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Oral health status of six-year-old children in Qatar: findings from the national oral health survey

Abstract: *Introduction:* Oral health has a significant impact on physical, social and mental well-being of an individual. Qatar, like the rest of the world, is experiencing higher prevalence of oral health-related problems. *Objectives:* To examine the oral health status and extent of preventive and curative needs among six-year-old school children in Qatar by key demographic indicators. *Methods:* Secondary data analysis of 1124 six-year-old private and government primary school children from the 2011 Qatar National Oral Health Survey was performed. Dental caries lesions status of primary dentition was assessed according to the WHO criteria. Descriptive statistics were carried out, and comparison among groups was executed by running *t* statistics. Logistic regression was performed to interpret the impact of various predictors. *Results:* Overall, 71.4% children presented with dental caries lesions with a higher prevalence among girls versus boys (73.8% versus 68.9%). The mean overall dmft was recorded as 4.2 with ±4.2 SD. Qatari children had 3.8 time odds of having dental caries lesions compared with non-Qatari children ($P < 0.001$). Overall, 18.9% of children showed signs of poor periodontal health. Odds of having more periodontal disease were significant in Qatari boys (OR = 3.1 CI = 2.0, 4.7, $P < 0.001$) compared to non-Qatari boys. On average, 3.6 teeth per student were in need of any treatment. *Conclusion:* This study indicated that only 28.6% of children aged six were free from caries lesions. The results urge to further strengthen the strategies and to improve oral hygiene by various evidence-based interventions.

Key words: dental caries; dmft; epidemiology; national survey; oral health; periodontal health; Qatar; six-year-old

Background

According to the World Health Organization (WHO), oral health is defined as an absence of chronic facial and/or mouth pain, oral and throat malignancies, oral sores, birth defects of palate and lips, gum diseases, decayed and lost teeth and other disorders that may affect the oral cavity (1). Oral health can be directly connected to the general well-being of an individual. Optimal oral health prevents one not only from the diseases of oral cavity but also from some systemic diseases (2, 3). Studies show that certain types of oral diseases are capable of predisposing individuals to systemic infections such as pneumonia, endocarditis, sinusitis and brain abscess (2, 3). Oral infections especially periodontal infections predispose cardiovascular diseases and have also been known to deteriorate

diabetes in sufferers (2, 3). The WHO reported that 60–90% of school children and nearly 100% of adults suffer from dental cavities globally (4). This is a significant disease burden that can be detrimental to the economic stability of individuals and nations (4, 5).

Lifestyle factors such as diet and oral hygiene play critical role in oral disease prevalence worldwide (4). Customs, cultural norms and socio-economic factors are also considered to be associated with oral health status; for instance, poor or economically disadvantaged populations are found to have a higher prevalence of oral diseases (4). If not properly treated, childhood oral disease can lead to physical, psychological and social problems in victims (5). Chronic oral diseases or infections in children can be detrimental to physical development as a result of nutritional deficiencies and learning disabilities attributable to missed school days and problems in articulation (5).

Qatar is a peninsula situated halfway along the west coast of the Arabian Gulf with an estimated population of 2404,776 (6). The capital of Qatar is Doha, where about three-fifths of the Qatar population resides. Qatar has experienced rapid socio-economic development and associated lifestyle changes in the past decade. While this has brought about tremendous development in the healthcare sector with excellent access to medical and dental care, certain lifestyle changes such as dietary habits and tobacco use could be negatively impacting the oral health in the country.

The World Health Survey – Qatar (2006) showed that about 23% of respondents were suffering from dental problems; these statistics were higher among women (27.6%) compared with men (18.9%), and Qataris (31%), compared with non-Qataris (19.2%) (7). As oral health-related data for children are lacking in Qatar, a national survey to assess the burden of major oral diseases among children and adolescents (ages 6, 12 and 15) was planned and implemented in 2010/2011. The aim of this survey was to obtain baseline oral health data for children, the distribution and severity of major oral conditions and the community needs for dental care. This study highlights the oral health status of primary dentition among six-year-old school children specifically along with treatment needs by key demographic indicators. The findings of this study could be helpful for developing guidelines and implementing evidence-based interventions to reduce oral health problems in Qatar.

