Self-efficacy perceptions in oral health behavior

Anna-Maija Hannele Syrjälä, Matti Lauri Edvard Knuuttila and
Leena Kyllikki Syrjälä

Department of Periodontology, Institute of Dentistry, and Department of Teacher Education,
University of Oulu, Oulu, Finland

Syrjälä A-MH, Knuuttila MLE, Syrjälä LK. Self-efficacy perceptions in oral health behavior. Acta Odontol Scand 2001;59:1–6. Oslo. ISSN 0001-6357.

The aim of this paper is to describe and understand people's views on dental self-efficacy and its formation. The qualitative data were collected by means of focused interviews with five patients selected on the basis of poor orientation to dental-care matters, measured using test scores from a previous questionnaire. The first stage of the analysis is a description of the background of the subjects from their own accounts; two proved to have internalized preventive dental beliefs and behavior deeply, while two others had traumatic experiences as a reason for irregular dental appointments. One subject with poor oral health behavior seemed to have limited preventive action to his yearly dental appointment. The second stage of the analysis focuses on interpretation of the subjects' perception of self-efficacy and related comments. Among sources of self-efficacy that prove important in dental care are the cognitive, experiential, supportive and emotional dimensions, and beliefs and values learned in the family and at school. This qualitative research increases our understanding of the oral health behavior of patients and emphasizes the importance of patient-centered oral health education. □ *Oral health behavior; qualitative study; self-efficacy*

Anna-Maija Hannele Syrjälä, Department of Periodontology, Institute of Dentistry, University of Oulu, P.O. Box 5281, FI-90414 Oulu, Finland. Tel. +358 08 5375011, fax +358 08 5375560, e-mail Anna-Maija.Syrjala@oulu.fi

People's oral health behavior is important for the prevention and care of oral disease. Their views of being able to cope with oral health behavior relate to actual tooth brushing, interdental cleaning and dental visiting (1, 2). These studies are based on Bandura's theory of self-efficacy (3–5), according to which people perform activities they find they can manage but avoid those they believe they are unable to cope with (4). A person's perception of his/her capabilities affects his/her adoption of and persistence with behavior (3). According to Bandura, adequate incentives and appropriate skills must be in place for an activity to be performed (4). In addition to oral health behavior, perception of self-efficacy has been shown to be related to various other health behavior practices (6, 7).

The formation of perceived self-efficacy is a life-long process and self-efficacy is reappraised in various life situations (8). Bandura (3) points out four sources of self-efficacy concerning some activity: the person's own performance, modeling by other people, verbal persuasion, and emotions related to the activity. Because the perception of self-efficacy is related to oral health behavior (1, 2), it would be useful to know how perceptions of dental self-efficacy are formed. However, there are no data available to suggest what sources of self-efficacy are important in oral health behavior.

In order to steer the oral health education given in clinical practice in the direction of patient-centered interactivity, it is useful to understand the evolution of the perception of dental self-efficacy. The aim of this qualitative case study was to describe and understand oral health behavior, particularly the role and formation of perceived self-efficacy.

Materials and methods

Oral health behavior is reflected in life-style (9), emotions (10), and in other psychological factors (1, 11, 12). The case-study design, useful in describing complex phenomena (13), allows comprehensive analysis of oral health behavior and associated perceptions. It also facilitates face-to-face contact with patients. The results, however, cannot be generalized in the same way as quantitative research.

Our qualitative research represents the sequential design of multi-method clinical research (14), in that a quantitative method, a questionnaire, was used to select people with good or poor orientation for further qualitative analysis, i.e. an interview. The initial selection was based on scores on a set of previously published scales partly revised for this purpose (15–18) (Table 1). Good orientation to dental care was reflected in the questionnaire by high scores in Kratwohl's taxonomy (15), few obstacles to dental care (16), high scores on the dental intrinsic motivation scale (17) and a high internal locus of control score (18). Opposing characteristics reflected poor orientation to dental care. Criteria for selection were as follows: scale for Kratwohl's taxonomy: actual range 19–24, high scores $\geq$23, low scores $\leq$21, scale for reasons preventing regular dental care: actual range 23–40, high scores 39, low scores $\leq$33, intrinsic motivation scale: actual range 25–44, high scores $\geq$42, low scores $\leq$30, and locus of control scale: actual range 24–38, high scores >35, low scores $\leq$35. Six subjects were selected for the interview out of the 30 who visited the State Occupational Health Centre in Oulu in 1 day. The eventual group comprised 1 woman (subject 3) and 2 men (subjects 1 and 5) with poor orientation and 2 women (subjects 2 and 4) with good orientation. A further man

