Dental check-up frequency: preferences of Dutch patients

B. C. Schouten[1], T.G. Mettes[2], W. Weeda[3] and J. Hoogstraten[4]

[1]*University of Amsterdam, Faculty of Social and Behavioural Sciences;* [2]*University of Nijmegen, Department of Preventive and Restorative Dentistry;* [3]*Academic Centre of Dentistry Amsterdam, Department of Social Dentistry;* [4]*University of Amsterdam, Faculty of Dentistry*

Objective In 1995, the requirement to visit the dentist for a check-up every six months in The Netherlands was replaced by the obligation to get a routine examination no more than once a year . The aim of this study was to determine patients' opinions about this change in policy, and to assess their preferences regarding frequency and content of regular dental check-up visits. Possible associations between patients' preferences for regular dental check-ups and a number of antecedent variables, such as dental attitudes, were examined as well. ***Basic research design*** Patients' preferences for regular dental check-ups were assessed by means of a questionnaire, containing a 19-item Likert-type scale, twelve visual analogue scales and seven forced choice items. Items assessing various background variables and a selection of items of the Dental Attitude Questionnaire were also added. This questionnaire was administered to patients of seven dental practices. A total of 428 patients completed the questionnaire. ***Results*** Results indicated that patients prefer to have regular dental check-ups. Patients' evaluation of six-monthly dental check-up visits was significantly more positive than their evaluation of flexible, individualized, check-up frequencies. Factors positively associated with a higher preference for regular dental check-up visits were female gender, being more satisfied with one's teeth, less cynicism toward dental health care professionals and more intrinsic motivation to maintain one's oral health. ***Conclusions*** Patients seem to prefer to attend their dentist regularly, at fixed intervals of about six months. This fact should be taken into account when deciding about the most appropriate interval between dental examinations.

Key words: dental check-up visits, recall frequency, social dentistry

Introduction

Due to major modifications in health care policy in 1995, coverage of dental care services for Dutch people insured by the sick fund diminished substantially. In The Netherlands, about two thirds of the population is insured for health care costs by the sick fund (Statistics Netherlands, 2005). The sick fund is a government-based health care insurance scheme for people with an annual income lower than €33,000 and covers the greater part of health care services. The remainder (mostly people with higher incomes) is insured by private insurance companies. With regard to routine dental check-ups, the obligatory six-monthly dental check-up for patients insured by the sick fund was replaced by a requirement to visit the dentist for dental examination no more than once a year. The rationale for this change in policy was twofold: to improve oral health and to save resources. Considering the purpose of dental check-ups, which is to prevent oral disease or detect signs of it at an early stage and thereby prevent future disease with minimal intervention (e.g. Perlus, 1994) and taking into consideration the ongoing decrease in the levels of oral disease in The Netherlands, it was no longer deemed necessary to maintain six-monthly dental examination visits.

As early as 1977, Sheiham initiated the debate over the scientific basis for six-monthly dental examinations for healthy individuals. Many Western-European countries are now supporting a policy of keeping more flexible periods between dental check-ups, based on an assessment of individual risk factors (Helminen & Vehkalahti, 2002; Kärkkäinen *et al.*, 2001; Lahti *et al.*, 2001; Murray, 1996; NICE guideline, 2003; Rosén *et al.*, 1999). Research carried out in The Netherlands provides some evidence that dentists are indeed individualising recall intervals for patients. For instance, Mettes & Bruers (2001) have reported that about half of Dutch dentists determine check-up frequency based on individual risk factors, such as the stability of oral health and the motivation of the patient. Although advocates of this individualisation of recall frequencies claim that the empirical evidence indicates there is no increased risk for the development of caries and periodontal disease when extending the recall intervals for low-risk patients (e.g. Benn *et al.,* 1999; Boggs *et al.,* 1996; Kärkäinnen *et al.,* 2001; Lahti *et al.,* 2001; Rosén *et al.,* 1999), a recent systematic review by Davenport and colleagues (2003) shows otherwise. Results of their review, which investigated the effects of different frequencies of dental check-ups on caries, peri-odontal and oral cancer outcomes, failed to demonstrate any consistency in the direction of outcome effects. Thus, there is no evidence so far to either refute or support the practice of six-monthly dental check-ups.

