Acta Odontologica Scandinavica, 2012; 70: 414–420

informa
healthcare

ORIGINAL ARTICLE

Adaptive coping strategies among adults with dental fear. Further development of a new version of the Dental Coping Strategy Questionnaire

JENNY M. BERNSON[1], MAGNUS L. ELFSTRÖM[2] & MAGNUS HAKEBERG[1]

[1]*The Department of Behavioral and Community Dentistry, Institute of Odontology, Sahlgrenska Academy, University of Gothenburg, and Research Center, Public Dental Service, Region Västra Götaland, Sweden, and* [2]*The Department of Psychology, School of Sustainable Development of Society and Technology, Mälardalen University, Sweden*

Abstract

Objective. The aim of this study was to further develop and investigate a newly constructed 15-item questionnaire on strategies for coping with dental treatment, used by fearful adult patients undergoing regular dental care and those with phobic avoidance. ***Materials and Methods.*** The dental coping strategy questionnaire (DCSQ-15) was distributed to 77 individuals with dental phobic avoidance and 94 fearful patients undergoing regular dental care. Previous analyses of a 20-item coping questionnaire (DCSQ-20) revealed that 2 of 4 identified factors predicted regularity or phobic avoidance of dental care. However, one of these factors was considered related to catastrophizing thoughts and not to coping strategies and it was therefore removed in the present study. ***Results.*** The reduced 15-item questionnaire was analyzed to identify its factor structure and a 5-factor solution was found. The five factors were labeled (i) 'self-efficacy', (ii) 'self-distraction', (iii) 'distancing', (iv) 'praying' and (v) 'optimism'. The factors of 'praying' and 'optimism' correlated significantly with dental anxiety and were assessed significantly higher and lower respectively, among individuals with phobic avoidance. A logistic regression analysis revealed that 'optimism', together with gender and dental anxiety, was predictive of the regularity or phobic avoidance of dental care.

Key Words: *adaptive behaviour, coping skills, dental anxiety, factor analysis, questionnaire*

Introduction

Going to the dentist is a very stressful situation for many people because of the anxiety and fear they often experience. It has been estimated that between 5 and 20%, depending on population, method and measurement, of the adult population suffer from high dental anxiety [1–5]. The majority of these patients, about 70%, with high dental anxiety attend regular dental treatment in spite of their fear and therefore often have to deal with the experience of considerable distress associated with the treatment [6–8].

To handle a fear-filled situation, individuals often use coping strategies that are seen as a key feature of the emotional process [9]. According to Lazarus and Folkman, in their transactional theory of stress and coping, coping involves constant changes in the cognitive and behavioral efforts of the individual to manage perceived discrepancies between situational demands and personal capacity [10,11].

In a previous study [12], in which we developed an instrument to assess coping strategies in the dental situation, we found that the use of coping strategies differs between patients undergoing regular or irregular dental care. The Dental Coping Strategy Questionnaire-20 (DCSQ-20) was developed from the Coping Strategy Questionnaire (CSQ), a widely used measure of coping strategies [13] that, over time, has been revised and shortened in different versions [14–16]. The DCSQ-20 captured four groups of strategies: (i) 'self-efficacy statements', (ii) 'distraction and distancing', (iii) 'catastrophizing' and (iv) 'praying and despair'. The study revealed that irregular dental

Correspondence: Jenny M. Bernson, Clinic of Oral Medicine, Box 7163, SE-402 33 Göteborg, Sweden. Tel: +46 31 7413410. Fax: +46 31 7413450. E-mail: jenny.bernson@odontologi.gu.se

(Received 10 November 2010; revised 9 March 2011; accepted 16 June 2011)

ISSN 0001-6357 print/ISSN 1502-3850 online
DOI: 10.3109/00016357.2011.634830

care was associated with more maladaptive coping strategies, including 'catastrophizing' and 'praying and despair', while patients with regular dental care tended to use more adaptive strategies, such as 'self-efficacy statements'. This adds to previous findings that dental phobic individuals with irregular dental care habits have a more negative thinking pattern [17,18] and more negative and catastrophic cognitions [19,20]. These findings indicate that the coping strategies used by patients with dental fear might be an important factor that influences their dental behavior.

