected articles were read to obtain the sample data of the present review.

**Search strategy**

The author systematically searched different digital databases such as PubMed, Medline, Google scholar, World Health Organization (WHO) website, Saudi Dental Journal, and Saudi Medical Journal to retrieve the published articles and reports on dental caries in Saudi Arabia. Search was performed up to the March 2013. Search strategy included key words such as “dental caries” or “caries,” dental decay or decay, decayed missing filled teeth (dmft) and DMFT, oral health behaviors/practices, oral health status, and fluorosis in Saudi Arabia. The lists of the references from the selected articles were checked, and relevant additional journal papers were picked to be included in the review. The manual search included the articles available at the library of the University of Dammam. Some of the articles were obtained by personally contacting their authors through E-mails. The search yielded the selected articles from 1982 to 2012, which particularly helped to estimate the secular trends in dental caries over a period of three decades in different age groups of the population.

**Inclusion criteria**

Inclusion criteria were established to include epidemiological studies conducted on children, adolescents, adults and elderly from all administrative regions to comprehensively report dental caries in different demographic groups in Saudi Arabia. The search included the articles published up to 2013. Observational population-based studies on prevalence, incidence and severity of caries were included in the review; hence, clinical trials were excluded. The research papers on the oral health practices and behaviors, enamel abnormalities, fluorosis, water fluoridation and oral treatment needs were included because some of them also reported caries prevalence or dmft/DMFT. The community based, school based, clinical and institutional based research articles on dental caries were included.
Therefore, the studies conducted on children whether attending public, private or military schools, clinic or hospital, and adults and older individuals visiting primary, secondary or tertiary health care facilities were included in the review. Caries research conducted on special needs children was also the part of the present review.

**Analysis**

World Health Organization recommendations were mainly used to report the prevalence of dental caries in different age groups, thus studies on ages or age groups of 5 years (5-7 years) for the primary dentition, and 12, 15, 35-44 and 65-74 years of ages or age groups for permanent dentition were analyzed. The review includes 15 studies on children aged 3-7 years, nine studies on children between 12 and 19 years, five studies on special needs children, seven studies on adults, and two studies on the older individuals. Data obtained from 38 study samples was analyzed to report the prevalence, dmft/DMFT, incidence and secular trends of dental caries among different target groups exposed to different social and cultural settings in various parts of the Kingdom. The prevalence and dmft or DMFT estimates were extracted from the selected studies and were plotted against the years in which studies were conducted to determine secular trends. Some of the studies were conducted on children with an age range of 2 to 18 years. therefore, appropriate sample size, and scores of prevalence and dmft/DMFT of children ages 3-7 years and 12-19 were extracted from the selected studies to follow the WHO guidelines as closely as possible.

**RESULTS**

**Caries prevalence, severity and secular trends among children**

The prevalence, severity and secular trends among children will be discussed under the headings of primary dentition of children aged 3-7 years, permanent dentitions of children aged 12-19 years, and special needs children.

**Primary dentition of children ages 3-7 years**

The prevalence of dental caries, dmft, age of the study subjects, sample size, and geographical locations are given in Table 1. The prevalence of dental caries and dmft score in children with primary dentition were 33.4% and 1.2 respectively in 1985 in Gizan. Several studies from Riyadh, Jeddah, Rabagh and Mecca during 1990s reported dmft estimates ranging from 2.1 to 6.47. The estimates of dmft increased to 7 or above as reported in two studies conducted in Tabuk and Riyadh in 2000. Nonetheless, Al-Banyan et al. examined a sample of 129 children aged 5-7 years and revealed a dmft value of 4.3 in 2000 in Riyadh. During the last decade, studies conducted in different parts of the Kingdom found dmft score from 3.9 to 7.34. However, elegantly designed multicenter study with a sample size of 3,782 participants conducted in 11 regions of Saudi Arabia reported caries prevalence of 82% and teeth of 4.9 in 2010.

Figures 1 and 2 show secular trends of dmft/deft estimates and the prevalence rates, and it can be observed that over the last three decades there has been a tremendous increase in the prevalence and severity of dental caries in children (3-7 years) in KSA.