In summary, the studies mentioned above did not prove very helpful in resolving the controversy over optimal recall intervals. Besides, it is unfortunate that the argument for extended, individualised recall intervals is primarily based on factors related to the progression of oral disease. It is not appropriate though to use only clinical parameters in deciding about recall frequencies,

Correspondence to: Dr. Barbara Schouten, University of Amsterdam, Faculty of Social and Behavioural Sciences, Department of Communication Science, Kloveniersburgwal 48, 1012 CX Amsterdam. E-mail: B.C.Schouten@uva.nl

because regular dental examinations serve more functions than just the monitoring of the progression of oral disease. For example, regular contact between dentist and patient enables the establishment of a relationship of trust, making it possible to continuously reinforce preventive advice, to motivate patients and so on (Perlus, 1994). Together with the clinical parameters, these additional factors should be incorporated in the decision-making process concerning the issue of dental check-up frequency. Furthermore, in terms of quality of care, which can be defined as the degree to which this care satisfies established or obvious needs (Poorterman, 1997), it is evident that preferences of patients about dental check-up frequencies should be taken into account as well.

In conclusion, to inform policy on optimal recall intervals, it is of vital importance to gain more knowledge about patients' preferences with regard to frequencies of dental check-ups. Therefore, the aim of the present study was to compare dental patients' opinions about six-monthly dental check-ups with their opinions about flexible, individualized intervals between dental check-ups. To the best of our knowledge, no prior studies exist on this topic. Hence, this study was exploratory in nature. Furthermore, possible associations between patients' opinions about dental check-up frequency and a number of antecedent variables were also examined. The variables chosen were based on previous research on factors associated with regular dental attendance (e.g. Dixon *et al.,* 1999; Gibson *et al.,* 2000; Nuttall, 1997; Woolfolk *et al.,* 1999; Woolgrove *et al.,* 1987). Specifically, we examined whether a number of socio-demographic variables, such as age, gender and education, dental attitudes and subjective oral health were related to patients' opinions about dental check-up frequency.

Method

Measurement of patients' preferences for regular dental check-ups

Patients' preferences for regular dental check-ups were assessed by means of a questionnaire, containing a 19-item Likert-type scale, twelve visual analogue scales and seven forced choice items. Because of the exploratory nature of this study, we chose to use different methods for reasons of convergent validity; that is, each method has its limitations and converging results will strengthen conclusions.

The 19-item scale consisted of nine items concerning the preference of patients for regular dental check-ups (e.g. 'It is important to me that my dentist examines my teeth every six months'), four items concerning patients' perception of the ability of routine dental examinations to reduce the risk of oral disease (e.g. 'By regularly attending my dentist for routine examination, I will prevent unnecessary problems with my teeth'), and six items concerning patients' expectations about the nature of a dental check-up visit (e.g. 'My dentist does not spend enough time checking my teeth during the dental check-up visit'). These items had to be answered on a 5-point Likert-scale, ranging from 'totally disagree' to 'totally agree'. Higher scores indicate a higher preference for regular dental check-ups. Total scale score was

derived by adding up item scores and dividing this score by the total number of items. Thus, total score ranges from 1 to 5.

The twelve visual analogue scales were constructed to assess patients' evaluation of the obligatory six-monthly dental check-up, which was the routine before 1995 in The Netherlands, and their evaluation of the new, more flexible policy, which obliged sick fund patients to visit their dentist no more than once a year for routine examination. Patients were asked to evaluate these two alternatives, six-monthly dental check-ups vs. flexible dental check-up frequency, by marking each of the visual analogue scales on a point between 0 and 100 mm (see Figure 1). Each of the two alternatives had to be evaluated by the following six descriptors: easy –difficult; good for my teeth-bad for my teeth; useful-useless; pleasant-unpleasant; financially attractive-financially unattractive; takes little of my time-takes lots of my time. The twelve visual analogue scales were recoded in 10-point scales, by giving a score of 1 if patients marked the scale between 0 and 10 mm., a score of 2 when they marked the scale between 11 and 20 mm, and so on. Higher scores indicate more positive evaluations of each of the alternatives.

Patients' preferences for regular dental check-ups were also assessed by means of seven forced choice items, corresponding with several aspects of regular dental check-ups, such as the frequency, financial aspects, and so on (see Table 1 for item content). Each of the items consists of two opposing statements, and patients had to choose the statement corresponding most with their opinion.