Methods

Study population

The secondary data analysis was executed using the precollected data of six-year-old children from the Qatar's National Oral Health Survey 2011. At the time of survey planning and implementation, the frame of schools was provided by the Ministry of Education and Higher Education (MEHE) formerly known as Supreme Education Council which contained information pertaining to the type of school (private or government), name and nationality of the child, sex, and age. The list was obtained during August and September 2011 and provided population by each age group corresponding to the 2010 Qatar census. A 10% probability sample from the population list of children in each age group was considered as a sample size to pledge reasonable results for Qatar. The sampling was drawn from seven geographical regions or clusters of Qatar (Doha, Al Wakrah, Al Khor, Al Rayyan, Al Dayyen, Madinat Al Shamal and Umm Slal). From each cluster, a subcluster of schools was selected randomly using probability proportional to size sampling technique, and then, the children were selected in the next stage. The school sample frame then was divided into three strata: primary, preparatory and secondary schools for 6-, 12- and 15-year-old children, respectively. Then, the schools were further divided into strata by Qatari male, Qatari female, non-Qatari male and non-Qatari female. In each school, the children were assigned a serial number. From each strata, a maximum number of 15 children were selected of the total children (N) in that strata. The first child was selected randomly between 1 and x ($x = N/15$); subsequently, rest of the children were selected systematically. Whenever the number of children was less than 15, all were selected. Based on the above-mentioned criteria, a total of 4103 children were selected randomly from MEHE provided population; however, a total of 3248 children of ages 6, 12 and 15 participated in this survey with a response rate of 79.2% (8). Although WHO recommends five years old as optimum age for this survey, the selection of six-year-old children was recommended by national authorities and also advised by WHO to be used in situations where school enrolment is later (8,9). A total of 1124 six-year-old children from primary schools participated in the survey from 59 schools distributed in the above-mentioned seven regions of Qatar.

Ethical procedures were followed throughout the implementation of the survey and consisted of obtaining informed consent from the parents of children before their participation.

Clinical data collection

A national survey based on WHO Oral Health Survey was developed and implemented (9). The survey comprised of two parts. First part provided general demographic information, while second part consisted of clinical questions to be filled by the examiners. The questions were structured to provide status of external oral examination, oral mucosa, enamel opacities, hypoplasia, periodontal health, dental fluorosis, dentition, dentofacial anomalies and treatment needs of the children. For this study, the following indicators based only on the primary dentition of six-year-old children were selected and calculated:

- Dental caries lesions (*based on dt, mt, ft*)

  - *Decayed teeth* (*dt*)
  - *Missing teeth* (*mt*)
  - *Filled teeth* (*ft*)
- Dental Fluorosis (*overexposure to fluoride*)
- Periodontal (gum) Status

  - *Gingival bleeding*

○ *Calculus*
• Treatment Status

  ○ *Care index* [(*ft/dmft*) × 100]
  ○ *Need*

Dental caries lesions and treatment needs were recorded according to the WHO criteria using data for teeth which were decayed, missing and filled (dmft) (Fig. 1). No distinction was made between primary and secondary caries while examination (9). Community Periodontal Index (modified) was used for the recording of periodontal status (9). Fluorotic lesions were measured using classification system as described in WHO's Oral Health Surveys – Basic methods (4th edition) (9).

Training and examination

All participating dentists had initial training on the WHO criteria (9) for survey. Calibration trials were conducted twice to control inter- and intra-examiner variability of clinical recordings. All dentists participating in the survey were calibrated during the training workshop against one senior dentist who was identified as a gold standard. Inter- and intra-examiner reliability was calculated, and reproducibility was assessed (8). The level of consistency was found not to be below (85–90%), which is recommended by WHO (9).