**Permanent dentition of children aged 12-19 years**

In 1982, Younes and El-Angbawi reported caries prevalence of 77.65% and DMFT of 2.90 in Riyadh. After a decade, Akpata et al. found caries prevalence of 76.5% and DMFT score of 2.10 in Riyadh. Highest caries prevalence (>90%) and greatest DMFT (>7) were observed in Riyadh and Qaseem in 2003, thus representing almost 65% increase in DMFT between 1982 and 2003. However, caries prevalence and DMFT estimates reported by AlDosari et al.
were 70% and 3.25 respectively in 2010.[29] In a longitudinal study, Al-Shammery et al. showed an increase of 2.85 in DMFT score (baseline DMFT 1.95 and final DMFT 4.81) over a period of 3 years, and dental caries affected one tooth per child each year[33] [Table 2].

During the past three decades, there was an exponential increase in DMFT in children aged 12-19 years, however, the prevalence rates show comparatively fewer variations [Figures 3 and 4].

Caries prevalence and severity among special needs children
The special needs include a wide range of children that may have medical, physical, mental, and behavioral disabilities and require assistance.[34] In a prospective study, Adenubi et al. observed caries prevalence of 79% in 1997 in Riyadh.[35] A cross-sectional study of deaf, blind and mentally retarded children from Riyadh reported caries prevalence of 96.5% and dmft of 7.31 in children aged 6-7 years, while 11-12-year-old children had almost 92% caries prevalence estimate and 4.9 DMFT score in 2004.[36] Murshid found caries prevalence of 65% and dmft of 3.1 and DMFT of 2.7 among autistic children in 2005 in Riyadh.[37] Children with cleft lip and palate aged 1-6 years exhibited a high dmft of 10.54 in 2008 in Dammam.[38] In 2009, Brown reported caries prevalence of 91.9% among medically compromised children aged 5 years in Riyadh[8] [Table 3].

Caries prevalence, severity and secular trends among adults
In a cross-sectional study, Almas et al. observed caries prevalence of 68.5% and DMFT of 8.36 in 1993 in Riyadh that are the lowest caries estimates among selected studies on adults in the present review.[39] Between 1996 and 2000, studies from different regions

Table 1: Studies on prevalence of caries and dmft of primary dentition of children aged 3-7 years in Saudi Arabia, 1985-2010

<table>
<thead>
<tr>
<th>Name of author(s)</th>
<th>Name of the journal</th>
<th>Research design</th>
<th>Sample size</th>
<th>Age (years)</th>
<th>Location (city/region)</th>
<th>Caries prevalence %</th>
<th>Caries index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salem and Holm, 1985[17]</td>
<td>Community Dental Oral Epidemiology</td>
<td>Cross-sectional study design</td>
<td>296</td>
<td>3-5</td>
<td>Gizan</td>
<td>33.4</td>
<td>dmft: 1.2</td>
</tr>
<tr>
<td>Al-Shammery et al., 1990[18]</td>
<td>Community Dental Oral Epidemiology</td>
<td>Cross-sectional study design</td>
<td>691</td>
<td>6</td>
<td>Riyadh</td>
<td>76.7</td>
<td>dmft: 3.77</td>
</tr>
<tr>
<td>Al-Khateeb et al., 1991[19]</td>
<td>Community Dental Oral Epidemiology</td>
<td>Cross-sectional study design</td>
<td>160 from each region</td>
<td>6</td>
<td>Jeddah Rabagh Mecca</td>
<td>No reported</td>
<td>dmft Jeddah: 4.6 Rabagh: 2.1 Mecca: 2.7</td>
</tr>
<tr>
<td>Alamoudi et al., 1995[20]</td>
<td>The Saudi Dental Journal</td>
<td>Cross-sectional study design</td>
<td>338</td>
<td>6-7</td>
<td>Jeddah</td>
<td>No reported</td>
<td>dmft: 6.47</td>
</tr>
<tr>
<td>Al-Mohammadi et al., 1997[21]</td>
<td>Community Dental Oral Epidemiology</td>
<td>Cross-sectional study design</td>
<td>258</td>
<td>4-6</td>
<td>Riyadh</td>
<td>60</td>
<td>dmft: 2.9</td>
</tr>
<tr>
<td>Stewart et al., 2000[22]</td>
<td>Saudi Dental Journal</td>
<td>Cross-sectional study design</td>
<td>123</td>
<td>5-7</td>
<td>Tabuk</td>
<td>92.5</td>
<td>dmft: 7.77</td>
</tr>
<tr>
<td>Al-Banyan et al., 2000[23]</td>
<td>International Journal of Pediatric Dentistry</td>
<td>Cross-sectional study design</td>
<td>129</td>
<td>5-7</td>
<td>Riyadh</td>
<td>No reported</td>
<td>dmft: 4.3</td>
</tr>
<tr>
<td>Al-Malik et al., 2002[26]</td>
<td>Community Dental Oral Epidemiology</td>
<td>Cross-sectional study design</td>
<td>415</td>
<td>5</td>
<td>Jeddah</td>
<td>76</td>
<td>dmft: 5.09</td>
</tr>
<tr>
<td>Sabah et al., 2003[27]</td>
<td>Saudi Dental Journal</td>
<td>Cross-sectional study design</td>
<td>30</td>
<td>5</td>
<td>Tabuk</td>
<td>76.7</td>
<td>dmft: 5.4</td>
</tr>
<tr>
<td>Al-Wazzan, 2004[28]</td>
<td>Saudi Dental Journal</td>
<td>Cross-sectional study design</td>
<td>602</td>
<td>6-7</td>
<td>Riyadh</td>
<td>94.4</td>
<td>dmft: 7.34</td>
</tr>
<tr>
<td>Brown, 2005[29]</td>
<td>East Mediterranean Health Journal</td>
<td>Retrospective study design</td>
<td>175</td>
<td>5</td>
<td>Riyadh</td>
<td>84.0</td>
<td>deft: 6.25</td>
</tr>
<tr>
<td>AlDosari et al., 2010[31]</td>
<td>Journal of Public Health Dentistry</td>
<td>Cross-sectional study design</td>
<td>3782</td>
<td>6-7</td>
<td>11 regions of KSA excluding central region</td>
<td>82</td>
<td>deft 4.9</td>
</tr>
</tbody>
</table>