Measurement of determinants of patients' preferences for regular dental check-ups

Several possible determinants of patients' preferences for regular dental check-ups were assessed: patients' dental attitudes, their subjective oral health and a number of socio-demographics. Patients' dental attitudes were measured by means of a shortened version of the Dutch Dental Attitudes Questionnaire (DAQ; Bos et al, 2003; Hoogstraten & Broers, 1987). The DAQ has six content scales (Cynicism, Health Concern, Motivation, Oral Function, Social Aesthetic, Susceptibility) and two validity scales (Halo, Infrequency), each containing eight items. For the purpose of this study, four items of each of the following three scales were selected:

1. Cynicism: the extent to which patients show suspicion regarding the motives of dental health care professionals and downplay the need for regular dental check-ups and oral hygiene (e.g. 'If I was told that I needed "extensive" dental treatment, I would get a second opinion').
2. Motivation: the extent to which patients are intrinsically motivated to maintain or improve their oral state or, on the other hand, are motivated primarily through the effort of others (e.g. 'I try to maintain good dental health because it is important to me').
3. Susceptibility: the extent to which patients believe that they are susceptible to health problems and the degree in which they believe a possible illness impacts on their ability to function well (e.g. 'I believe that I could have a serious dental problem and not be aware of it').
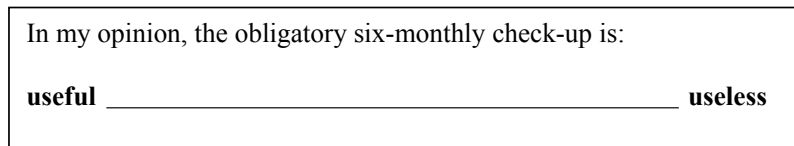
```
┌─────────────────────────────────────────────────────────────────┐
│   In my opinion, the obligatory six-monthly check-up is:          │
│                                                                   │
│   useful _____ useless      │
└─────────────────────────────────────────────────────────────────┘
```

Figure 1. *an example of one of the visual analogue scales in the study*

Table 1. Frequencies on the seven forced choice items

Item *if I were to choose, than:*	*n*	*female patients (%)*	*male patients (%)*
1 a. My dentist should decide how often I need a dental check-up	294	72	75
b. I will decide myself how often I need a dental check-up	108	28	25
2 a. It matters a lot for my oral health if I get a dental check-up regularly *	348	88	80
b. It does not matter a lot for my oral health if I get a dental check-up regularly	61	12	20
3 a. I would like to combine the routine examination with treatment	295	71	75
b. I would not like to combine the routine examination with treatment	114	29	25
4 a. I would definitely get a dental check-up every six months *	325	83	72
b. I would definitely get a dental check-up less than every six months	85	17	28
5 a. I visit my dentist regularly for a dental check-up	365	91	85
b. I do not visit my dentist regularly for a dental check-up	47	9	15
6 a. I do not wait with making an appointment for a dental check-up until some thing is really the matter with my teeth	374	92	90
b. I wait with making an appointment for a dental check-up until something is really the matter with my teeth	36	8	10
7 a. I would spend money on getting my teeth checked	337	85	83
b. I would not spend money on getting my teeth checked	66	15	17

* significant difference between male and female patients (p <.05)

Each of the twelve items had to be answered on a 6-point scale, ranging from 'totally disagree' to 'totally agree'. Total scores for each subscale were obtained by adding up the item scores and dividing this score by the total number of items. Thus, total score for each subscale ranges from 1 to 6, with higher scores indicating respectively less cynicism, higher motivation and higher susceptibility.

Finally, a number of items were added to assess the following patient characteristics: actual frequency of dental check-up visits, change in frequency after 1995, preferred period of time between successive dental check-ups, type of insurance, age, gender, education, income, and perceived dental health. In addition to patients' perceived dental health, both the dentist and the dental assistant were asked to evaluate the patients' oral health by means of a report mark ranging from 1 ('extremely poor') to 10 ('excellent').