A field organizer contacted the schools to prepare the necessary arrangements and introduce the survey to the staff of the school. Examination and data collection place was identified where day light was readily available to assure light standardization in all examination sites. Survey teams consist of examiner/dentist and recorder/dentist. Examiners were responsible for maintaining adequate infection control during survey process which included use of personal protective equipment such as disposable masks, gloves and protective glasses.

Data management and analysis

The dental caries indices (for primary dentition) were computed from decayed teeth (dt), missing teeth (mt), filled teeth (ft) and dmft altogether for each participant. A similar procedure was used for the analysis of information about dental treatment needs. Data were described according to the WHO principles (9). The data pertaining to secondary teeth were excluded from the analysis; therefore, study only explores primary dentition status of children.

Statistical analysis was performed using SPSS version 22.0 (IBM corporation, Chicago, IL, USA). Means were used to describe caries status (dmft, dt, mt, ft). The caries status was classified into categories, that is dmft = 0 (no caries lesions), dmft ≥ 1 (caries lesions present), dmft = 1–4 (moderate) and dmft > 4 (high). Student's *t*-test was used to compare the mean indices among nationalities and sex. Prevalence of dental indicators was obtained using frequencies and percentages and categorized by sex and nationality. The chi-square test was applied for testing the statistical significance of different associations between sex, nationality and caries index. Odds ratio (OR) and 95% confidence interval were calculated using logistic regression to interpret the impact of assumed predictors such as sex and nationality on the presence of dental caries lesions among six-year-old school children. For all statistical tests, a *P*-value of less than 0.05 was considered as statistically significant. Care index for temporary teeth was calculated by ft divided by dmft multiplied by 100.
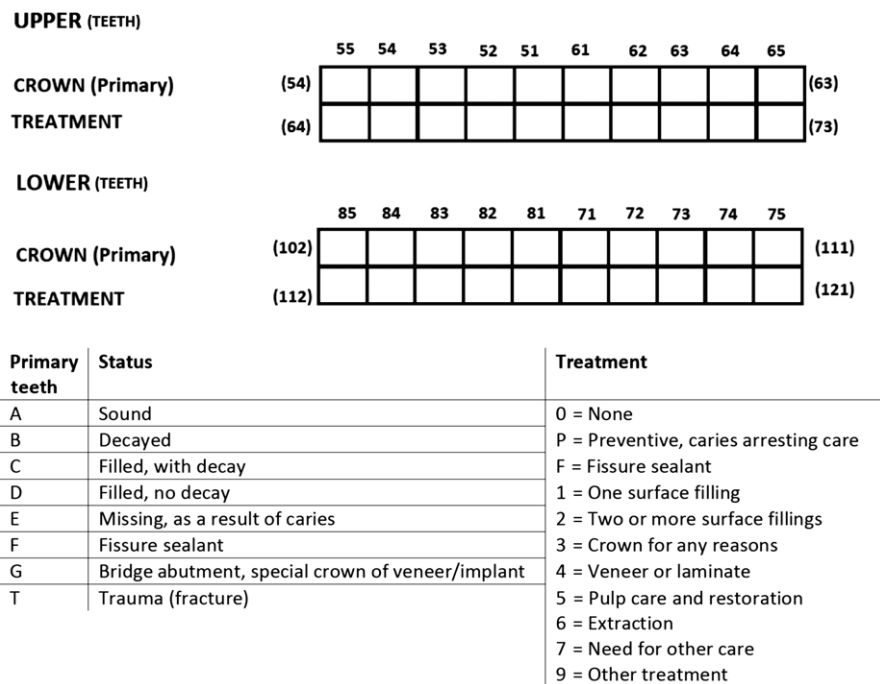

UPPER (TEETH)

		55	54	53	52	51	61	62	63	64	65	
CROWN (Primary)	(54)											(63)
TREATMENT	(64)											(73)

LOWER (TEETH)

		85	84	83	82	81	71	72	73	74	75	
CROWN (Primary)	(102)											(111)
TREATMENT	(112)											(121)

Primary teeth	Status	Treatment
A	Sound	0 = None
B	Decayed	P = Preventive, caries arresting care
C	Filled, with decay	F = Fissure sealant
D	Filled, no decay	1 = One surface filling
E	Missing, as a result of caries	2 = Two or more surface fillings
F	Fissure sealant	3 = Crown for any reasons
G	Bridge abutment, special crown of veneer/implant	4 = Veneer or laminate
T	Trauma (fracture)	5 = Pulp care and restoration
		6 = Extraction
		7 = Need for other care
		9 = Other treatment

Fig. 1. Coding the dentition status and treatment needs – primary teeth.

