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### Optimizing oral health: Towards a tailored, effective and cost-effective dental care

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# Chapter

# 7

**Parental attitudes towards  
oral health and caries-risk  
in their children**



# Parental attitudes towards oral health and caries-risk in their children

## Introduction

Life style interventions gain effectiveness when they are tailored for patients holding specific attitudes (Schwarzer et al., 2010). This probably also holds for caries preventive measures, but identifying attitudes on an individual patient level may be difficult or too time-consuming in daily dental practice. Attitudes are, by definition, subjective and difficult to catch using survey questionnaires (Cross, 2005). The importance of attitudes of parents towards oral health related behaviour of their child is well established (Daly et al, 2010; Wigen & Wang, 2010). In chapter 6 attitudes towards oral health among parents of 6-year-old children at risk of developing caries were explored using Q-methodology (Watts & Stenner, 2012), and identified five prevailing attitudes: conscious and responsible, i.e. parents who are aware of the need to care and willing to take responsibility; *trivializing and fatalistic*, i.e. parents who are convinced that dental disease is a genetic matter and not a major problem; *appearance-driven and open-minded*, i.e. parents who are convinced that having good-looking teeth is important and follow dental professional's advice to achieve this; *knowledgeable but defensive*, i.e. parents who are aware of why and how to apply healthy dental behaviour but report to be too busy to spout it into practice; *conscious and concerned*, i.e. parents who are afraid that all their efforts in maintaining a proper oral hygiene in the end will be futile (Vermaire et al., 2010).

Studies like the one performed in chapter 6 may give relevant information for daily dental practice, but conducting intensive interviews with each and every parent or patient is not likely to be considered feasible. When similar information could be collected with less time effort, it can be used in dental counsel-sessions or in planning caries prevention strategies. The aim of this study is to investigate whether, as an alternative, parents can be matched with aforementioned attitudes towards oral health by means of a short questionnaire. As an aside, this study gives insight in the distribution of these attitudes among a large sample of parents. Furthermore, this study aims to explore how the five attitudes associate with diet and oral hygiene habits and with clinical outcomes in children.

## Methods

The parents of 179 9-year-old children ( $\pm 3$  months) participating in a randomized controlled trial (RCT) on caries-preventive strategies (Chapter 2) were included in this study. As part of the 3-year follow-up measurement of the trial, data on oral hygiene habits, dietary habits, socioeconomic status, dental knowledge, perceived dental hygiene burden and willingness to invest in oral hygiene were collected, together with clinical data on caries experience and oral hygiene of the child. A more extensive description of how these data were collected is reported in Chapter 5.

### Attitude measurement

A vignette sheet was developed based on the results of the Q-methodological study of chapter 6 (Figure 1). As described by Baker et al. (2010), abbreviated descriptions of the five attitudes were composed using the characterizing and distinguishing statements of each attitude. The readability of the abbreviated descriptions of the attitudes was assessed using a T-Scan interface (Kraf & Pander Maat, 2009). Each attitude description was tested on mean number of characters per word, the mean length of the words used, proportion of frequent words (i.e., how many words in the text are among the 9,600 most used words in the Dutch language), D-level of the text (i.e., scale of difficulty of the grammar used), mean distance between subject and verb, mean distance between object and verb, Lemma type-token ratio (i.e., a measure of word diversity), mean number of adjectives, mean number of nouns and the density of personal references. The T-scan showed no substantial differences in readability between the five descriptions. The description of attitude 5 was slightly more difficult to read, possibly making it less appealing to the reader, and the description of attitude 2 had a relatively higher density of personal references, potentially making it more appealing to the reader. Because the differences in readability were minor and no straightforward alternatives for improvement could be identified, no changes were made to the original descriptions. No considerable impact of readability is expected on matching parents with the attitudes.