Survey procedure

Before distributing the questionnaire to the dental practices, some pilot work was undertaken to see if the wording of the questions was clear and to see how much time it would take to fill out the questionnaire. This resulted in some minor revisions in the formulating of a few ques-tions. After piloting, the questionnaire was administered to patients of seven dental practices, located in seven different communities (both cities and villages) in different parts of The Netherlands over a period of two months (June-July 2003). These solo or group practices were a convenience sample, obtained from the network of the Academic Centre of Dentistry Amsterdam. None of the seven practices, when asked to participate in this study, refused. Dentists in these practices were informed about the time needed to fill out the questionnaire; all dentists indicated that they would organize their schedule to make it possible for patients to fill out the questionnaire. Each practice received 125 questionnaires with the request to hand these out to all patients aged 16 years and older, visiting the dental practice during that period. Patients were instructed by the receptionist or, if not available, by the dental assistant, to fill out the questionnaire in the waiting room prior to their visit to the dentist. They were told that the questionnaire concerned opinions regarding dental check-up frequency. After the dental visit, both the dentist and the dental assistant gave a mark of 1 to 10 for the patients' oral health status, independent of each other. The practice received 50 eurocents for every completed questionnaire.

Data analysis

Data were first processed by descriptive analyses (frequencies, means, reliabilities, etc.). Patients' evaluations of six-monthly dental check-ups vs. flexible dental check-up frequency were compared by means of paired t-tests. To test for possible differences between dental practices on patient characteristics (age, gender and educational level), several analyses of variance with dental practice as factor (with Bonferroni correction) as well as a chi² –test were performed. Results of this analysis showed that for all patient characteristics, significant differences were found (p <.05). Closer inspection of the results revealed that one of the seven practices was accountable for all significant differences. In this practice, patients were significantly more often male, higher educated and older. However, because of the relatively big sample size and strict testing, small differences will easily reach significance. The actual size of the differences was negligible (for instance, with regard to education a difference of one scale-point on a 5-point scale), and therefore, it was decided to analyse data of all seven practices together. Differences in scores were tested using t-tests and chi² tests, and multiple regression analysis (enter method) was carried out to predict patients' preferences for regular dental check-ups from the antecedent variables.

Results

Sample characteristics

Four hundred and twenty eight (48.9%) questionnaires were returned after the two-month period, 37% by male patients and 63% by female patients. According to the dental assistants/receptionists, very few patients refused to fill out the questionnaire when asked, but due to time constraints patients did not always have enough time to do so before the dental visit. Mean age of the patients was 42.9 years (sd: 13.4). 32% of the patients had completed higher vocational education or university, 39% of them had completed intermediate vocational education, higher general secondary education or pre-university education, and 28% had completed elementary school, lower vocational education or lower general secondary education.

A majority of the patients (73%) reported that their dental check-up frequency had not changed as a consequence of the change in policy in 1995 (20% of the patients stated that they visited their dentist less after the policy change), and a majority of the patients (64%) reported visiting their dentist twice a year for a check-up visit (27% of the patients reported visiting their dentist once a year). Furthermore, almost all patients (92%) said that they had visited their dentist in the last 12 months, and all patients were insured for health care costs (67% were insured by the sick fund and 33% were insured by private insurance companies).

The majority of patients (63%) were of the opinion that their oral health was good or very good, and the same number reported to be satisfied with their teeth. Only 5% of the patients indicated that their oral health was poor, and 8% of patients were dissatisfied with their teeth. The mean report mark dentists gave to their patients' oral health was 6.7 (sd: 1.4), which was almost the same as the mean report mark of the dental assistant (6.8; sd: 1.2). Judgement about patients' oral health of the dentist and dental assistant was highly correlated (Pearson's r = 0.83).

Patients' preferences for regular dental check-ups

The reliability of the 19-item scale assessing patients' need for regular dental check-ups was satisfactory (Cronbach's alpha 0.78), after deletion of five items that correlated negatively with the total scale. Hence, the total scale used in further analyses consisted of 14 items, seven items concerning the preference of patients for regular dental check-ups, three items concerning patients' perception of the ability of routine dental examinations to reduce the risk of oral disease and four items concerning patients' expectations about the nature of a dental check-up visit. Mean item score of the total scale was 3.83 (sd=0.43; range 1-5), indicating that patients' preference for regular dental check-ups was relatively high.