The desired effect of coping behavior is a solution or prevention of the state of tension due to the stressed situation. Depending on personal resources, internal and external, people choose strategies that influence the adaptation outcome. It has been suggested that catastrophic behavior, the phenomenon of expecting or worrying about major negative consequences, could be viewed as a coping strategy because it could represent an attempt to obtain support or assistance from others. A further suggestion has been that catastrophizing or self-blame by increasing distress mobilize the individual for action [21]. In contrast, a strong line of reasoning is that catastrophizing could be seen more as an outcome of stress, or as an appraisals of the dental situation, than as a strategy [22,23]. Research indicates that fear interacts with catastrophizing and that catastrophizing influences attentional interference [24]. For example, patients who report high levels of pain catastrophizing report much higher levels of pain, psychological distress and physical disability [25]. It has been argued that the use of certain coping strategies might help reduce levels of catastrophic thinking [26]. In modern coping research, coping strategies are seen as conscious techniques, thoughts and behaviors, aimed at managing, correcting or mastering the problem [27]. As we understand this line of reasoning, the use of adaptive coping strategies may facilitate the cognitive reconstruction of catastrophic thinking. Using this more conservative definition of coping strategies, we believe that catastrophizing, although a central part of fear, does not assess a coping strategy *per se* and therefore, in this study, we excluded the catastrophic subscale from the DCSQ-20. As a result, five items from the original DCSQ-20 relating to catastrophic cognitions were removed and a new version, the DCSQ-15, was applied in this study.

The aim of this study was to further investigate the newly constructed DCSQ-15 questionnaire to focus on more adaptive coping strategies in the dental treatment situation and to evaluate its psychometric properties in a sample of adult, highly dentally fearful patients with regular or irregular dental care.

Material and methods

Participants

The participants were two groups of patients regularly attending dental care or avoiding dental care. Patients were included if (i) they had self-reported experiences of high dental fear and also (ii) were judged by their dentist to suffer from high dental fear.

The first group—regular attendees—was made up of 94 consecutive patients who regularly attended general dental care at the Public Dental Service in Gothenburg, Sweden. A convenience sample of seven different dentists at three clinics recruited patients and collected data.

The second group—irregular attendees—comprised 77 consecutively selected patients without regular care, who applied for treatment at the Dental Fears Research and Treatment Clinic in Gothenburg. All the patients in this group had refused conventional dental treatment and stated that they had not been treated regularly for the past three years at the very least.

The study was approved by the local Human Ethics Committee.

Measures

Dental anxiety was assessed by Corah's DAS [28,29] and the Dental Fear Survey (DFS) [30,31].

The DAS was designed to evaluate overall dental fear. It measures reactions to four imagined dental treatment situations and each situation is assessed on a scale from calm (with a score of 1) to terrified (with a score of 5). Ratings are added together to produce a total score ranging from 4–20. A population's normative mean score has been reported to be 8–9 and a DAS score of ≥ 13 have often been used as the criterion for high dental fear [32,33].

According to Hakeberg and Berggren in their work on identifying dimensions of the scale to mirror dental fear and phobias, the DFS measures five different dimensions of dental fear among dental phobic patients: avoidance behavior; physiologic arousal; anticipatory anxiety; fear of needles and fear of drilling [34]. Twenty items are rated from a low (with a score of 1) to a high (with a score of 5) intensity of reaction and they are added together to produce a score ranging between 20 and 100. Patients with severe dental fear have obtained scores of >65 [34,35].

The DCSQ-15 is a further development of the DCSQ-20 [12], which originated from the Coping Strategy Questionnaire (CSQ) [13]. The DCSQ-20 was adapted to the dental treatment situation and consists of 20 statements that mirror coping. The DCSQ-20 were translated and re-translated into Swedish to verify its compatibility with the original

version of the CSQ [12]. To create the reduced DCSQ-15, five items (6, 13, 14, 17 and 18) from the DCSQ-20 were removed. These items were considered to be related to catastrophizing thoughts. The response scale format from the DCSQ-20 was kept; it involves a 1-7 point Likert scale, where 1 indicates never and 7 indicates always. This gives a total score ranging from 15 to 105.

Procedure

The patients were asked to participate in the study in conjunction with their first visit to the clinics (yearly recall visits for regular attendees). After giving informed consent, they provided background information about gender, age and regular or irregular dental care. Both groups completed the three questionnaires before seeing the dentist.

Statistical analyses

The collected data were analyzed using SPSS version 17.0. Descriptive statistics, the χ^2-test, *t*-test, correlation and reliability analysis (alpha) were used in the statistical analysis.