KSA – Kingdom of Saudi Arabia; dmft – Decayed missing filled teeth
Table 2: Studies on prevalence of caries and DMFT of permanent dentition of children aged 12-19 years in Saudi Arabia, 1982-2010

<table>
<thead>
<tr>
<th>Name of author(s)</th>
<th>Name of the journal</th>
<th>Research design</th>
<th>Sample size</th>
<th>Age (years)</th>
<th>Location (city/region)</th>
<th>Prevalence %</th>
<th>Caries index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Al-Shammery et al., 1990[18]</td>
<td>Community Dental Oral Epidemiology</td>
<td>Cross-sectional study design</td>
<td>843</td>
<td>12</td>
<td>Riyadh</td>
<td>Not reported</td>
<td>DMFT: 1.64</td>
</tr>
<tr>
<td>Al-Khateeb et al., 1991[19]</td>
<td>Community Dental Oral Epidemiology</td>
<td>Cross-sectional study design</td>
<td>320 in each region</td>
<td>12-15</td>
<td>Jeddah Rabagh Mecca</td>
<td>Not reported</td>
<td>DMFT: 4.4</td>
</tr>
<tr>
<td>Akpata et al., 1992[21]</td>
<td>Community Dental Oral Epidemiology</td>
<td>Cross-sectional study design</td>
<td>363</td>
<td>12-13</td>
<td>Riyadh</td>
<td>76.5</td>
<td>DMFT: 2.10</td>
</tr>
<tr>
<td>Alamoudi et al., 1995[20]</td>
<td>Saudi Dental Journal</td>
<td>Cross-sectional study design</td>
<td>505</td>
<td>12</td>
<td>Jeddah</td>
<td>Not reported</td>
<td>DMFT: 2.20</td>
</tr>
<tr>
<td>Al-Shammery et al., 1996[33]</td>
<td>Saudi Dental Journal</td>
<td>Longitudinal epidemiological study design</td>
<td>309</td>
<td>12-13</td>
<td>Riyadh</td>
<td>63.8</td>
<td>Baseline DMFT: 1.95</td>
</tr>
<tr>
<td>Stewart et al., 2000[22]</td>
<td>Saudi Dental Journal</td>
<td>Cross-sectional study design</td>
<td>131</td>
<td>Mean age: 11.12</td>
<td>Tabuk</td>
<td>76.3</td>
<td>DMFT: 2.91</td>
</tr>
<tr>
<td>AlDosari et al., 2003[32]</td>
<td>Saudi Dental Journal</td>
<td>Cross-sectional study design</td>
<td>Total: 734</td>
<td>15-19</td>
<td>Riyadh Qaseem</td>
<td>91.1 in Riyadh 90.5 in Qaseem</td>
<td>DMFT: Riyadh: 7.35 Qaseem: 7.05</td>
</tr>
<tr>
<td>AlDosari et al., 2010[29]</td>
<td>Journal of Public Health Dentistry</td>
<td>Cross-sectional study design</td>
<td>8418</td>
<td>12-18</td>
<td>11 regions of KSA excluding central region</td>
<td>70</td>
<td>DMFT: 3.50</td>
</tr>
</tbody>
</table>