Cronbach's alpha for the six visual analogue scales assessing patients' evaluation of the obligatory six-monthly dental check-up visit was 0.71, and for the six visual analogue scales assessing patients' evaluation of the flexible dental check-up frequency 0.74. Figure 2 gives the mean scores of male and female patients separately on each of the six visual analogue scales with regard to their evaluations of the six-monthly dental check-up visit. Figure 3 gives the mean scores of male and female patients separately on each of the six visual analogue scales with regard to their evaluations of the flexible dental check-up frequency. As can be seen from both figures, patients' evaluation of the obligatory six-monthly dental check-up visit was significantly more positive (p <.001; paired t-tests) than their evaluation of the more flexible alternative, except for their evaluation with regard to the financial attractiveness of both alternatives. Patients evaluated the obligatory six-monthly dental check-up visit as significantly less financially attractive than the more flexible alternative (p <.001). Figure 2 and Figure 3 also show that female and male patients score differently on most scales. A series of t-tests revealed that female patients evaluated six-monthly dental check ups as better for their teeth, as more useful and as less time-consuming than male patients. In contrast, female patients evaluated the new, flexible alternative as less useful and less pleasant, but still better for their teeth than male patients (p <.05).

The answers on the seven forced choice items confirmed the results found on the 19-item Likert-scale and the twelve visual analogue scales (see table 1 for item frequencies, given separately for male and female patients). For example, most patients indicated that they prefer to visit their dentist regularly for a dental check-up, that they are willing to spend money to get their teeth checked, and that they feel it matters a lot for their oral health if they visit their dentist for check-up visits regularly. Chi² tests revealed two significant differences in scores between female and male patients. Significantly more female patients than male patients were of the opinion that it matters a lot for their oral health if they get a dental check-up regularly, and significantly more female patients than male patients reported to definitely get a dental check-up every six months.
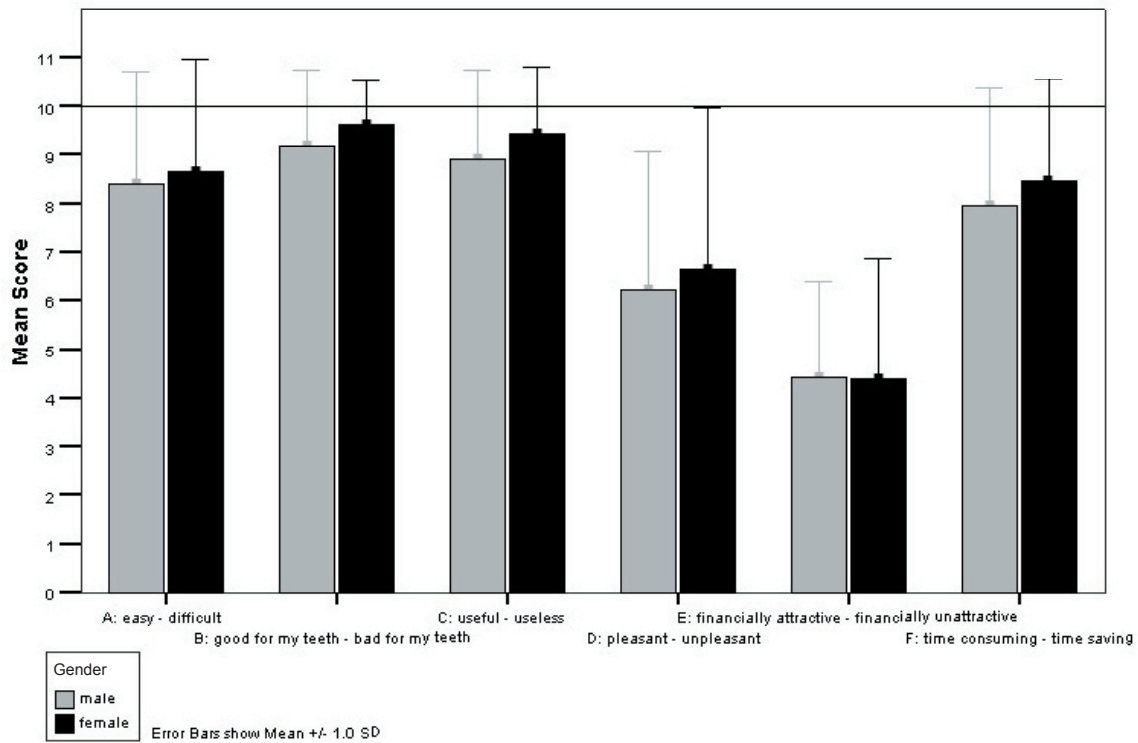
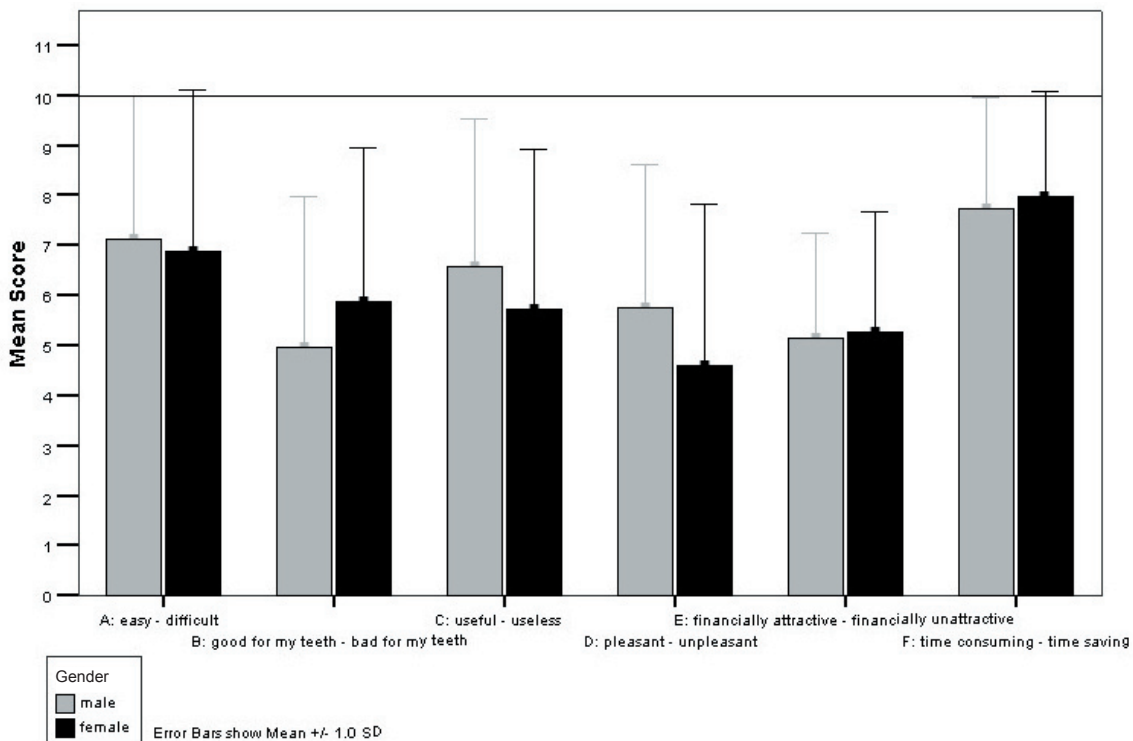**Figure 2**. *Mean scores on the six visual analogue scales for six-monthly visits*