Table 1. Examples of items in each scale on the quantitative questionnaire which were used to choose participants for the interview

Kratwohl's taxonomy for dental care (items 1–12), e.g. I would participate in an intensive dental instruction programme if I were asked.
Reasons preventing regular dental care.
Reasons preventing daily cleaning of the teeth (items 1–4), e.g. Lack of interest in taking care of my own teeth.
Reasons preventing yearly dental check-ups (items 5–14), e.g. Earlier unpleasant experiences of dental procedures.
Intrinsic motivation scale (items 1–12), e.g. I brush my teeth carefully because it gives me pleasure.
Locus of control scale (items 1–10), e.g. The fate of my teeth is in the hands of the dentist, no matter how much time I spend taking care of them.

with good orientation had been selected for interview, but could not be contacted at the time.

The qualitative data were collected by means of focused interviews using both open-ended and specific questions. The interviews were tape-recorded and transcribed. They were carried out, along with clinical examinations, at the University Dental Clinic in Oulu, Finland, by the main author, AMS, a specialist in periodontology. Pilot work had been done on interviewing informants. The interviews lasted mostly between 1 and 2 h, but one interview took longer. They were conducted in peaceful surroundings attempting to create a confidential atmosphere.

The clinical examination provided data on objective oral health status, i.e. one source of evidence of oral health behavior. This included an assessment, by visual examination and probing, of dental caries in terms of decayed surfaces on all the teeth, oral hygiene (19) and gingival inflammation, such as bleeding on probing in the right quadrant of the upper jaw and the left quadrant of the lower jaw according to the criteria of Ainamo and Bay (20). Deeper periodontal inflammation was measured by probing the periodontal pocket depth on four surfaces of each tooth.

Table 2. Main categories of qualitative data

1. Participants' own comments on the present condition of their teeth
2. Attribution to the present oral situation
3. Dental care in childhood
4. Perception of one's own self-efficacy
5. Sources of self-efficacy perception in spontaneous answers
6. Definition of perception with further specific questions
7. Regularity of oral health behavior in different situations
8. Belief about the one's ability to affect dental health
9. Value attached to dental health
10. Beliefs of the informants about how they think important persons to them would hope they would care for their teeth
11. Willingness to comply with the ideas of important persons

The qualitative data were analyzed by reducing the main categories (see Table 2). The interview included questions about regularity of tooth brushing, use of dental floss and dental visits in different situations, general perception of self-efficacy in taking care of one's teeth, and the source for this judgement. When analyzing a participant's discourse, a thematic unit was used, the length of which varied from individual words to many sentences.

The protocol for the study has been approved by the Ethics Committee of the Medical Faculty of the University of Oulu.

Results (Tables 3 and 4)

First stage of interpretation

The first stage of interpretation included descriptions of the individual cases, i.e. telling their stories. After that, the informants were divided into two groups based on their oral health behavior.

Persons with poor oral health behavior

A middle-aged man lazy about teeth brushing (subject 1). A deficient model and poor experiences of regular dental care in childhood describe factors that may be related to the moderate self-efficacy perception of this person. He seemed to be lazy and said about brushing: '*I guess it's one of the less pleasant things in life for people of my generation*', '*I take care of my teeth, anyway, . . . because of my mouth smelling*'. He visits the dentist for help and for confirmation and has transferred the responsibility for his dental care in the hands of the dentist. This can also be seen in a moderate perception of his ability to control his oral health, and the fact that he underlines the role of the dentist. Attribution of the present dental situation included both the role of the dentist and his own visiting when he had symptoms: '*when it's felt like now something cold's got in or something a bit like that, then I've dropped in and he's* (the dentist) *filled the little holes straight away*'. His dental condition was fairly good: there were some periodontal problems, but no carious lesions.

