



## Teenagers' Oral Health and Oral Self-Care in Curaçao

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### Abstract

**Objectives:** This study was aimed to examine teenagers' awareness of their personal oral health and of their oral self-care in Curaçao, and to compare the oral hygiene habits in relation to age and gender. **Methods:** A cross-sectional study was carried out among 461 teenage boys and girls (12-18 years old) on the island of Curaçao (Dutch West Indies). The data were collected from anonymous questionnaires in secondary schools during the 2013-2014 school year. Items about socio-demographics and oral health behavior (e.g., visits and experiences with oral health professionals, sugar-intake, opinions, and preferences) were included and these variables were analyzed.

**Results:** Although oral health care for the youth up to eighteen years is reimbursed by the national health insurance, only one-third of this subgroup of the population was aware of this health service. More than one third of the teenagers had never been to an oral hygienist, and fifty-five percent had visited the dentist in the year prior to this study. The 'young' age-group had visited a dentist relatively more recently, and around the age of 5 years they went for a first visit to a dentist. About half of the boys and girls reported never experiencing symptoms of oral diseases, while one out of eight teenagers reported having occasional complaints on regular basis (e.g., bad breath, bleeding gums or sore, cavities, tooth ache and bad taste or problems with eating/drinking). Finally, more boys than girls liked tooth decorations, and they regard this as attractive and sexy. In addition, the 'moderate' age-group of the teenagers reported wearing tooth decorations as being smart and healthy.

**Conclusions:** The findings suggest that oral health and its social-psychological determinants are related to teenagers' oral health awareness, their preferences and oral self-care, affected by age and gender.

### Keywords

Teenagers; Oral health awareness; Oral self-care; Gender; Curaçao

### Introduction

Insight in teenagers' awareness of their own oral health and of their oral self care is essential for the promotion of oral health. In general, the dependency of this social-psychological point of view, group of young boys and girls on their individual beliefs and attitudes towards oral health is instable. Not only from oral health, but also from social psychological point of view, it is relevant to tailor the

needs and expectations of this specific subgroup of teenagers in relation to their age and gender into (re-)organized oral health programmes towards health promotion and prevention in Curaçao [1]. For teenagers, health-related concerns and the two main oral health diseases as caries and periodontal problems, are probably not the only motives for their oral self-care. Noticeable, these dental diseases can be considered as behavioral diseases, because they can be prevented by simply performing adequate oral hygiene behavior and by restricting the frequency of sugar-intake [2,3]. However, study reports suggested that behaviors which may promote health are often performed for reasons other than improvements in general health; for instance, tooth brushing may be engaged in to look more attractive [4]. In addition, from a review of scientific literature on physical attractiveness, oral health may have an important, although often neglected, effect on a person's appearance, and from an evolutionary point of view, '...strong, even white teeth provide a constellation of cues to health, developmental history, masticatory efficiency, and genotypic quality, and are thus predicted to be attractive' [5]. Also, on the basis of young adolescents' beliefs and attitudes in relation to oral health, it has been suggested that unhealthy teeth are perceived as negatively affecting a person's image [6]. The strength and type of oral health care determinants that are relevant may differ for subgroups related to age and gender. As a consequence, it is important no longer treating teenagers as a homogeneous group of young adolescents. Recognizing the various determinants is an important step in developing effective interventions to promote the maintenance of good oral health, to prevent oral diseases and stimulate to perform adequate oral self-care in this particular culture or region.

The present study aimed to examine the determinants on oral health and oral self-care among 12-18 year-old teenagers – a mixed population of black and white people – in Curaçao. Prior to this survey study a public lecture "Open your mind and mouth, it's all about attitude!" was presented in October 2013 at the University of Curaçao Dr. Moises da Costa Gomez (UoC) [7], and a Radio z86 – interview was held by Orlando Qualess in Willemstad, Curaçao.