Results

Study population characteristics

The sample had slightly higher number of girls ($n = 591$, 53%) compared with boys ($n = 533$, 47%). About 36% ($n = 412$) of children were Qatari nationals, while 64% were non-Qatari ($n = 712$).

Decayed, missing, filled teeth (dmft)

Overall, 71.4% children presented with dental caries lesions based on dmft with higher prevalence among girls when compared with the boys (73.8% versus 68.9%). This reveals that nearly seven of 10 children aged 6 years suffered from dental caries lesions. By nationality, the percentage was higher in Qatari (86.7%) boys and girls compared with non-Qatari (62.7%) children (Table 1). Overall, 40.8% children had high caries lesions (dmft > 4) with greater percentage among girls (overall) and Qatari children (Table 1). The mean overall dmft was recorded as 4.2 which means that on average, the children had somewhat more than four teeth with dental carries lesions. The mean dmft indices were also higher in Qatari children (5.8 dmft) versus non-Qataris (3.2 dmft) and were statistically significant ($P < 0.001$). By sex, overall dmft was slightly higher in girls (4.2 dmft) compared with the boys (4.1 dmft). Overall, Qatari girls presented with the highest mean dmft (6.0) followed by Qatari boys (5.7 dmft), non-Qatari boys (3.3 dmft) and non-Qatari girls (3.1 dmft). Qatari children also showed higher odds (OR = 3.87, CI = 2.4–6.1, $P < 0.001$) of having caries lesions compared to non-Qataris (Table 3). By sex, the girls had higher odd of having dental caries lesions compared to boys, but this relationship was not statistically significant (OR = 1.27, CI = 0.98–1.6, $P = 0.06$; Table 3).

In relation to the data by average number of teeth with caries lesions, only 31.1% of boys and 26.2% of girls were lesion-free (Fig. 2). Per cent lesion-free status was higher in non-Qatari children especially boys (39.8%) versus girls (35%) (Fig. 3). About 15% of Qatari boys were free of caries lesions versus Qatari girls (12.3%; Fig 3). While examination, children had up to 17–18 teeth with caries lesions; however, percentage of children with these many teeth with lesions was low (Fig. 2). Highest proportion of children presented with caries lesions in one to two of their teeth with 16.8% of girls and 16.3% of boys within this category (Fig. 2). Among Qatari children, highest percentage of boys (16.1%) had caries lesions in three to four of their teeth, while for girls, highest proportion category was five to six teeth (20%; Fig. 3). In non-Qatari children, about 20% of girls and 17.5% of boys had one to two teeth (highest proportion category for non-Qataris) with carious lesions (Fig. 3).

Fluorosis

The majority of children (80.9%) presented with no fluorosis. About 5% of children had any level of fluorosis. Only six

Table 1. Prevalence of dental caries lesions in deciduous teeth of six-year-old children