Table 3. Main background data of the participants

Variable	Subject 1	Subject 2	Subject 3	Subject 4	Subject 5
Sex	Male	Female	Female	Female	Male
Age	Middle-aged	Young	Middle-aged	Middle-aged	Middle-aged
Occupational status	Detective constable	Computing instructor	Trained horticulturist	Secretary	Maintenance worker
Score on the questionnaire	Low	High	Low	High	Low

Table 4. Main data used in the analysis

Main categories	Subject 1	Subject 2	Subject 3	Subject 4	Subject 5
Attribution to present oral situation	Extraction of bad teeth, dental attendance if needed	Genetic factors, regular daily care, xylitol chewing gum	Poor dental care in childhood, lack of knowledge afterwards	Regular dental visiting, cleaning of the teeth, xylitol chewing gum	Carelessness, infrequent dental visiting and tooth brushing
Dental care in childhood	Very poor model	Clear model	An ambiguous model	Moderate model	No model
Perception of one's own self-efficacy	Moderate	Fairly good	Poor	Fairly good	Poor
Sources of self-efficacy perception	Personal experience, support from dentist	Home, school, personal experience, support from dentist	Ignorance, lack of interest	Personal experience, support from dentist	Ignorance, personal experience
Regularity of oral health behavior in different situations					
-dental attendance	Regular	Regular	Irregular	Regular	Irregular
-tooth brushing	Irregular	Regular	Regular	Regular	Irregular
-interdental cleaning	Irregular	Irregular	Irregular	Regular	Regular
Belief about the one's ability to affect dental health	A person can affect somehow	A person can affect very much	A person can naturally affect, if the teeth have been cared for since childhood	A person can surely have effect	A person can affect by cleaning the teeth, but if the decay starts you cannot do anything
Traumatic experience#	No	Many decayed teeth in childhood	A very unpleasant extraction 20 years ago	Extractions in childhood and adulthood	Unpleasant cavity preparation in childhood

Traumatic experience was not a main category originally, but being an important aspect it was included on the basis of the informants' comments.

A middle-aged woman with a traumatic dental experience (subject 3). The oral health behavior of this subject had been severely affected by a traumatic experience of tooth extraction about 20 years previously, which gave rise to a phobia. This promoted resistance to visiting a dentist, finding out about dental care or taking an interest in it, which, in turn, resulted in a sense of poor self-efficacy. Although she mentions ideas related to high valuation, her poor self-efficacy prevents her from acting accordingly. She commented that brushing her teeth was a routine, but that after brushing *'I feel good'*. She said about interdental cleaning: *'It's not struck me as being all that important'*. She does not have a clear perception of her own control in oral health, but mentions that responsibility for dental care did feature in childhood: *'well, the reason come from when I was a kid . . . in those days there were . . . er . . . lots of people with problems with their teeth, and going to the dentist was too expensive for most families to be able to send the children, and then the journeys were long too.' '. . . later on it was up to you, but you didn't have enough information about it* (dental situation) *as they do today, and it would probably be different now.'* She had had an ambiguous model in childhood: *'My grandfather never brushed his teeth . . . my dad did . . . yeh . . . for him it was sort of more important than for my mother'*. Her cariological and periodontal condition was poor, being related to her perception of self-efficacy.

A middle-aged man with negligent oral health habits and guilt (subject 5). This subject's poor perception of self-efficacy seems related to the absence of a model and experiences of preventive dental care in childhood and guilt at visiting the dentist so rarely on account of fear. He usually only made a dental appointment when he had symptoms. He said: *'There was one time they had to drill with an old pedal machine 'cos the machines had burst at my school. After that I always avoided it, maybe still do, so that I'm sort of scared of going to the dentist . . . um . . .'*. His self-efficacy seems to have been affected by ignorance of how to take care of his teeth and his own experience with decaying teeth. He attributed his dental situation to his own negligence: *'I suppose it boils down to my own carelessness . . . um . . . that . . . yeh it sort of happens that they don't get brushed as often as they are supposed to and then I don't go to the dentist often enough 'cos I don't go every year like you're supposed to'*. His poor perception of self-efficacy, belief in his own helplessness in controlling dental health, and low valuation of dental care are in accordance with his poor preventive behavior. Rushing to get to work or somewhere else, tiredness, and vomiting when brushing were the reasons for his irregular brushing habits. However, he got a nice fresh feeling in the mouth after brushing. His habit of interdental cleaning adds a separate dimension to his behavior. His clinical dental situation was quite good, with some periodontal problems but no carious lesions.