Curaçao is an island in the Southern Caribbean Sea, off the Venezuelan coast, that forms part of the Dutch Caribbean. The Country of Curaçao, which includes the main island and the small, uninhabited island of Klein Curaçao, is a constituent country of the Kingdom of the Netherlands. Central Bureau Statistical Office (CBS, 2011) estimates that Curaçao has a population of over 150,000 on an area of 444 km<sup>2</sup> (171 sq mi), and its capital is Willemstad. Prior to 10 October 2010, when the Netherlands Antilles was dissolved, Curaçao was administered as the Island Territory of Curaçao [in Dutch: Eilandgebied Curaçao], one of five island territories of the former Netherlands Antilles. The Island has a variety of different cultures, immigrants from different countries, e.g. Colombia, Venezuela, Haiti, Santo Domingo, Netherlands et cetera. Although Dutch is the official language, Papiamentu – a mixture of Portuguese, Spanish, English and Dutch words – as the native language is spoken by almost 80% as its mother tongue [8].

In Curaçao, there are 41 dentists, most oral professionals work in private clinics. Around 16 dentists work in relation to the national health insurance Social Security Bank (SVB) or BZV [Sociale

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Verzekerings Bank or Basis Ziektekosten verzekering], which only approved paid dental care for individuals under the age of 18 years, and individuals over the age of 65 years. There are 18 dental hygienists, who mostly work in general dental clinics, however there are two independent dental hygiene practices [9]. As a result of differences in lifestyle and risk factors that arise from environmental, economic, social and behavioral causes, such as poor living conditions and poor education, (Curaçao has 9.000 “drop-outs”) as well as differences in traditions with regard to oral self-care, oral hygiene interventions need to be embedded within oral health systems that are financially fair for disadvantaged and poor population groups [8-10].

## Materials and Methods

The survey for this cross-sectional study was developed by the authors, based on their expertises as professional oral hygienists, combined with practical/clinical experiences, and completed with questionnaire-items used in earlier determinants of oral hygiene behavior studies [11], and was conducted according to universal ethical principles. During November 2013 and January 2014, the fieldwork was organized and the data entry was done by Social Work students of the University of Curaçao Dr. Moises da Costa Gomez (UoC) as part of a course in research methods.

## Participants and procedure

From the second week of November 2013, a large number of teenagers from seven secondary schools on the island Curaçao were randomly selected and invited to participate in the study. The questionnaire was administered until January 2014 among boys and girls, who answered a questionnaire during their classes, and in or around the school yards. The educational level of most of the included the schools was vocational training (VSBO and MAVO). In a few schools the educational level was vocational training to advanced vocational training (HAVO/VWO).

## Questionnaire

The questionnaire included demographic questions on matters such as age, gender, and questions about visits to oral health professionals and oral health behavior (e.g., opinions and preferences). These items and other questions were open-ended, multiple choice, or to be answered on bipolar adjective rating or Likert scales.

Diverse questions about national health insurance, first time and frequencies of visits to dentist/oral hygienist/orthodontist, experiences, symptoms of oral diseases or oral health complaints.

Subjective perception of oral health was valued by them self by using a number ranging from 0 = “very poor perceived oral health” to 10 = “extremely good perceived oral health” on a ‘Ladder Scale’ as the Self-Anchoring Striving Scale [12].

Subjective perception of tooth decorations was measured using five worded statements in a semantic differential format. The students indicated on 7-point scales how they evaluated their perception of tooth decorations, by answering the question: ‘I regard tooth decorations, such as gold caps and/or diamonds on my front teeth....,’ on the dimensions 1=ugly to 7=attractive, 1=status lowering to 7=status enhancing, and so on: dull-sexy, stupid-smart, and unhealthy-healthy. The total sum score ranged from 5 to 35. The Cronbach’s  $\alpha$  of this scale was .76.