The correlation matrix of the DCSQ-15 was decomposed using a principal components analysis. Factors were orthogonally rotated (Varimax rotation with Kaiser's normalization) to maximize the statistical separation of the DCSQ-15 into subscales. Inspection of these analyses with regard to eigen values and scree plots led to a decision relating to the number of factors that were going to be retained. Subscale (factor) labels were selected to reflect their origin in the CSQ and DCSQ-20, as well as the content of the item loadings on the different factors. Gender, age, the DAS and the DCSQ-15 factors were subsequently included in a logistic regression model (stepwise backward) to evaluate their ability to predict dental care behavior (avoidance vs regular dental care). $p < 0.05$ was regarded as the level of statistical significance, but adjustments have been made for multiple comparisons.

Results

Women predominated in both groups but there were significantly more men in the irregular group; the female:male ratio was 80:14 among regular attendees and 56:21 among irregular attendees ($\chi^2 = 3.99$; $p < 0.05$). There was also an age difference; the irregular attendees were younger than those in the regular group group [35.5 yr, standard deviation (SD) = 10.6, vs. 40.8 yr, SD = 12.6; $t = 2.95$; $p = 0.01$].

The mean total score of the DAS and the DFS and subscale scores were significantly higher in irregular attendees than in regular attendees (Table I); 51% and 49% of the individuals in the group of regular attendees and 84% and 79% within the irregular attendee group had a score of DAS ≥ 13 and DFS >65, respectively.

Three of the items included in the DCSQ-15 (5, 14 and 15) revealed statistically significant differences between irregular and regular attendees. The distributions of item means and standard deviations were for item 5: [4.6 (2.5), vs. 3.7 (2.4), $t = -2.3$, $p < 0.05$], item 14: [3.5 (SD 2.4), vs. 2.7 (SD 2.1), $t = -4.4$, $p < 0.001$] and item 15: [4.1 (1.8), vs. 5.2 (1.9), $t = 2.3$, $p < 0.05$]. Item responses did not differ significantly according to age but two of the items (2 and 8) were rated significantly higher among men compared to women (item 2: [4.2 (2.3), vs. 3.4 (2.1), $t = 2.01$, $p < 0.05$] and Item 8: [2.6 (1.9), vs. 1.9 (1.6), $t = 2.44$, $p < 0.05$].

Table I. Mean values and standard deviations for DAS, DFS factors and DCSQ–15 factors.

	Regular		Irregular			
	Mean	SD	Mean	SD	*t*-value	*p*-value
DAS sum	13.2	2.8	16.6	2.8	−7.962	0.000
DFS sum	61.2	13.4	76.2	14.1	−7.098	0.000
DFS, Factor I, Avoidance behavior	4.9	2.4	7.2	2.1	−6.628	0.000
DFS, Factor II, Physiologic arousal	14.0	3.7	18.5	3.7	−7.953	0.000
DFS, Factor III, Anticipatory anxiety	23.6	6.3	30.0	6.5	−6.446	0.000
DFS, Factor IV, Fear of needles	7.2	2.3	7.8	2.3	−1.667	0.097
DFS, Factor V, Fear of drilling	11.4	3.1	12.6	3.1	−2.576	0.011
DCSQ-15 sum (total sum/number of items)	3.7	1.1	3.7	1.0	0.257	0.798
DCSQ-15, Factor I, Self-efficacy statements	4.3	1.6	4.3	1.6	0.127	0.899
DCSQ-15, Factor II, Self-distraction	3.6	1.5	3.3	1.5	1.236	0.218
DCSQ-15, Factor III, Distancing statements	2.5	1.3	2.6	1.5	−0.691	0.490
DCSQ-15, Factor IV, Praying	3.2	2.0	4.0	2.0	−2.699	0.008
DCSQ-15, Factor V, Optimism	5.2	1.6	4.4	1.6	3.101	0.002

Differences between regular and irregular attendees tested with the *t*-test.

Table II. Dental coping strategy questionnaire (15 items) item factor loadings.