DMFT – Decayed missing filled teeth; KSA – Kingdom of Saudi Arabia

Table 3: Studies on prevalence of caries and dmft/DMFT of special needs children aged 3-14 years in Saudi Arabia, 1997-2009

<table>
<thead>
<tr>
<th>Name of author(s)</th>
<th>Name of the journal</th>
<th>Research design</th>
<th>Sample size</th>
<th>Age (years)</th>
<th>Location (city/region)</th>
<th>Prevalence</th>
<th>Caries index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adenubi et al., 1997[35]</td>
<td>The Saudi Dental Journal</td>
<td>Prospective study design</td>
<td>66</td>
<td>3-14</td>
<td>Riyadh</td>
<td>79</td>
<td>Not reported</td>
</tr>
<tr>
<td>Al-Qahtani and Wyne, 2004[36]</td>
<td>Tropical Dental Journal</td>
<td>Cross-sectional study design</td>
<td>218 blind, deaf and mentally retarded children</td>
<td>6-7 and 11-12</td>
<td>Riyadh</td>
<td>96.5 for 6-7 years group 91.6 for 11-12 years group</td>
<td>dmft for 6-7 years group: 7.31 DMFT for 11-12 years group: 4.9</td>
</tr>
<tr>
<td>Murshid, 2005[37]</td>
<td>Saudi Dental Journal</td>
<td>Cross-sectional study design</td>
<td>20 autistic children</td>
<td>5-14</td>
<td>Riyadh</td>
<td>65</td>
<td>dmft: 3.1 DMFT: 2.7</td>
</tr>
<tr>
<td>Chohan and Wyne, 2008[38]</td>
<td>Pakistan Oral and Dental Journal</td>
<td>Cross-sectional study design</td>
<td>84 cleft lip and palate children</td>
<td>1-6 and 7-14</td>
<td>Dammam</td>
<td>No reported</td>
<td>dmft: 10.54 Combined dmft/DMFT: 10.92</td>
</tr>
<tr>
<td>Brown, 2009[39]</td>
<td>East Mediterranean Health Journal</td>
<td>Retrospective study design</td>
<td>211 medically compromised</td>
<td>5</td>
<td>Riyadh</td>
<td>91.9</td>
<td>Mean deft: 9.91</td>
</tr>
</tbody>
</table>

DMFT – Decayed missing filled teeth
of KSA showed DMFT scores of 10 and 11. Even higher DMFT score (14.53) was observed in a study involving a sample of 297 school teachers in 2001 in Riyadh. Similarly, a study conducted in 2005 reported caries prevalence of 89.2% and DMFT value of 13.24 in Al-Ahsa [4] [Table 4]. Secular trends indicate a dramatic increase in caries estimates among adults during the last decade [Figure 5].

**Caries prevalence and severity among elderly**

Among older individuals, DMFT value of 24.3 was observed in a cross-sectional study with a sample size of

540 subjects in 2005 in Riyadh. Similarly, another study revealed higher DMFT estimate (18.6) in elderly residing in residential homes in 2012 in Riyadh [44] [Table 5].

**DISCUSSION**

The present review on the prevalence and severity of caries over the past decades identified that caries are a highly prevalent condition that adversely affects all ages in Saudi Arabia. In children with primary dentition (ages 3-7 years), the highest estimates of caries prevalence was almost 95%, while 45.5% was the lowest prevalence rate reported during the last decade. In similar age group, dmft index ranged from a minimum of 3.2 to the maximum of 7.34. Approximately, 91% was the highest caries prevalence, and greatest DMFT value was 7.35 among the children/adolescent aged 12-19 years. Nevertheless, caries prevalence of 70% and DMFT count of 3.25 were the lowest caries estimates observed among 12-18 years old children in 2010.