Dental Anxiety was measured by the Dental Anxiety Scale (DAS). This is a 4-item self-report scale measuring fear for dental treatment

at the day before, in the waiting room, waiting to be drilled and waiting to be cleaned [13]. Items were scored on a scale of 1 to 5, and summed to provide an overall dental anxiety score ranging from 4=“not anxious at all” to 20=“extremely anxious”. The Cronbach’s  $\alpha$ =.64. The higher the score, the stronger the dental anxiety.

Oral Hygiene Behavior (OHB) was assessed by using some items of the index for OHB [3,11], including an item concerning consumption of sugar-containing snacks and/or soft-drinks.

## Effects of a poster-based intervention

The impact of a Dutch poster-based intervention on the topic of oral health in relation to soft-, and/or sport drinks, used in a NVM-public campaign (i.e., a public campaign organized by the Dutch Dental Hygienists’ Association – Nederlandse Vereniging van Mondhygienisten; NVM) in secondary schools was measured too [14].

## Statistical analyses

The IBM Statistical Package for Social Sciences 22.0 (SPSS, Inc., Chicago, IL, USA) was used for data analysis. For the present article the missing values for age were substituted by the mean age in this sample. The internal consistency of the used scales was assessed by Cronbach’s alpha’s. The data were subjected to frequency distributions, and means and standard deviations (SD) of the scales were calculated. One-way analyses of variance were performed to determine whether any significant differences in mean scores of the variables existed between boys and girls, and between the three age-groups.

## Ethics statement

Permission for this study was obtained from the Ethical Committee of Social Sciences (ECSS) of the UoC. Involvement of the secondary schools was confirmed, participation of the teenage boys and girls was on a voluntary basis, they were free to refuse contribution, confidentiality was assured, no pressure was exerted to take part in the study, and individually verbal informed consent was obtained. Furthermore, the ethical board, Central Committee on Research Involving Human Subjects, affirms that research which requires filling in a questionnaire just once generally does not fall under the scope of the Medical Research Involving Human Subjects Act [15].

## Results

The sample included 461 teenagers (51% girls), 12-18 years of age with a mean (SD) age of 14.6 (1.3) years. To determine differences in age-groups, age was divided in three categories: 18% was categorized as ‘young’ (12-13 years), 65% as ‘moderate’ (14-15 years) and 17% as ‘old’ (16 years and older). The percentages of gender differences in the three age categories is roughly equal: 45%-49% boys and 51%-55% girls. The group of girls in this sample appeared to be in every respect an adequate representation of the female teenage population in Curaçao [16].

## Visits to dentists, oral hygienists, and orthodontist

Less than two-third of the total sample teenagers (61%) reported their age, which was related to their first visit to a dentist. The mean age was 7.6 years (SD=3.3). Only 2,5% reported that they were 2 years old, i.e., proximately the age of eruption of primary dentition,

when they visited a dentist for the first time [17]. A relatively high percentage of 12.5%-15% was reported for a first visit to a dentist at 4, 6 and 9 years of age. The results revealed that almost 35% of the teenagers had visited a dentist longer than a year preceding the study, and 55% in the year prior to the study. In the five years before the study, a dentist had not seen more than a quarter of the teenagers (28.4%), 31.3% had been seen by a dentist only once or twice times, and more than 40% three to more than 5 times (Table 1). Up to 60% of the boys and girls reported that their experiences with a dentist were good to very good. Only 13% of the teenagers reported to have had very bad to bad experiences. In addition, in the five years prior to the study, 38.1% of the teenagers had never been to an oral hygienist, 31.5% had been seen by an oral hygienist once or twice times, and about as many (30.4%) three to more than 5 times (Table 1). Of the total amount of teenagers who had visited a oral hygienist (63%), half of them reported to have had good to very good experiences, and one out of eight boys and girls had experienced a visit to an oral hygienist as bad to very bad. Almost a quarter (23.3%) of the teenagers visited an orthodontist for treatment.