		Rotated factor component loadings				
Factors and items		I	II	III	IV	V
Factor I: self-efficacy						
DCSQ 10	I tell myself not to be afraid	0.845	0.066	0.077	0.060	0.191
DCSQ 4	I pretend that my fear does not exist	0.777	0.170	0.137	0.015	−0.172
DCSQ 3	I tell myself to be strong enough to stand it, despite my fear	0.666	0.180	0.011	0.269	0.175
DCSQ 9	I tell myself I can't let my fear stand in the way of what I have to do	0.663	−0.056	0.180	−0.026	0.571
Factor II: self-distraction						
DCSQ 12	I think about people I like to be with	0.112	0.741	0.235	0.055	0.002
DCSQ 1	I try to think of something nice	0.393	0.692	0.133	0.103	−0.132
DCSQ 6	I would like to listen to music during treatment	−0.063	0.619	−0.080	−0.116	0.273
DCSQ 7	I count to myself, sing to myself or try to play mental games with myself to keep my mind off the treatment	0.153	0.505	0.441	0.125	0.125
Factor III: distancing						
DCSQ 13	I pretend it is not my body, but something apart from me	0.033	0.053	0.795	0.086	0.146
DCSQ 8	I think that the pain sensation feels like something else, such as numbness	0.045	0.061	0.684	0.185	0.070
DCSQ 2	I try to feel distant from the treatment, almost as if I were somewhere else	0.265	0.380	0.647	−0.165	−0.097
Factor IV: praying						
DCSQ 5	I pray that the treatment will soon be over	0.097	0.066	−0.035	0.886	0.062
DCSQ 14	I pray that the fear will disappear	0.118	−0.043	0.342	0.757	−0.053
Factor V: optimism						
DCSQ 15	I just keep on despite the fear	0.079	0.097	0.118	−0.002	0.841
DSCQ 11	I try to think years ahead, about what everything will be like after the treatment	0.388	0.338	0.067	0.284	0.424

Principal component analyses were performed and, based on Kaiser's criterion (eigen value >1), the scree plot and the interpretability of the item loadings, a five-factor solution was chosen that explained 65% of the total variance (Table II). The factors were labeled: (i) '*self-efficacy*'; (ii) '*self-distraction*'; (iii) '*distancing*'; (iv) '*praying*'; and (v) '*optimism*' (Table II). A large part of the variance (29%) was explained by *self-efficacy* statements. *Praying* was rated significantly higher among individuals with irregular dental care, while *optimism* was rated significantly higher among individuals with regular dental care (Table I). The internal consistency Cronbach's alpha for the 15 items was 0.81.

Four of the five DFS factors were rated higher in the irregular group (Table I). The correlations between the subscales of the DCSQ-15, DFS and DAS were calculated. For the group of individuals with irregular dental care, there was a significant correlation between DCSQ-15 *praying* and DFS-*physiologic arousal* ($r = 0.299$, $p = 0.008$) and a significant negative correlation between DCSQ-15 *optimism* and DAS sum ($r = 0.290$, $p = 0.01$).

The group of regular attendees showed significant correlations between DCSQ-15 distancing statements and DAS sum ($r = 0.246$, $p = 0.02$) and DFS-*fear of drill* ($r = 0.233$, $p = 0.02$). There were also significant correlations between DCSQ-15

praying and DAS sum ($r = 0.273$, $p = 0.008$), DFS sum ($r = 0.281$, $p = 0.006$), DFS-*physiologic arousal* ($r = 0.345$, $p = 0.001$), DFS-*anticipatory anxiety* ($r = 0.250$, $p = 0.02$) and DFS-*fear of drill* ($r = 0.226$, $p = 0.03$).

To predict dental care behavior, the five coping strategy factors, together with gender, age and the DAS, were entered into a logistic regression analysis (Table III). The strongest predictor was gender (men) (OR = 8.8). Dental anxiety and dental coping strategy factor-*optimism* were also significant predictors, with ORs of 1.6 and 0.7 respectively. Dental coping strategy factor-praying failed to enter the equation but was close to significance (OR = 1.2, $p = 0.096$). Risk factors for irregular dental care were therefore being male, having high dental anxiety and using little optimism.

Discussion

The aim of this study was to further investigate the newly constructed Dental Coping Strategy Questionnaire-15, to focus on more adaptive coping strategies in the dental treatment situation. The DCSQ-20 instrument [12] was shortened into a 15-item questionnaire, the DCSQ-15, by excluding the five items relating to catastrophic thinking. When using a more conservative definition of what a coping strategy is, another factor solution emerged in the revised coping strategy questionnaire, the DCSQ-15, compared with the DCSQ-20. In the present study, a new coping strategy factor, *optimism*, was found. The other four factors revealed in this study are more comparable in both instruments. With its factor solution, the revised and shortened instrument, the DCSQ-15, had a higher explained total variance of 65% compared with the DCSQ-20 with 52%.