Participants with well internalized oral habits

A young lady with strict oral hygiene habits (subject 2). This person's dental habits had been greatly affected by the model represented by her parents in childhood and the

value they placed on a healthy life-style. '*Certainly the basic principle*' of taking care of the teeth '*is from home* (family values and beliefs) . . . *if you want to feel good, you must have good teeth*' . . . *'and health has always been the number one thing . . . we only had sweets on one day a week and then brushed our teeth'* and '*fluoride tablets' . . . we used to take them, too*'. She told of the public dental health care services at school: '. . . *we got fluoride rinses at school'*. The meaning that subject 2 applied to dental care included general health and the importance of feeling that the teeth are in good condition. Her consequent fairly good perception of self-efficacy, her clear perception of personal control in dental health and the value she placed on dental health all seemed to be consistent with the preventive action she took. *'Or you could say it's almost automatic, that you sometimes find you have to brush your teeth even in the middle of the day . . . you just feel like it'*. She put her present dental situation down to personal effort. Her inadequate interdental cleaning was a separate area in her oral health behavior. Her positive dental experiences included a clean mouth, the dentist's personality and the pictures and small presents received during dental appointments as a child. The clinical examination showed good oral hygiene, a moderate periodontal condition and no carious lesions.

A middle-aged woman with internalized oral hygiene habits (subject 4). Subject 4 noted the importance of having her own teeth, even though they were filled, and pointed out that she had got rid of her dental problems and had a good feeling in her mouth. Although this subject's shame at having so many filled teeth contributes to an unsure perception of self-efficacy, her willingness to try shows better self-efficacy and deep internalization. It also shows that her actual oral health behavior is connected to an effort to maintain the present condition of her teeth.' *I always brush* (my teeth) *and I even get up if I've already gone to bed* (in the evening), *I just feel I have to go'* (to brush), and feelings about brushing: '*And you naturally try to make them as clean as possible . . . and you then feel good', 'you try to avoid getting decay'*. '. . . *I used to have those headaches . . . I had problems with my bite, . . . but now I feel good because I've had regular dental appointments and the fillings have been reduced . . .* (the overfillings have been filed down)'. Powerful internalization had taken place in adulthood as a result of unpleasant experiences during dental extractions in childhood and adulthood which she had since been able to overcome, acquired knowledge, and the supportive behavior of her dentist. This internalization comes through in her comments about her children having no dental decay. Her perception of self-efficacy, her belief in personal control, and the high value she places on dental health were seen in the regularity of her tooth brushing and use of dental floss and her dental attendance behavior. She also had a good periodontal situation; she had no carious lesions and used xylitol chewing gum.

Second stage of interpretation

At the second stage of interpretation, the following sources seemed to be related to dental self-efficacy on the basis of the combined material of participants and previous results. Five categories were formed to describe the dimensions of the sources of self-efficacy.

1. Cognitive dimension.—A lack of knowledge seemed to be the major primary dimension for poor self-efficacy in oral health behavior. Two subjects spontaneously reported ignorance as the source of poor self-efficacy:

– 'It is ignorance, . . . you see, and you have to care more about it' (subject 3, poor self-efficacy).
– 'I just haven't been to any place where they show you what you should do. I mean, the dentist has never shown me' (subject 5, poor self-efficacy).

The subjects with better self-efficacy seemed to have acquired knowledge about dental care, and did not actually mention knowledge as a source of their self-efficacy.

2. Experiential dimension.—Personal experience was mentioned as the source of self-efficacy by most subjects. The experience of taking care of their own dental health seemed to have resulted in a better oral condition and, consequently, induced a better perception of self-efficacy. Conversely, personal experience of a lack of adequate oral health behavior and its contribution to a poor oral condition seems to be related to poor self-efficacy. The following comments indicate the importance of personal experience as a source of self-efficacy:

– 'I mean, when the gums stop bleeding you know you're beginning to get it right' (subject 1, moderate self-efficacy).
– 'Maybe it is that I have no decay nor any other problems (subject 2, fairly good self-efficacy).
– 'Well, I dunno, it seems to me that it's a bit like, well things haven't gone the way I'd 'ave wanted . . . like . . . still I got holes' (subject 5, poor self-efficacy).

3. Supportive dimension.—Those who had a better perception of self-efficacy told of receiving support from the dentist, while a lack of supportive experience during dental visits was related to poor self-efficacy. The following comments show support received from contacts with a dentist:

– 'especially when I was younger, the way the dentist looked and behaved had an influence, I can remember how 20 years ago it was really nice to go to the dentist even when I had tooth decay because I got a little present' (subject 2, fairly good self-efficacy).
– 'Now that I've been visiting the dentist, I clean the spaces between my teeth more thoroughly, I used to have kind of overfilled teeth, but then I began to visit another dentist and the present dentist fixed my teeth so well that I can now clean all the spaces with dental floss' 'We (the subject and her husband) have

a good relationship with our dentist' (subject 4, fairly good self-efficacy).