**Oral health awareness, tooth decorations, anxiety and oral self-care**

The teenagers valued their perceived oral health as 'good', with a mean value of 8.1 (SD=1.7). A remarkably percentage of 34% valued their personal oral health with the number 10, which means 'extremely good'. Rather than one-third of the teenagers (37.4%) is aware of the hundred percent oral health insurance for the youth up to eighteen years by the national health insurance, and about as many (35.6%) did not know at all about this reimbursement for oral health. Ranging from 46%- 63% of the teenagers reported never experiencing symptoms of oral diseases, while around 10%-14% reported regular having occasional complaints (e.g., bad breath, bleeding gums or sore, cavities, tooth ache and bad taste). All teenagers valued tooth decorations in general as slightly negative, with a mean value of 17 (SD=8.3). However, boys more than girls liked tooth decorations (M=18.1, SD=8.5) and (M=15.8, SD=8), respectively, F(1,395)=7.3, p<0.001. The teenagers' mean score on the DAS, M=8.9 (SD=3.0) suggests no dental anxiety, but the frequency scores of the DAS scale showed that 7% and 3.3% of the teenagers reported to have moderate and extreme dental anxiety, respectively [13].

The frequencies in percentages of teenagers' oral self-care, based on some items of the index for OHB and an item concerning consumption of sugar-containing snacks and/or soft-drinks, are presented in Table 2. Almost three-quarter of the teenagers brushed their teeth at least twice a day, mostly in the morning before their breakfast, and almost two-third brushed their teeth before they go to sleep. More than a half (55%) reported to brush two or three minutes each time; 55% cleaned their tongue daily and 28% sometimes. Three-quarter of the teenagers reported to use a manual tooth brush, 53% used fluoride containing toothpaste, and 36% and 44% never use floss

**Table 1:** Frequencies (percent) of visits to the dentist and oral hygienist in the five years prior to the present study.

Number of visits in the 5 year prior the study	Percents	
	Dentist N = 434	Oral hygienist N = 441
'None'	28.4	38.1
'1-2 times'	31.3	31.5
'3-5 times'	26.3	19.5
'More than 5 times'	14.1	10.9

**Table 2:** Oral self-care of the total sample of teenagers based on some items of the index for OHB (13): per cent per item.

Items and values	percents
<b>Frequency of tooth brushing (N = 444)</b>	
'Twice a day' or 'more than 2 times a day'	74.1
'Once a day'	20.7
'Not every day'	5.6
<b>Moments of tooth brushing (N = 429)</b>	
'Morning before breakfast' (N = 429)	76.7
'Morning after breakfast' (N = 420)	37.4
'Before going to sleep' (N = 428)	64.0
<b>Duration of tooth brushing (N = 444)</b>	
'Two minutes' or 'Three minutes'	55.0
'Longer than three minutes' or 'One minute'	37.2
Shorter than 'One minute'	7.9
<b>Method of tooth brushing (N = 398)</b>	
'Bass-method'	9.0
'Horizontal movement'	42.7
'Vertical movement'	29.6
'Circular movement'	17.6
<b>Fluoride toothpaste (N = 423)</b>	
'Toothpaste with fluoride'	53.4
'Toothpaste without fluoride'	14.7
'I don't know'	31.4
<b>Interdental cleaning (floss: N = 438; tooth sticks: N = 431)</b>	
'At least once a day' floss or tooth sticks	25.8
'Not every day' floss or tooth sticks	20.7
'Never' floss or tooth sticks	38.1
'Never' floss or tooth sticks	35.0
'Never' floss or tooth sticks	36.3
'Never' floss or tooth sticks	44.3
<b>Tooth brush</b>	
'Manual tooth brush'	74.2
'Powered tooth brush'	16.9
'Combination'	8.7
<b>Tongue cleaning (N = 425)</b>	
'Every day'	53.4
'Sometimes'	28.0
'Never'	18.6
<b>Consumption of sugar-containing snacks and/or soft-drinks (N = 422)</b>	
'Never'	9.0
'Sometimes, but not every day'	31.8
'Once or twice a day'	35.5
'Three to five times a day'	16.6
'Six to ten times a day'	4.5

and tooth picks, respectively, as interdental cleaning methods.