As final question in a larger questionnaire, parents were instructed to read the vignette sheet containing the five abbreviated descriptions of oral health attitudes (Figure 1). Next, they were asked to indicate for each description how well it matched their attitude towards oral health, using a five-point rating scale with answer categories “not at all” (1), “not” (2), “neutral” (3), “a little” (4), or “very much” (5). These scores for each attitude are the main outcome measure in this study. Next, parents were asked to

indicate which one of the descriptions matched their attitude best. The answer to this question was used as a control question as well as to match parents to a single attitude in the event equal highest scores were given on more than one attitude and these needed to be untied. Finally, parents were asked which description did not match their attitude at all, again as a control question (see Figure 1).

### **Clinical measurements**

Oral hygiene of the children was measured using the simplified oral hygiene index (OHI-s) (Greene & Vermillion, 1968). Caries was scored using dmfs/DMFS at the dentine threshold (d3/D3) (WHO, 1979).

### **Analysis**

The match of parents with the five attitudes towards oral health behaviour was explored using descriptive statistics. To be able to give an indication of the distribution of attitudes among participating parents, they were matched to a single attitude using the following simple procedure: if a parent gave a maximum score of 4 or 5 to a single attitude, this attitude was selected as the best matching attitude. If a parent's maximum score of 4 or 5 tied between two or more attitude descriptions, the parent was matched to one of these tied attitudes based on the follow-up question in which they were asked to indicate which single description matched their attitude best. In all other cases, a parent was not matched to a specific attitude.

Bivariate associations between the 1 to 5 scores on the attitude questions and categorical variables (e.g., background characteristics, dietary and oral hygiene habits) were investigated using Chi-square test and with continuous variables (e.g., willingness to invest, clinical outcomes) using ANOVA. Multivariate associations were investigated using binary logistic regressions, with the scores on each attitude question dichotomized into 0 (for scores 1, 2 and 3) and 1 (for scores 4 and 5) as dependent variable. Given the size of the sample and the variety of potential explanatory variables in the data-set, these were tested using a forward conditional procedure (entry criterion  $p < .10$ ; removal criterion  $p < .15$ ). Analyses were conducted in SPSS version 19. The study was approved by the Medical Ethical Committee of the VU University Amsterdam, the Netherlands. Protocol number NL 13709.029.06.

## Results

A total of 179 survey questionnaires were returned, of which 9 were excluded because the attitude questions were not answered completely or not at all. Therefore, 170 (95.0%) respondents remained for analysis. Most respondents ( $n = 137$ ; 80.6%) were mothers accompanying their child to the dental clinic, 28 (16.5%) were fathers and 5 (2.9%) were other family members. Respondents were fairly equally distributed across low ( $n = 50$ ; 29.4%), middle ( $n = 62$ ; 36.5%) and high ( $n = 58$ ; 34.1%) SES-categories. The large majority was of Dutch origin ( $n = 141$ ; 82.9%), the remainder of immigrant origin ( $n = 29$ ; 17.1%).

Figure 2 presents the response patterns to the attitude questions ( $n = 170$ ), which shows that all possible scores were used for all attitudes. All respondents matched well (score 4) to very well (score 5) with at least one of the five attitudes. The maximum score on any attitude was 4 for 64 respondents (37.6%) and 5 for the remaining 106 respondents (62.4%). Eight respondents gave all five attitudes the same score (i.e., six respondents gave all a score 4 and two gave all a score 5). Table 1 shows that mean scores (and sd) were fairly similar for attitudes 1, 3, 4 and 5, and lower for attitude 2 (but sd higher). Correlations between attitude scores were low, indicating the attitudes are distinct. Higher SES was positively associated with attitude 1 ( $p < .01$ ) and negatively with attitude 2 ( $p < .001$ ); no significant associations were found with origin. Using the follow-up question for untying equal highest scores, 159 of the 170 respondents (93.5%) could be matched to a single best matching profile. Attitude 1 matched best for 9% of the sample, attitude 2 for 8%, attitude 3 for 31%, attitude 4 for 43% and attitude 5 for 9% of the sample (Figure 3).