| Sex | Nationality | N | Characteristics (mean ± SD) | | | | Classification of dmft* (per cent) | | | | | |
			dmft	Decayed teeth (dt)	Missing teeth (mt)	Filled teeth (ft)	dmft = 0 (caries lesions absent)	dmft ≥1 (caries lesions present)	dmft (1–4) (moderate)	dmft (>4) (high)	dt≥1 (%)	Care Index (%)
Both sexes	Overall	1124	4.2 ± 4.2	3.18 ± 3.7	0.37 ± 1.08	0.62 ± 1.3	28.6	71.4	30.6	40.8	62.7	36.4
	Qatari	412	5.8 ± 4.2	4.4 ± 4.0	0.69 ± 1.5	0.72 ± 1.4	13.3	86.7	26.7	60.0	78.2	36.1
	Non-Qatari	712	3.2 ± 3.7†	2.4 ± 3.3†	0.19 ± 0.68†	0.56 ± 1.3	37.3	62.7§	32.9	29.8§	53.8§	36.5
Boys	Total	533	4.1 ± 4.3	3.14 ± 3.9	0.38 ± 1.0	0.59 ± 1.3	31.1	68.9	30.1	38.8	59.3	37.9
	Qatari	184	5.7 ± 4.4	4.1 ± 4.2	0.68 ± 1.4	0.87 ± 1.5	14.7	85.3	30.4	54.9	72.8	42.7
	Non-Qatari	349	3.3 ± 4.0†	2.6 ± 3.6†	0.22 ± 0.75†	0.44 ± 1.1†	39.8	60.2§	29.8	30.4§	52.1§	34.3
Girls	Total	591	4.2 ± 4.0	3.2 ± 3.6	0.37 ± 1.1	0.64 ± 1.4	26.2	73.8	31.2	42.6	65.8**	35.1
	Qatari	228	6.0 ± 4.0	4.7 ± 3.8	0.70 ± 1.6	0.59 ± 1.3‡	12.3	87.7	23.7	64	82.5¶	31
	Non-Qatari	363	3.1 ± 3.5†	2.3 ± 3.1†	0.16 ± 0.61†	0.68 ± 1.5‡	35.0	65.0§	35.8	29.2§	55.4§	38.6

*dmft classification (0, ≥1, 1–4 & >4) are based on a UAE study published in WHO- Regional Office for the Eastern Mediterranean's journal (13).
†The group mean is significantly different from Qatari.
‡The group mean is significantly different from boys who belong to the same nationality.
§Group mean is significantly different from distribution among Qatari.
¶The proportion among the group is significantly different from distribution among boys who belong to the same nationality.
**The proportion among the group is significantly different from boys (total Qatari and non-Qatari).

Table 2. **Prevalence of gingival bleeding and calculus, among six-year-old children by sex and nationality**

Nationality	Poor periodontal health n (%)	Gingival bleeding n (%)	Calculus n (%)
Overall sample			
Total	212 (18.9)	190 (16.9)	33 (2.9)
Both sexes			
Qatari	89 (21.6)	85 (20.6)	8 (1.9)
Non-Qatari	123 (17.3)	105 (14.7)*	25 (3.5)
Boys			
Total	109 (20.5)	96 (18.0)	19 (3.6)
Qatari	61 (33.2)	59 (32.1)	4 (2.2)
Non-Qatari	48 (13.8)*	37 (10.6)*,‡	15 (4.3)
Girls			
Total	103 (17.4)	94 (15.9)	14 (2.4)
Qatari	28 (12.3)‡	26 (11.4)	4 (1.8)
Non-Qatari	75 (20.7)*,‡	68 (18.7)*,‡	10 (2.8)

*The distribution among the group is significantly different from distribution among Qatari.

‡The distribution among the group is significantly different from distribution among opposite sex who belong to the same nationality.
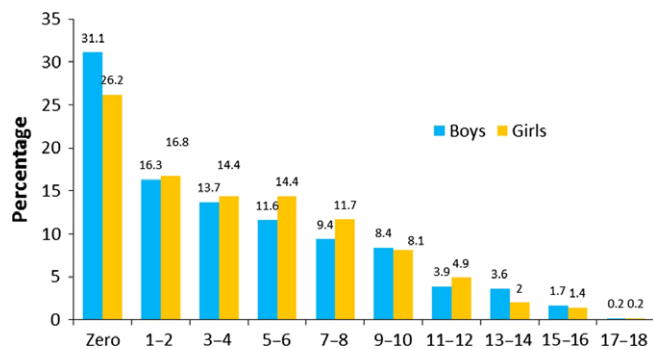

Fig. 2. Distribution of primary dental caries lesions (by number of teeth) among six-year-old children by sex.

children had moderate (0.3%) and severe (0.3%) fluorosis, while 39 had mild (1%) and very mild (2.4%) fluorosis.