World Health Organization and World Dental Federation (FDI) established goals to achieve 50% of children aged 5-6 years to be caries free and global average of DMFT not to be >3 for 12-year-old children. However, even after 13 years, the proportion of caries free children is

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**Table 4: Studies on prevalence of caries and DMFT among adults with mean age between 30 and 45 years in Saudi Arabia, 1991-2005**

<table>
<thead>
<tr>
<th>Name of author(s)</th>
<th>Name of the journal</th>
<th>Research design</th>
<th>Sample size</th>
<th>Age (years)</th>
<th>Location (city/region)</th>
<th>Prevalence %</th>
<th>Caries index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Almas et al., 1993 [39]</td>
<td>Pakistan Oral and Dental Journal</td>
<td>Cross-sectional study design</td>
<td>200</td>
<td>35-44</td>
<td>AlQaseem</td>
<td>68.5</td>
<td>DMFT: 8.36</td>
</tr>
<tr>
<td>Almas and Al-Jasser, 1996 [40]</td>
<td>Saudi Medical Journal</td>
<td>Cross-sectional study design</td>
<td>58</td>
<td>35-44</td>
<td>Riyadh</td>
<td>Not reported</td>
<td>DMFT: 10</td>
</tr>
<tr>
<td>Al-Jasser and Almas, 1997 [41]</td>
<td>Tropical Dental Journal</td>
<td>Cross-sectional study design</td>
<td>57</td>
<td>35-44</td>
<td>Riyadh</td>
<td>98</td>
<td>DMFT: 11</td>
</tr>
<tr>
<td>Ashri, 1999 [42]</td>
<td>Saudi Dental Journal</td>
<td>Cross-sectional study design</td>
<td>302</td>
<td>Mean age: 39</td>
<td>Riyadh</td>
<td>82.9</td>
<td>Not reported</td>
</tr>
<tr>
<td>Khan, 2000 [43]</td>
<td>Pakistan Oral and Dental Journal</td>
<td>Cross-sectional study design</td>
<td>174</td>
<td>31-40</td>
<td>Riyadh</td>
<td>Not reported</td>
<td>DMFT: 9</td>
</tr>
<tr>
<td>Khan et al., 2001 [25]</td>
<td>Saudi Dental Journal</td>
<td>Cross-sectional study design</td>
<td>289</td>
<td>Mean age: 33.38</td>
<td>Riyadh</td>
<td>Not reported</td>
<td>DMFT: 14.53</td>
</tr>
<tr>
<td>Al-Ghannam et al., 2005 [4]</td>
<td>Saudi Dental Journal</td>
<td>Cross-sectional study design</td>
<td>544</td>
<td>Mean: 42.7</td>
<td>Al-Ahsa</td>
<td>89.2</td>
<td>DMFT: 13.24</td>
</tr>
</tbody>
</table>

DMFT – Decayed missing filled teeth

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**Table 5: Studies on prevalence of caries and DMFT of older individuals aged 65 years and above, 2005-2012**

<table>
<thead>
<tr>
<th>Name of author(s)</th>
<th>Name of the journal</th>
<th>Research design</th>
<th>Sample size</th>
<th>Age (years)</th>
<th>Location (city/region)</th>
<th>Prevalence %</th>
<th>Caries index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Al-Shehri, 2012 [44]</td>
<td>Open Journal of Stomatology</td>
<td>Cross-sectional study design</td>
<td>83</td>
<td>Mean age: 72</td>
<td>Riyadh</td>
<td>Not reported</td>
<td>DMFT 18.6</td>
</tr>
</tbody>
</table>

DMFT – Decayed missing filled teeth

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[Downloaded free from http://www.sjmms.net on Wednesday, March 02, 2016, IP: 197.163.9.67]
Adolescents showed dental caries in India. It is evident caries, while 54% of 12 years and 63% of 15 years of found that about 52% of 5-year-old children had dental
2.1 for adults and 12.4 for older individuals. Srivastava
America, the adults aged 35-49 had DMFT values of
DMFT score of 24.3. Alarming caries estimates in all
fl
dental caries from all geographical areas of the
country involving all age groups is one of the weaknesses
of the present research. Similarly, inclusion of studies
involving smaller sample size, nonrandomization and
subjects attending hospital or clinic threatens the validity
of the current review. Moreover, almost all studies,
except one longitudinal study on caries incidence
and one retrospective study, included cross-sectional
research design which has its own limitations as far as
generalizability and interval validity are concerned.