Correlations with non-clinical outcomes are presented in Table 2. Parents scoring higher on attitude 1 ('Conscious and concerned') more often served all main courses on a daily basis, had a higher score on dental knowledge and a lower score on dental burden. Parents scoring higher on attitude 2 ('Trivializing and fatalistic') more often skipped breakfast and lunch on a regular basis, and thus did not serve all main courses on a daily basis, were less willing to invest money or time in the oral hygiene of their child, valued the general health of their child lower, had a lower score on dental knowledge and a higher score on dental burden. Parents with a higher score on attitude 3 ('Appearance-driven and open minded') more often served breakfast and lunch on a daily basis, and thus all main courses as well, were more willing to invest money in the oral hygiene of their child, and valued the general and oral health of their child higher.

Parents with a higher score on attitude 4 ('Knowledgeable but defensive') were less willing to visit the dentist and also had a higher score on dental burden. Parents scoring higher on attitude 5 ('Conscious and concerned') more often served breakfast and lunch, and thus all main courses, on a regular basis.

Table 3 presents correlations between the five profiles and clinical outcomes. Children of parents scoring higher on attitude 1 had lower ms and dmfs scores, those of parents scoring higher on attitude 2 had higher OHI-s and dmfs scores, and those of parents scoring higher on attitude 4 had a higher OHI-s score.

Multivariate analysis showed that matching best to attitude 1 (i.e., a score of 4 or 5 on profile 'Conscious and concerned') was associated with higher SES ( $p = .06$ ), higher dental knowledge ( $p = .05$ ), and valued the oral health of their child higher ( $p = .05$ ). Matching best to attitude 2 was associated with lower SES ( $p = .00$ ), serving breakfast less frequently ( $p = .05$ ), the parent eating between meals snacks more often ( $p = .10$ ) and valuing general health lower ( $p = .06$ ). Matching best to attitude 3 was associated with eating lunch more regularly ( $p = .008$ ), a lower number of between meal snacking by the parent ( $p = .06$ ) and a higher value given to oral health ( $p = .02$ ). Matching best to attitude 4 was associated with a lower SES ( $p = .08$ ), a higher perceived dental hygiene burden ( $p = .01$ ) and a higher dental knowledge ( $p = .02$ ). Matching best to attitude 5 was associated with a lower SES ( $p = .005$ ) and eating breakfast more frequently ( $p = .002$ ). The overall percentages correct classification of the binary logistic regressions varied between (65.2 and 89.0).

## Discussion

The aim of this study was to investigate whether parents can be matched with five main attitudes towards oral health found in a former study by means of a short questionnaire, making the use of such information in dental counsel-sessions or in planning caries prevention strategies more feasible. The results appear to be favourable. We found that respondents identified well to very well with at least one of the attitudes, and seemed to be able to differentiate well the extent to which they matched to the different attitudes. In addition, this study explored how the five parental attitudes associate with diet and oral hygiene habits and with clinical outcomes in their children. Various statistically significant associations were observed, and although most coefficients were small to moderate, the direction (i.e., sign) of the correlations was intuitively as expected. Finally, this study gave some insight in the

distribution of these attitudes among parents and showed that this varied between 8 and 43%, and that attitudes 3 and 4 represented almost 75% of the population in this study.

Before discussing the results, some potential limitations of this study should be addressed. First of all, this study was innovative in linking results of a Q-methodological study to those of a clinical study. The development, use and analysis of abbreviated descriptions of attitudes found using Q-methodology is still in an exploratory stage. Feasibility, reliability and validity of such an approach still need to be established. Our results appear encouraging, but further research and replication of this study is required. Furthermore, the Q-study that laid the foundation for this study was conducted in the Netherlands, and the abbreviated descriptions used in the questionnaire analysed here were aimed at the Dutch public. Replication of this study in other countries may therefore require replication of the Q-methodological study as well. Finally, the sample used in this study is selective and the order in which the attitude questions were presented to respondents was not randomized. Therefore, some precaution is warranted in the interpretation and generalization of the findings regarding the associations of attitudes with other characteristics of the sample, and the distribution of the attitudes in a wider population.