Figure 3. *Mean scores on the six visual analogue scales for flexible visit frequency*

Finally, patients indicated that the mean preferred period of time between successive dental check-ups for them is 6.9 months (sd = 2.2).

Determinants of patients' preferences for regular dental check-ups

Mean scores on the subscales cynicism, motivation and susceptibility of the DAQ were respectively 1.9 (sd. 0.71), 5.2 (sd. 0.76) and 4.0 (0.87), indicating that (a) patients are not cynical toward the motives of dental health care professionals and do not downplay the need for regular dental check-ups and oral hygiene, (b) patients are intrinsically motivated to maintain or improve their oral state, and (c) patients are realistic in their assessment of their susceptibility to health problems; the majority of patients believed that they are able to detect serious oral health problems themselves, and a lot of patients also believed that they will need dental treatment in the coming year.

Univariate analyses showed that patients' preferences for regular dental check-ups, as assessed with the 14-item Likert-scale, was related to two patient characteristics, namely patients' gender and patients' satisfaction with their teeth. Male patients had significantly lower preferences for regular dental check-ups than female patients ($F(1,306) = 7.2$; $p<.001$), and patients who were less satisfied with their teeth had lower preferences for regular dental check-ups than patients who were satisfied with their teeth ($F(2,306) = 4.4$; $p=.001$). No other associations were found between patients' preferences for regular dental check-ups and patients' characteristics.

To determine whether patients' preferences for regular dental check-ups could be predicted from the various background variables assessed in this study, a multiple regression analysis was carried out. The following variables were entered in the regression equation: mean scores on cynicism, motivation, susceptibility, patients' age, gender, educational level, income, satisfaction with their teeth, their perceived oral health, and the evaluation

Table 2. Results of regression analysis with patients' need for regular dental check-up visits as dependent variable

Variable:	R^2	B	p
Cynicism	.112	-.19	.000
Motivation	.021	.11	.02
Total:	.133		

on patients' oral health by the dentist/dental assistant. Patients' scores on the cynicism and motivation subscales of the DAQ, explained 13.3% of the variance in patients' score on their preference for regular dental check-up scale (Table 2). The less cynical and the more motivated the patient, the stronger their preference for regular dental check-up visits. The other variables did not contribute significantly to the regression model.