World Health Organization guidelines regarding age
groups in oral health survey designs were not
strictly followed due the possibility of losing important
information from scarcely available data on caries, though
attempts were made to stick to these recommendations
as closely as possible. Different studies reported
inconsistent estimates of prevalence of caries as well
as dmft/DMFT values in similar age groups which are
possibly because of different study subjects, different time
periods of the studies, different geographical locations,
difference in economic, social and cultural settings
and personal hygiene practices. The wide variations
of caries statistics even among same age groups and
same geographic locations underline the need for better
research planning for future population-based studies
from all administrative regions of Saudi Arabia.

Over the past few decades, the economic surge in Saudi
Arabia has significantly changed life style approaches,
which influenced oral health perceptions and behaviors
of the people. In addition, population in Saudi Arabia
exponentially increased by 13.16% between 2007 and
2010. Tremendous growth in population coupled with
dramatic societal changes, unhealthy oral health behaviors
and practices, inadequate access to oral health care
particularly in remote areas, nonavailability of fluoridated
water and paucity of clinical and population-based
research on the detrimental effect of caries can account
for increased prevalence of caries in Saudi communities.

As mentioned earlier, adults and elderly make up >60% of the total population in Saudi Arabia, nonetheless, there are very few studies available on them and most studies

Data collected from the National Health and Nutrition Examination Survey (1999-2004) in the United States showed that about 28% of children (2-5 years) had caries in primary teeth while about 51% of children aged 6-11 years had caries in primary teeth, and 21% of them had caries in their permanent teeth. A cross-sectional study comprising a sample of 2,014 preschool Chinese children aged 3-5 years reported caries prevalence of 55% among them in 2007. Similarly, a study involving 1,487 children ages 0-5 years showed that 40% of preschoolers had caries in their primary teeth in 2007 in Southern Brazil. In 2002-2003, a nationwide health survey found that about 52% of 5-year-old children had dental caries, while 54% of 12 years and 63% of 15 years of adolescents showed dental caries in India. It is evident that caries prevalence appears much higher among Saudi compared with children from other countries.

The adults with a mean age between 30 and 45 years had a prevalence of 89.2% and DMFT of 13.24 in 2005, which is the most recent study on adults included in the present review. Similarly, the plight of the oral health of older individuals can be reflected by observing the DMFT score of 24.3. Alarming caries estimates in all age groups in Saudi Arabia are much higher than those observed in many other countries. In United States of America, the adults aged 35-49 had DMFT values of 10.91. Srivastava et al. performed a systematic review and found that some multicenter studies conducted in many states of India reported that DMFT estimates in elderly ranged from about 5 to 15, which are markedly lower than identified in the present review. Similarly, second national survey of oral health status in China with a sample size of 140,712 involving six age groups (5, 12, 15, 18, 35-44 and 65-74 years) and each age group comprising 25,452 participants reported that mean DMFT score was 1-1.6 for 12-18 years of children, 2.1 for adults and 12.4 for older individuals.
were conducted on children. Similarly, most studies were done on Saudi populations; however, expatriate children and adult populations make considerable proportions of the total population in the country thus necessitating epidemiological studies involving large sample size of such communities.

CONCLUSION

The present data shows that various age groups in Saudi Arabia demonstrate a high prevalence and greater severity of caries, and secular trends also show a striking increase in DMFT and caries prevalence rates over the past few decades. However, preventive measures can be taken to considerably reduce the levels of dental caries in the country. The collaboration of caries prevention programs with national public health programs or other chronic disease programs is considered the most effective strategy. Reduction in the consumption of sugar containing foods, provision of community water fluoridation, school/community based topical fluoride application programs, availability of fluoride containing toothpastes and fluoridated dietary supplements, and oral health education and promotion are the most important caries preventive measures. Needless to say, the role of dental treatment or antimicrobial therapy remains extremely important in controlling dental caries.

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REFERENCES

Al-Ansari: Dental caries among different Saudi populations


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