Periodontal health status

Periodontal health status was assessed by the data from examination providing information on gingival bleeding which is an important sign of gingivitis as well as calculus. Overall, about 19% children showed signs of poor periodontal health by suffering from gingival bleeding (17%) and/or calculus (2.9%; Table 2). The prevalence of poor periodontal health status was higher in Qatari children (21.6%) compared with non-Qatari (17.3%). By sex, greater percentage of boys had poor periodontal health compared with girls (20.5% versus 17.4%). The percentage was higher in non-Qatari girls compared with Qatari (20.7% versus 12.3%). Odds of having more periodontal disease due to nationality and sex were only significant in Qatari boys (OR = 3.1 CI = 2.0, 4.7, P < 0.001; Table 3).

Treatment status (care index) and need

Overall care index (ft/dmft) was 36.4% slightly high among non-Qatari children (36.5% versus 36.1%) and higher among boys compared with girls (47.9% versus 35.1%). Highest care index was identified in Qatari boys (42.7%; Table 1). The data also showed that during examination, about 3.2% (n = 36) children had pain or infection associated with the disorders of oral cavity. Overall on average, 3.6 teeth were in need of any treatment.

Discussion

The current study describes the most important oral diseases in the primary dentition of the six-year-old school children who participated in Qatar national oral health survey in 2011. The study shows that about 71% of children were suffering from dental caries lesions. Only 28.6% of children were caries-free and this percentage is lower than the WHO goal of 2000 according to which 50% of six-year-old children should be caries-free (8,10). This demonstrates the high prevalence of caries among the study population. Among six-year-olds, seven of ten children were affected by dental caries lesions and there was high prevalence of children with untreated caries. Only one of four teeth with dental caries lesions had received treatment in terms of dental filling or more radical tooth extraction. For both sexes, about one-fifth of the six-year-old children had nine or more teeth with dental caries lesions. Because of such a high level of disease, these children should be considered to be a high-risk group. Regionally, in Saudi Arabia (2000) similar to our study, a dmft value of 4.3 (±3.2) was reported among six-year-old children (11). In Kuwait (2001), the mean dft (missing not included) value was 4.6 (12), while in a United Arab Emirates-based dental survey (2001–2002), the mean dmft among five-year-old children was 5.1 (13). In another study from Saudi Arabia (2002), the dmft was identified as 7.3 in six- to seven-year-olds (14). Further exploration of data showed that the prevalence of caries, and mean dmft indices were higher both among girls and among Qatari nationals (Table 1). The disease burden was massive in Qatari children, whereas non-Qataris had disease distributions skewed to the right, reflecting a less heavy disease burden.

A low prevalence of fluorosis was identified with 81% of children having disease-free status. This is consistent with the results of a study in Saudi Arabia (2000) in which 86% of children did not show any signs of fluorosis (11). An oral health survey conducted in Island of Nevis (2004) also showed that 84.9% of six-year-old children were fluorosis-free (15). Due to a very small number of children with fluorosis, the data did not provide sufficient information by sex and nationality to be shared in this paper.

The National Oral Health Survey in 2011 was implemented because no baseline oral health data were available for children in Qatar. However, some studies provide oral health information in Qatar; for example, the data from the Qatar STEPwise survey in 2012 provided information for adults only. The dental health situation among children can only be

predicted by the lifestyle of adults in the same household. The STEPwise survey reported that about 26% of adults in Qatar are not cleaning their teeth at least twice a day (16). In addition, 4% of respondents stated that they do not clean their teeth at least once a day. Overall, the percentage of respondents having seen a dentist during the past 12 months was 64.7% with women having a higher proportion of visiting the dentist compared with men (69% versus 59.6%) (16). Furthermore, the overall percentage of respondents who had pain or discomfort caused by their teeth or mouth during the past 12 months prior to the STEPwise interview was 40.6% with a higher proportion in women compared with men (48.3% versus 32.7%) (16).