Discussion

Since 1995, Dutch dental patients insured by the sick-fund no longer have to attend their dentist every six months for a dental check-up visit. Instead, the new, more flexible, policy which came into effect from that year onwards obliged these patients to visit their dentist no more than once a year for a routine examination. This study addressed the question what patients think about this change in policy, and whether they prefer one alternative over the other.

Unfortunately, only 48.9% of the questionnaires were returned, limiting the weight that can be placed on the results of this study. It should be noted, though, that survey nonresponse is steadily increasing during the last decades worldwide, with The Netherlands being a country with one of the lowest mean response rates at the moment (below 60%) (De Heer, 1999). Thus, a response rate of 48.9% is, unfortunately, not much below average

in The Netherlands. With regard to this particular study, an explanation for the low response rate is that the questionnaires were not actually distributed to all patients. Fortunately, the dental assistants/receptionists indicated that very few patients refused to participate in the study when asked. However, even when distributed, there may not have been enough time available for patients to fill out the questionnaire before their dental visit.

Taking into account the above, results of our study suggest that patients have a strong preference for regular dental check-up visits. When asked to indicate which period of time they prefer between successive dental check-ups, they reported a mean period of slightly less than seven months. Furthermore, all three different methods used in this study to assess patients' preferences for regular dental check-up visits, the Likert items, visual analogue scales and forced choice items, point in the same direction: when the choice lies in the hand of the patient, they prefer to attend their dentist for routine examinations twice a year. In fact, the majority of patients reported to actually visit their dentist twice a year. These data correspond with figures presented by van Rossum and Smits (2002), which also indicate no difference in dental check-up visit frequencies before and after 1995. Thus, patients' attendance behaviour with regard to dental check-up visits does not seem to have altered after the change in policy in 1995, despite the fact that about half of the Dutch dentists indicate that they have individualized check-up frequencies (Mettes & Bruers, 2001).

An additional question this study addressed was whether patients' preference for regular dental check-up visits could be explained by a number of background variables, associated with regular dental attendance. Not surprisingly, we found that the less cynical and more motivated the patient, the stronger their preference for regular dental check-ups. Furthermore, female patients as well as patients who are more satisfied with their teeth, have higher preferences for regular dental check-up visits than male patients and patients who are less satisfied with their teeth. These factors are partly in concordance with factors related to actual regular dental attendance. For example, male patients, patients who are less satisfied with their oral health and patients who are less motivated, are less likely to attend their dentist on a regular basis than females, patients who are satisfied with their oral health and more motivated patients (e.g. Nuttall, 1997; Woolfolk et al., 1999). Thus, preferences for regular dental check-up visits and actual regular dental attendance seem to be related to each other to some extent. It should be noted though, that the percentage of explained variance was relatively small in this study (about 13%), indicating that other factors, not assessed here, are probably associated with patients' preferences for regular dental check-up visits.

Advocates of extending recall intervals, based on individual risk factors, tend to base their arguments on epidemiological data about progression of oral disease. Besides the fact that the evidence for their arguments is not that clear-cut (Davenport et al., 2003), this approach suffers from two additional serious limitations. First, the fact that there is substantial variation in clinical judgements among dentists is neglected (e.g. den Dekker,

1990; Poorterman, 1997). Thus, the limited reliability of assessing individual risk factors, may make the approach of individualised recall intervals less than feasible; in other words, it is perhaps better to be safe than sorry. Second, the perspective of the patient on the issue of recall frequencies is not taken into account at all. This is not only unfortunate, to say the least, it is also inappropriate when one considers that quality of dental care is as much determined by clinical factors as it is determined by more 'subjective' factors, such as the dentist-patient relationship (Eijkman et al, 1998). In order to deliver good quality care, the relationship between dentist and patient should be one of trust, and this can only be achieved by respecting and incorporating patients' views in the dental decision-making process. Therefore, the decision about the most appropriate interval between dental examinations should be taken by dentist and patient together.