Despite these limitations, the results also showed some keystones for further research towards a more tailored caries preventive care. Differences in attitudes towards oral health related behaviour may result in necessary different approaches in caries prevention. In that context, it is noteworthy to stress out that – next to differences in associations between attitudes and clinical and non-clinical variables – some similarities were found as well. This implies that not every attitude may require its own strategy but several aspects of different attitudes may be applicable to one single parent. For example: concerning brushing habits, a large proportion of parents in both profiles 2 and 4 indicated that the child is held mainly responsible for their daily oral hygiene. Children of parents with profile 2 and profile 4 had also higher plaque scores than children of other parents. Results of the original Q-methodological study (chapter 6), provide more comprehensive information on the profiles.

Results from that study show that parents of Profile 2 are convinced that their child of 6 years old is quite capable of doing so itself, while the parents holding profile 4 know that they should brush their child themselves but they don't like the nuisance of arguing about it with their child. Therefore, although both clinical and non-clinical



outcomes are the same in different groups, the targeted intervention may be different. For example it may be suggested – in this specific situation – to emphasize on knowledge in the case a parent scores high on Profile 2 and on counselling to find a feasible moment in the daily routine for parents scoring high on Profile 4.

Parents scoring high on profile 2 can be considered to have the least desirable lifestyle pattern: eating less regular meals on a daily basis than the other groups, eating more than 5 between-meal snacks a day, being less willing to invest in the oral health of their child (in terms of money and brushing time) and having the lowest scores on dental knowledge. This may cause their children to run a higher risk to develop dental diseases.

Parents with profiles 2 and 4 may be less willing to invest in the oral health of their children, for various reasons. In that case, motivating these parents may be necessary to prevent dental decay in their children. If that fails, these children may benefit more from professionally applied caries preventive actions since their parents may be expected to be less involved in active participation in the oral care of their child.

It can be concluded that by using a self-assessed attitude tool, derived from the results of a Q-methodological study, it is possible to identify different groups of parents with different oral health-related risk factors. Of course it is hardly likely that people are 100% only 1 type of parent; parents can be considered to be a mix of different typologies. However, information on the composition of that mix may be helpful for the dental professional to estimate risks and to deliver a more tailored prevention strategy in children. The identification of parental attitudes using this self-reported questionnaire has the potential to provide this extra information. Whether attitude-dependent-applied caries prevention will show different success-rates is the next step in this development.

**Table 1: Mean score and bivariate correlations between attitudes**

	Score Mean (S.D.)	Conscious and Responsible (attitude 1)	Trivializing and Fatalistic (attitude 2)	Appearance-Driven and Open-Minded (attitude 3)	Knowledgeable but Defensive (attitude 4)	Conscious and Concerned (attitude 5)
Conscious and Responsible	3.7 (0.87)	1.00	-0.25**	0.21**	0.01	-0.05
Trivializing and Fatalistic	2.8 (1.20)		1.00	-0.24**	0.11	0.06
Appearance-Driven and Open-Minded	4.3 (0.80)			1.00	0.25**	0.19*
Knowledgeable but Defensive	4.1 (0.83)				1.00	0.32**
Conscious and Concerned	3.8 (0.79)					1.00

Note:

\*\*\* p < 0.01;

\* p < 0.05.