**Effects of a poster-based intervention**

The impact and findings concerning design, content and the intention or willingness for behavioural change as an effect of a Dutch poster-based intervention, used in a NVM-public campaign in secondary schools on the topic of oral health in relation to soft- and/or sport drinks, are presented in Table 3. Of all teenagers, 28.2% felt affected to the NVM-poster, and 39.2% understand the message of the NVM-poster. Around 35% reported to have the intention to drink less soft-, and/or sport drinks, and that they will take better care of their teeth.

**Effects of age**

The results show that the younger the teenagers are, the lower the mean age reported for a first visit to a dentist is, and this was statistically significant F(2,279)=16.4, p<0.001. The mean age was 5.6 years (SD=2.5) for the 'young' age-group, 7.9 years (SD=3.2) for

**Table 3:** Percents of all teenagers per item concerning the poster-based intervention on the topic of oral health in relation to soft-, and/or sport drinks

Items and values	Percents (N = 461)
<b>Would you be affected by this NVM-poster?</b>	
'Absolutely not' = 1	35.2
2	10.2
3	14.0
4	12.4
5	5.7
6	3.3
'Absolutely yes' = 7	19.2
<b>'I find the message of the NVM-poster difficult/easy to understand.'</b>	
'Very difficult' = 1	18.4
2	5.5
3	11.0
4	26.0
5	5.5
6	4.3
'Very easy' = 7	29.4
<b>'By this NVM-poster I'm going to drink less soft-, and/or sport drinks. In addition, I will take better care of my teeth.'</b>	
'Absolutely not' = 1	28.9
2	8.9
3	12.0
4	15.3
5	5.5
6	3.3
'Absolutely yes' = 7	26.1

the 'moderate' age-group, and 8.8 years (SD=3.7) 'old' age-group, respectively. Moreover, the 'young' age-group of the teenagers (M=1.7, SD=1.3) had visited in the year prior to the study a dentist relatively more recently than the 'old' age-group (M=2.1, SD=1.5), and the 'moderate' age-group (M=2.9, SD=1.8) visited a dentist the longest time ago,  $F(2,414)=20.49$ ,  $p<0.001$ . The 'moderate' age-group of the teenagers (M=1.7, SD=0.5) visited an orthodontist more than the 'younger' (M=1.9, SD=0.3) and 'older' age-group (M=1.8, SD=0.4),  $F(2,422)=5.5$ ,  $p<0.01$ . In addition, the teenagers of the 'moderate' age-group valued their perceived oral health with a mean value of 8.4 (SD=1.7), while the other two age-groups a mean value of 7.6 (SD=1.5) and M=7.7 (SD=1.9) reported,  $F(2,374)=7.4$ ,  $p<0.001$ . No age differences were observed in a visit to a dentist or an oral hygienist in the five years before the study, neither in their experiences with both professionals, and in the awareness of the 100% oral health insurance. Only in two oral health complaints, i.e., cavities and jaw problems there were significant age differences. The younger the teenagers are, the less they reported complaints of cavities (M=1.6, SD=0.7); (M=1.7, SD=0.9); (M=2.0, SD=0.9) respectively,  $F(2,448)=3.6$ ,  $p<0.05$ . The 'moderate' age-group (M=1.7, SD=1.0) reported more jaw problems than the 'young' and 'old' age-groups (M=1.5, SD=0.9) and (M=1.4, SD=0.5), respectively,  $F(2,440)=4.7$ ,  $p<0.01$ . The 'moderate' age-group of the teenagers (M=3.6, SD=2.2), more than the 'young' and 'old' age-groups (M=3.1, SD=1.5) and (M=2.5, SD=1.7), respectively reported wearing tooth decorations as being smart,  $F(2,413)=8.5$ ,  $p<0.001$  and healthy (M=3.4, SD=2.3); (M=2.7, SD=1.7); (M=2.3, SD=2.0) respectively,  $F(2,416)=9.6$ ,  $p<0.001$ . The 'young' age-group (M=9.7, SD=3.2) indicated that they experienced more dental anxiety than the 'moderate' and 'old' age-groups (M=8.6, SD=2.6) and (M=9.1, SD=4.0), respectively,  $F(2,360)=3.4$ ,  $p<0.05$ . The consumption of sugar-containing snacks and/or soft-drinks by the 'old' age-group (M=3.3, SD=1.1) was the highest followed by the 'young' and 'moderate' age-groups (M=2.9, SD=1.2) and (M=2.7, SD=1.0), respectively,  $F(2,419)=9.7$ ,  $p<0.001$ . Only in