References

Benn, D.K., Clark, T.D., Dankel, D.D, Kostewicz, S.H. (1999). Practical approach to evidence-based management of caries. *Journal of the American College of Dentists* **66**: 27-35.

Boggs, A., Maurer, S.M., Mourino, A.P., Farrington, F.H., Shetty, N.S. (1996). Recall intervals: effect on treatment needs: a retrospective study. *The Journal of Clinical Pediatric Dentistry* **20**: 119-122.

Bos, A., Hoogstraten, J., Prahl-Andersen, B. (2003). A comparison of dental health care attitudes in The Netherlands in 1985, 1995, and 2001. *Community Dentistry and Oral Epidemiology,* **31**: 207-212.

Davenport, C.F., Elley, K.M., Fry-Smith, A., Taylor-Weetman, C.L. & Taylor, R. S. (2003). The effectiveness of routine dental checks: a systematic review of the evidence base. *British Dental Journal* **195**: 87-98.

Dekker den, J. (1990). *Behandelingsplanning in de tandartspraktijk* (Treatment planning in dental practice). Ph.D. thesis, University of Amsterdam.

Dixon, G.S., Thomson, W.M., Kruger, E. (1999). The West Coast Study 1: self-reported dental health and the use of dental services. *New Zealand Dental Journal* **95**: 38-43.

Eijkman, M.A.J., Duyx, M.P.M.A., Visser, A.P. (1998). *Patiëntenvoorlichting en mondgezondheid* (patient education and oral health). Bohn Stafleu van Loghum, Houten.

Gibson, B.J., Drennan, J., Hanna, S., Freeman, R. (2000). An exploratory qualitative study examining the social and psychological processes involved in regular dental attendance. *Journal of Public Health Dentistry* **60**: 5-11.

Heer de, W. (1999). International response trends: results of an international survey. *Journal of Official Statistics* **15**:129-142.

Helminen, S.K.J., Vehkalahti, M.M. (2002). Do check-up intervals correspond to caries indices in the free public dental service in Helsinki, Finland? *Community Dental Health* **19**:166-172.

Hoogstraten, J., Broers, N.J. (1987). The Dental Attitudes Questionnaire: comparing two response formats. *Community Dentistry and Oral Epidemiology,* **15**:10-13.

Kärkkäinen, S., Seppä, L., Hausen, H. (2001). Dental check-up intervals and caries preventive measures received by adolescents in Finland. *Community Dental Health* **18**: 157-161.

Lahti, S.M., Hausen, H.W., Widström, E., Eerola A. (2001). Intervals for oral health examinations among Finnish children and adolescents: recommendations for the future. *International Dental Journal* **51**:57-61.

Mettes, T.G., Bruers, J.J.M. (2001). Aspecten van het periodiek controle-onderzoek (Aspects of regular dental examinations). *Nederlands Tandartsenblad* **56**: 444-445.

National Institute for Clinical Excellence (2004). Dental recall: Clinical Guideline 19.

Murray, J.J. (1996). Attendance patterns and oral health. *British Dental Journal* **181**: 339-342.

Nuttall, N. (1997). Review of attendance behaviour. *Dental Update* **24**: 111-114.

Perlus, J. (1994). Determining recall frequency; A controversial issue. *Ontario Dentist* **71**: 31-35.

Poorterman, J.H.G. (1997). *On quality of dental care; the development, validation and standardization of an index for the assessment of restorative care.* Ph.D. Thesis, University of Amsterdam.

Rosén, B., Olavi, G., Badersten A., Rönström, A., Söderholm, G., Egelberg J. (1999). Effect of different frequencies of preventive maintenance treatment on periodonal conditions; 5-year observations in general dentistry patients. *Journal of Clinical Periodontology* **26**: 225-233.

Rossum van, G., Smits, E. (2002). Op bezoek bij de tandarts (Visiting the dentist). *Statistics Netherlands,* Heerlen/Voorburg.

Sheiham, A. (1977). Is there a scientific basis for six-monthly dental examinations? *The Lancet* **2**: 442-444.

Woolfolk, M.W., Lang, W.P., Borgnakke, W.S., Taylor, G.W., Ronis, D.L., Nyquist, L.V. (1999). Determining dental check-up frequency. *Journal of the American Dental Association* **130**: 715-723.

Woolgrove, J., Cumberbatch, G., Gelbier, S. (1987). Understanding dental attendance behaviour. *Community Dental Health* **4**: 215-222.