The present study also indicates that six-year-old girls are more likely to have dental caries lesions compared with boys (Table 1); however, further studies are needed to identify any factors that predispose the female population in Qatar to have relatively more dental problems compared with men. In a 2007 Romanian study, a higher percentage of six-year-old girls presented with dental caries lesions compared with boys (89.3% versus 87.3%) (17). The dental caries lesions

prevalence was also found to be higher in the Romanian study compared with the Qatar National Oral Health Survey findings for six-year-old children (88.3% versus 71.4%) (17). The higher caries prevalence in girls was also observed in a 2010 study conducted in Sri Lanka, where a higher percentage of two- to five-year-old girls (43.6%) presented with caries compared with boys (33.7%) (18).

In terms of behavioural factors that can directly or indirectly affect oral health, a higher fibre intake, low sweet consumption, dairy products and whole-grain food items can contribute to reducing caries (19, 20). This is important because according to the STEPwise survey, around 91% of Qatari nationals consume fewer than five servings of fruit and/or vegetables per day (16, 21). It is also important to mention that dental hygiene (e.g. the use of a toothbrush and toothpaste) cannot be replaced by dietary or other behavioural modifications alone, as brushing helps disrupt plaque and most toothpastes contain fluoride. Brushing has an important role in the lower prevalence of caries even with the high sweet consumption in developed countries (20).

The present study has various strengths. The data analysed for this study were collected using the WHO's oral health survey methodology. Random sampling and clustering methods were applied to improve the results at the time of the survey implementation in 2011. The sampling frame was well chosen, and the number of children who took part in the survey was sufficient to assess the oral health status of the study population. The survey data, however, were limited to clinical data only and did not provide information on knowledge and attitude towards oral health. It would be useful to also have behavioural information associated with dental health along with the clinical examination while implementing programmes or projects in the future. The behavioural component can include information on diet with types and frequency of consumption, cleaning habits including frequency of cleaning per day, the dental health of other household members and questions
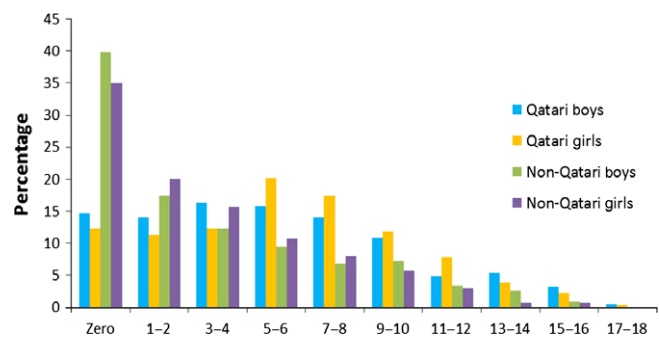

Fig. 3. Distribution of primary dental caries lesions among six-year-old Qatari and non-Qatari children by sex.

Table 3. **Effect of sex and nationality on oral health status in study population**

	dmft* = 0 (caries lesions absent)[‡]	dmft≥ 1 (caries lesions present)		dmft (1–4) (moderate)		dmft (>4) (high)		Poor periodontal health	
		OR (95% CI)	P value	OR (95% CI)	P value	OR (95% CI)	P value	OR (95% CI)	P value
Sex									
Girls	Reference	1.27 (0.98, 1.6)	0.06	1.23 (0.90, 1.6)	0.18	1.3 (0.97, 1.7)	0.07	0.82 (0.60, 1.1)	0.19
Boys	*Reference*								
Nationality									
Qatari	Reference	3.87 (2.8, 5.3)	<0.001	2.3 (1.5, 3.2)	<0.001	5.6 (3.9, 7.9)	<0.001	1.32 (0.97, 1.8)	0.07
Non-Qatari	*Reference*								
Boys									
Qatari	Reference	3.8 (2.4, 6.1)	<0.001	2.7 (1.6, 4.7)	<0.001	4.9 (2.9, 8.0)	<0.001	3.1 (2.0, 4.7)	<0.001
Non-Qatari	*Reference*								
Girls									
Qatari	Reference	3.8 (2.4, 6.0)	<0.001	1.8 (1.1, 3.2)	0.01	6.2 (3.8, 10.1)	<0.001	0.54 (0.33, 0.86)	0.009
Non-Qatari	*Reference*								