4. Negative emotions.—The effect of unpleasant emotional experiences was not straightforward. Having had previous unpleasant experiences, subjects 3 and 5 continued to show emotional arousal, a phobia, which continued to prevent regular dental care and consequently seemed to be related to poor self-efficacy.

– 'there were such difficulties in pulling it out . . . they were . . . beyond description so that . . . the dentist just couldn't get it out . . . and they had to give me more anesthetic' (subject 3, poor self-efficacy).
Subjects 2 and 4 had overcome negative experiences, and this had generated a willingness to try to keep the teeth in good condition and had consequently resulted in better self-efficacy.

– 'yes, it was something in the first contact, I remember when I was in my first year at school we went to this dentists' surgery and like the room – absolutely awful – and then they pulled out loads of my teeth . . . so that somehow I got this horrible. . . , I for ages I was scared of dentists' (subject 4, fairly good self-efficacy).

5. Model in childhood.—A clear model of regular dental care acquired in childhood was related to better self-efficacy, while an unclear model or the lack of any model was related to poorer self-efficacy. Subject 2 pointed out the following source of her fairly good self-efficacy perception: 'perhaps it is very much from home . . . from home and school'

Discussion

An attempt has been made to qualitatively evaluate the sources of self-efficacy in dental care. Credibility in qualitative research has been said to entail 'coherence, insight and instrumental utility' (21). The coherence in our results can be evaluated by assessing their relation to the theoretical assumptions. In our case study, the ideas of Bandura (3) concerning personal experience, emotional arousal, and modeling as sources of self-efficacy were supported in the context of oral health behavior. Multiple sources of evidence, such as a quantitative questionnaire, an interview, and a clinical oral examination, improve trustworthiness, which would have been even better had the interviews taken place at home during actual oral self-care procedures. However, this would have been difficult to organize. Furthermore, the interviews and clinical examinations were carried out by the same author in peaceful surroundings. The interviewer had acquired training in conducting and analyzing pilot interviews.

It is not possible to reproduce the comments made by the participants extensively in this paper, which would have provided full insight into the feelings of the interviewees. The discussions were wide-ranging, however, and interpretations were made on the basis of various aspects of oral health behavior.

The instrumental utility of this study is that the results illustrate and provide a better overall understanding of patients' oral health behavior, an understanding based on the participants' experiences and on the meanings they give to oral health behavior in their lives (22, 23). It also gave the participants an opportunity for confidential discussion, which is difficult during normal dental visits. Indeed, this interview helped the woman who had experienced a traumatic tooth extraction and who after a 20-year delay visited the dentist for treatment. This report will give readers the chance to evaluate their dental behavior, to develop new insights, and to understand the factors that shape and promote oral health behavior. The role of the dentist in providing information, giving the patient support, and creating a safe atmosphere in which to reduce emotional arousal seems to be important in shaping patients' perceptions of self-efficacy. Furthermore, the relation reported previously (24), between parents' and their children's oral health behavior, may partly be explained by the dental self-efficacy formed on the basis of the model at home.

Although a qualitative study does not attempt to generalize, our results resemble those reported by Stewart et al. (1) in that perceptions of self-efficacy are related to oral health behavior, such as dental visits and tooth brushing. As far as self-efficacy perception and interdental cleaning are concerned, our results concur with the assumption of Helöe et al. (25), namely that the use of toothpicks is either part of dental habit or a separate habit on its own.

It was possible through the present approach to understand and identify sources of dental self-efficacy. Although the results cannot be generalized, this qualitative case study approach has proved to be a viable means of analyzing and providing a better overall understanding of oral health behavior. It reveals aspects of oral health behavior such as experiences, emotions, and the significance of a model derived in childhood which cannot be found through quantitative studies. Each of the informants had his/her own story about oral health behavior in childhood and adulthood. The cases were therefore individual and their oral health behavior was diverse, as were their perceptions of dental self-efficacy. An individual approach to each patient and the supportive role of the dentist should be taken into account when training dental personnel. In further studies, oral health behavior could be more frequently analyzed through the patient's own oral accounts of their experiences.

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Received for publication 30 May 2000
Accepted 9 October 2000