**Table 2: Bivariate correlations between attitudes and non-clinical outcomes**

	Statistic % or Mean (sd)	Conscious and Responsible (attitude 1)	Trivializing and Fatalistic (attitude 2)	Appearance-Driven and Open-Minded (attitude 3)	Knowledgeable but Defensive (attitude 4)	Conscious and Concerned (attitude 5)
<b>Dietary habits (n = 156)</b>						
Breakfast (% yes daily)	91.7	n.s.	-0.33**	0.18*	n.s.	0.24**
Lunch (% yes daily)	94.9	n.s.	-0.24**	0.29**	n.s.	0.19*
Dinner (% yes daily)	98.7	n.s.	n.s.	n.s.	n.s.	n.s.
All main courses (% yes daily)	90.4	0.16*	-0.34**	0.21**	n.s.	0.24**
Between meal snacking (% ≥5 / day)	17.3	n.s.	n.s.	n.s.	n.s.	n.s.
<b>Oral hygiene habits (n = 156)</b>						
Child brushes 2x / day (% yes)	43.6	n.s.	n.s.	n.s.	n.s.	n.s.
Parent brushes child 2x / day (% yes)	33.3	n.s.	n.s.	n.s.	n.s.	n.s.
<b>Willingness to invest (n = 155)</b>						
Money (€ / month)	31.6 (30.7)	n.s.	-0.22**	0.15*	n.s.	n.s.
Time (minutes brushing / day)	6.5 (4.2)	n.s.	-0.16*	n.s.	n.s.	n.s.
Time (visits to dentist / year)	3.5 (1.7)	n.s.	n.s.	n.s.	-0.23**	n.s.
Valuation general health (VAS 0-10)	9.6 (0.8)	n.s.	-0.15*	0.19**	n.s.	n.s.
Valuation oral health (VAS 0-10)	9.5 (1.0)	n.s.	n.s.	0.16*	n.s.	n.s.
Dental knowledge score (scores 0-10)	7.3 (1.8)	0.27**	-0.19**	n.s.	n.s.	n.s.
Dental burden score (scores 0-10)	3.0 (1.8)	-0.20**	0.14*	n.s.	0.16*	n.s.

Note:

\*\*\* p < 0.01;

\* p < 0.05.

Table 3: Bivariate correlations between attitudes and clinical outcomes in children (n = 170)

	Statistic % or Mean (S.D.)	Conscious and Responsible (attitude 1)	Trivializing and Fatalistic (attitude 2)	Appearance-Driven and Open-Minded (attitude 3)	Knowledgeable but Defensive (attitude 4)	Conscious and Concerned (attitude 5)
OHI-s	0.83 (0.63)	n.s.	0.27**	n.s.	0.14*	n.s.
ds	1.45 (3.46)	n.s.	n.s.	n.s.	n.s.	n.s.
ms	1.57 (3.75)	-0.13*	n.s.	n.s.	n.s.	n.s.
fs	2.62 (3.92)	n.s.	n.s.	n.s.	n.s.	n.s.
dmfs	5.65 (8.16)	-0.18**	0.13*	n.s.	n.s.	n.s.

Note:

\*\* p < 0.01;

\* p < 0.05.

OHI-s: simplified oral hygiene index: minimum score 0 (no plaque) maximum score: 3 (plaque on upper third of tooth),

ds: decayed surfaces primary dentition,

ms: missing surfaces because of caries in primary dentition,

fs: filled carious surfaces in primary dentition,

dmfs/DMFS total decayed, missing and filled surfaces because of caries in primary/permanent dentition.

**Figure 1: Attitudes question (translated from Dutch into English)**

**Instruction:** Please read carefully the descriptions below and indicate by ticking the appropriate box how well each one matches your attitude towards oral hygiene.