*dmft: decayed/missing/filled (primary) teeth.
dmft classification (0, ≥1, 1–4 & >4) are based on a UAE study published in WHO- Regional Office for the Eastern Mediterranean's journal (13).
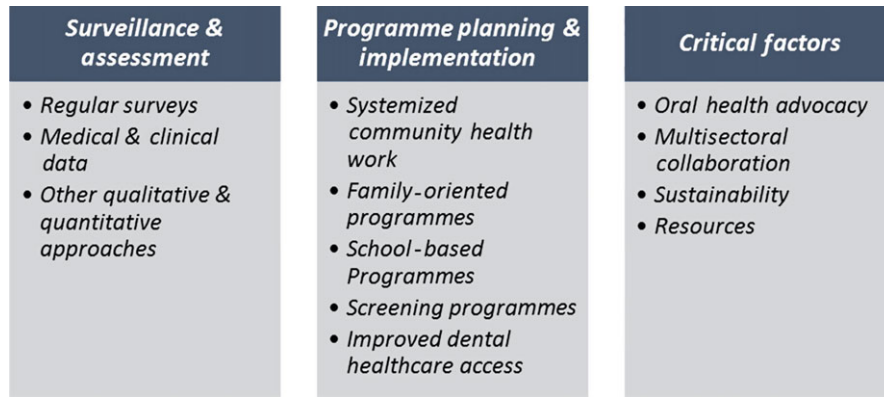
Fig. 4. Strategies to improve oral health status.

related to access to dental health care. A knowledge, attitude and behavioural-based survey can be carried out by involving parent(s) and teachers (in school settings). It is also important to mention that the recommended ages for oral health survey are 5, 12 and 15 years by WHO with exception of using six-year-old in certain situations (9). It was convenient to use six-year-old children for national survey in Qatar because minimum age to be enrolled in elementary school is six years according to the admission policy of MEHE (22). Furthermore, this age was also prioritized by national health authorities in Qatar (8).

The present study and Qatar National Oral Health Survey provide the basis for future surveillance of oral health status in children and adolescents. This study indicates that the WHO's goal for 2000 was not achieved by Qatar in 2011 and that only approximately 29% of 6-year-old children were caries-free (8).

The study urges further strengthening of strategies (Fig. 4) and to improve oral health using multidimensional approaches. Initiatives emphasizing on, for example, the use of fluoridated toothpaste, regular brushing and limiting sweet consumption could contribute in achieving optimal oral health. The findings of this study can be beneficial for clinicians, oral health professionals, public health professionals and other key stakeholders in implementing best practices and programmes to address the identified issues. Effective ongoing surveillance systems can provide data to detect changes and challenges that can be critical for initiating and sustaining evidence-based programmes. Surveillance can yield oral health trends, offering directions to develop tailored initiatives and improving oral health conditions in the target population. Multidisciplinary approaches as well as the collaboration and effective use of resources can play a critical role in achieving goals and sustaining programmes.

Clinical relevance

Scientific rationale for the study

Oral health status during childhood periods could predict the oral health and/or development of other chronic diseases at later ages. Social determinants play an important role in oral health status of a region.

Principal findings

By nationality, Qataris are more likely to have oral health problems compared with non-Qataris. By sex, girls have more dental problems than boys in Qatar.

Practical implications

At the public health level, it is critical to allocate resources as per accordance to the needs of target population. At clinical level, the dental professionals should identify and consider the social determinants especially ethnic background while examining and educating patients. This study provides the data to build national oral health action plan and strategies.

Conflict of interest

The authors declare no conflict of interest. All authors contributed equally to prepare this article.

Ethical procedures

Ethical procedures were followed throughout the implementation of the survey.

Informed consent

Informed consent was obtained before survey implementation. After completion of survey process, the data were handled with full confidentiality.

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