two of the three items, significant age differences were found in the effects of a Dutch NVM-poster-based intervention. The 'young' and 'moderate' age-group felt similar affected to the NVM-poster, (M=3.5, SD=2.0) and (M=3.5, SD=2.3), respectively, more than the 'old' age-group, (M=2.2, SD=1.8),  $F(2,418)=11.34$ ,  $p<0.001$ . In addition, they respectively reported to have the intention to drink less soft-, and/or sport drinks, and that they will take better care of their teeth due to the NVM-poster-based intervention (M=3.9, SD=2.0) and (M=3.9, SD=2.4), respectively, in comparison with the 'old' age-group (M=2.9, SD =2.6),  $F(2,415)= 5.6$ ,  $p<0.01$ .

### Effects of gender

No gender differences in the age for a first visit to a dentist were observed. However, girls (M=2.4, SD=1.7) had visited a dentist relatively more recently than boys (M=2.6, SD=1.8) in the year prior to the study,  $F(1,407)=4.6$ ,  $p<0.05$ . Furthermore, there were no gender differences observed in a visit to a dentist or an oral hygienist in the five years before the study, in the experiences with these oral health professionals, and in visits to an orthodontist for treatment. According to the awareness of the 100% oral health insurance, oral health complaints and oral self-care also no gender differences were found. However, more boys (M=4.1, SD=2.3) than girls (M=3.3, SD=2.2) reported wearing tooth decoration as more attractive,  $F(1,420)=14.0$ ,  $p<0.001$  and sexy; boys (M=3.8, SD=2.2) and girls (M=3.3, SD=2.2), respectively,  $F(1,410)=7.0$ ,  $p<0.01$ . No significant gender differences were found in the impact or effects of the Dutch NVM-poster-based intervention concerning the consumption of soft, and /or sport drinks.

### Discussion

The aim of this survey study was to examine teenagers' awareness of their personal oral health and of their oral self-care in Curaçao, and to compare the oral hygiene habits in relation to age and gender. In general, the produced epidemiological data on oral health among this age-groups demonstrate that the sample of teenagers of 12-13 years old, appeared to be, especially related to oral health behavior, in every respect an adequate representation of the youth population in Curaçao [1,16]. Also from oral professionals' practical point of view the findings of this study characterized this target group, and the outcomes are salient, relevant, and suggests recommendations for an oral health program, towards health promotion and prevention. Still, it is important to keep in mind that youth of 12 years and older depend on their parents [1], and from that perspective, it can be hypothesized that a part of the 52% of the adults who are not visiting the dentist [18], could be seen as some of the parents 28.4% or 38.1% of the teenagers, that had not been seen by a dentist or had never been to an oral hygienist. However, girls and 'young' age-group teenagers had visited a dentist relatively more recently than boys or the two older ages-groups in the year prior to the study. In similar vein of the hypothesis mentioned before, there may be a connection with some of these adults, even if they attach great value to regular visits to an oral health professional, but are not insured by the Social Security Bank (SVB), nor have a (private) health insurance [1], and the 35.6% of the teenagers who reported not to know about the 100% oral health insurance for the youth up to eighteen years. A Dutch study shows that one out of ten children of parents/guardians with a low socio-economic background has a suboptimal oral health condition [19]. Moreover, a reported mean age of almost eight years for a first visit to a dentist is relatively late, in comparison to the recommended age of 2 years old [17]. According to the CBS in the Netherlands, 35% of all