I think it is a shame if my child would develop a cavity in his/her teeth. I consider a healthy mouth to be very important. To reach this goal a parent should watch carefully what his/her child eats and brushes their teeth very carefully. When your child develops a cavity, the parent is the one the most responsible for.

not at all    not    a little    well    very well

My child is quite capable to brush its teeth itself. The problem with cavities is that –as a parent- you are not able to do anything about it. Certainly when you mother, father, or grandparents have “weak teeth” as well. You can brush teeth like no other, but cavities are inevitable. Once a cavity is there, I believe the dentist is quite capable to restore it perfectly.

not at all    not    a little    well    very well

A healthy mouth is very important for me: it is the first thing other people will look at and a fresh, healthy looking mouth gives my child a lot of self-confidence. If you take good care of your teeth now, it can save you from a lot of trouble in the future. I’m eager to learn from the dental professional how to take the best care of my teeth as possible.

not at all    not    a little    well    very well

I consider healthy teeth to be of great importance so I do my best to keep it that way and I think I know what I should do. I do encounter some difficulties, though. I have a busy life and sometimes other things go first and I don’t like arguing with my child over tooth brushing. Therefore it is very important for my children to see the dentist regularly for checkups and treatment.

not at all    not    a little    well    very well

I know what to do to preserve my child’s dental health: I brush twice a day and watch what my child’s diet very closely. Still I’m afraid that it is possible that in some families you just cannot fully prevent caries. Of course it is worse to have a cavity in a permanent tooth than in a primary one.

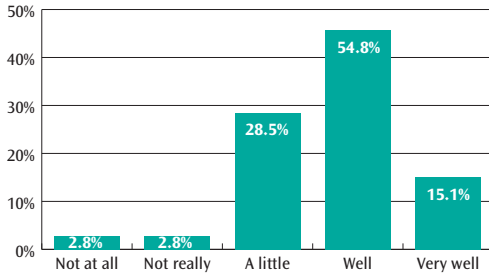
not at all    not    a little    well    very well

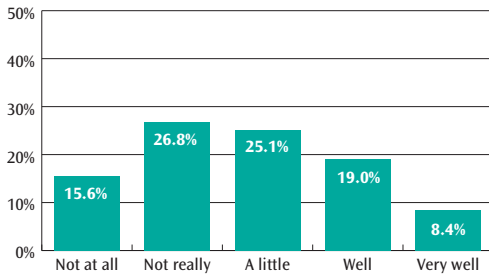
<p><b>Which of these descriptions matches your attitude best?</b></p>					<p><b>Which of these descriptions does not match your attitude at all?</b></p>				
not at all	not	a little	well	very well	not at all	not	a little	well	very well
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p><input type="checkbox"/> No description matches best</p>					<p><input type="checkbox"/> No description does not match at all</p>				

**Figure 2: Responses to attitudes questions**

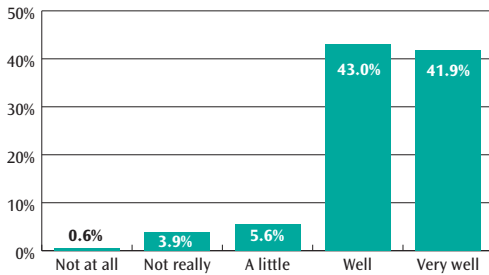
**Conscious and Responsible**



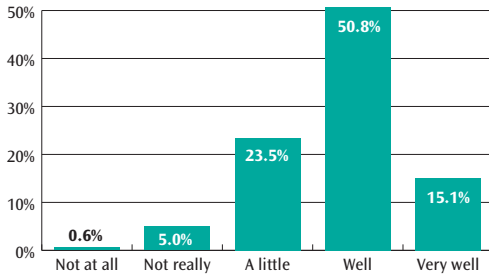
**Trivializing and Fatalistic**



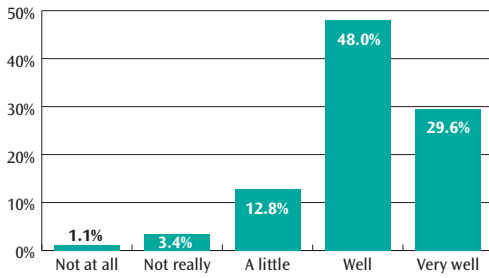
**Appearance-Driven and Open-Minded**



### Knowledgeable but Defensive



### Conscious and Concerned



**Figure 3: Distribution of attitudes based on single best matching attitude**