children in the age of 0-3 years have been seen by the dentist at the age of 2 years [20]. In 2013, the 'College voor Zorgverzekeringen' in the Netherlands reported 40%-43% caries experience using the DMF-T score by five year old children [21]. However, in Curaçao, about half of the teenagers reported never experiencing symptoms of oral diseases, and one-third valued their personal oral health as 'extremely good, while around 10%-14% reported regularly having occasional complaints as for instance cavities and tooth ache. Moreover, the younger the teenagers are, the less they reported complaints of cavities. In the group of teenagers it can be hypothesized that a higher consumption of sugar-containing snacks and/or soft-drinks by the 'old' age-group, in comparison with the 'young' and 'moderate' age-groups is related to the reported outcomes according the poster based intervention: that the 'young' and 'moderate' age-group felt more affected by the NVM-poster, and that they both reported to have the intention to drink less soft-, and/or sport drinks, including to take better care of their teeth. According to tooth decorations boys more than girls liked these, and they reported wearing tooth decoration as more attractive and sexy. Noticable, the 'moderate' age-group of the teenagers liked these more than the 'young' and 'old' age-groups and they consider wearing tooth decorations as being smart and healthy. Furthermore, in general no dental anxiety was reported by the teenagers, but the 'young' age-group indicated to experiencing more dental anxiety than the 'moderate' and 'old' age-groups.

This survey study has some limitations. Firstly, it is a survey of a rather small group of teenagers in the 'young' age-group and 'old' age-groups. Secondly, the scale to measure subjective perception of tooth decorations is newly developed and the validity of it is not certain. However, at face-validity, the items in the scale appear to be a useful method for assessing and evaluating perception of tooth decorations. Third, the data do not relate to actual behavior, but to self-reported behavior. Because of that caution regarding the interpretation of some data is needed, because what teenagers say do not always match what they really are doing. Socially desirable responding could be a possible explanation [22]. Although not all relations are significant or can be interpreted unequivocally, these data illustrate that there are a few variations between boys and girls, and in different age-group within the population of teenagers in Curaçao. Whether or not preventive oral hygiene approaches are as useful for both groups can only be answered using another study design, especially tailored for the different age-groups. Nevertheless, these findings are illustrative and provide more insight in the way teenagers; boys and girls, young or old, perceive and experience different aspects in their personal oral health awareness and self-care. Also, it provide a serious indication that oral health promotion and prevention for teenagers needs improvement. This is important because they are at risk not to receive 'optimal care', while especially for these young adolescents the potential social and behavioural consequences of oral health are substantial. Noteworthy, beyond providing oral health care, oral health professionals and dental/oral hygienists as paramedic professionals in particular are preventive specialists of oral health [23,24] with a principal responsibility for maintaining a healthy mouth [25], and therefore, are expected to emphasize the relation between oral and general health as contributors of well-being of teenagers and patients in general. Based on the findings, there are various recommendations for intervention programs on how to implement, plan and evaluate, oral health related social and communication skills training in the workfield or practices of oral health professionals in Curacao. Such effective educative programs and cognitive behavioral interventions could include games, discussions and (videotaped) role plays to help

health professionals learn to communicate with teenagers about 'their' topics of interest and to supervise and interact with them effectively. Also, in the selection for role models for intervention tailored for teenagers peer groups of same sex and age could be chosen as well as mothers and teachers. However, to improve knowledge of oral hygiene of parents is generally not related to changes in oral hygiene for themselves or for the spouse [26]. Finally, further research would provide more clarity. In particular, research in which the focus is directed to the use of available knowledge and efficiency of care in everyday oral health services is necessary [27,28].

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The authors declare that they have no competing interests.

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