Two different dental fear-related coping strategy factors with potential mediating roles to dental avoidance were identified. The two factors were "optimism" and "praying". High scores for optimism were associated with regular dental care, whereas there was a tendency for praying to predict more irregular attendance.

Optimism may be regarded as the generalized expectation of positive outcomes in the future and it can be viewed in terms of state and trait. A personality trait is more stable over time, while optimism as a state depends on the situation and the interaction of people involved [36]. Optimism has been found to be associated with many positive health outcomes, such as for example improved immunological function [37,38]. A previous study in the field of dentistry has found a relationship between optimism and active coping and established that optimism was strongly related to dental health [39]. The DCSQ-15 is designed to capture situational optimism, even though it may have aspects of optimism that are a reflection of personality. This could, for example, mirror a patient's confidence in his/her coping abilities.

Praying to a god or to a higher power is practiced worldwide, but it varies in form and procedures across and within cultures and religions. In Sweden, with its less religious society compared with the United States, for example, praying is more informal and might be common during times of stress and illness [40]. In pain research, the coping strategy of praying has been associated with more disability and higher levels of anxiety and depression [41]. Praying is often seen as an emotional, passive strategy that reflects a maladaptive adjustment to chronic pain [42].

The strongest predictor of dental care behavior was gender. It is known that women report dental fear more frequently than men and have higher levels on dental fear scales [2,3]. Many studies report that dental fear is much more common among women [42], but in some studies of dental fear there are no gender differences [43,44]. Women appear to run twice the lifetime risk of developing specific phobias compared with men [45] and there is also a relationship between dental fear and general anxiety where women report more dental fear and general anxiety in combination than men [46]. It may be more socially acceptable for women to report fear and this could be the reason to why women more frequently seeks remedy for dental fear and attends dental treatment more often in spite of their fear while men with dental fear could have a higher risk to end up in phobic avoidance behavior because of the social pattern.

Table III. The final model of the logistic regression (backward stepwise) predicting regular vs. irregular dental care.

Variable	B	SE	*p*-value	OR	CI
Gender	2.18	0.56	0.000	8.8	2.95–26.45
DAS	0.49	0.08	0.000	1.6	1.38–1.93
DCSQ-15, Factor IV – praying	0.17	0.10	0.096	1.2	0.97–1.45
DCSQ-15, Factor V – optimism	−0.36	0.14	0.009	0.7	0.53–0.91

B, regression coefficient; SE, standard error; OR, odds ratio; CI, 95% confidence interval.
Nagelkerke $R^2 = 0.49$.

Self-efficacy was a relatively frequently used coping strategy factor in both the regular and irregular groups, with no significant differences between the groups. It is too early to draw any absolute conclusions, but, in the previous study with the DCSQ-20 [12], the strategy of *self-efficacy* was close to significance when it came to predicting regular dental care. The DCSQ-15 coping strategy factors of *self-distraction* and *distancing statements* showed no significant differences between the groups and were somewhat less frequently used. In the previous study, the very similar coping strategy factor of *distraction and distancing* in the DCSQ-20 did not have any discriminatory value either. There is therefore little evidence to suggest that any of these three coping strategy factors could be adaptive in the dental treatment situation.

In the results of the correlation test of the factors in the DCSQ-15 and DFS, we found a relationship between the coping strategy factor of *praying* and patients reporting physiologic responses during treatment within the group of irregular attendees. This could indicate that, under severe stress during treatment, these patients occupy a more passive and powerless position, not ready to act, their physiologic reaction is high and the stress remains. *Praying* as a passive way of coping may represent a somewhat unrealistic hope and wish and has been correlated with lower self-efficacy in pain studies [42,47]. In the group with regular dental care, there were significant correlations between the coping strategy factor of *praying* and the total level of dental fear according to the DAS and DFS, the physiologic responses during treatment, the anticipatory anxiety and fear of the drill. There were also significant correlations between the coping strategy factor of *distancing statements* and the level of dental fear and fear of the drill. This study indicates that these patients have different and perhaps more varied ways of handling the stress than patients with irregular dental care. By going regularly to the dentist, the patient keeps the level of fear slightly lower and finds it easier to have better control of the physical response and obtain a distance to the treatment. These patients are more exposed to dental treatment on a regular basis and therefore have more experience and more DFS factors to which to relate, whereas patients with irregular dental care have more difficulties, especially when answering the DFS factors of *fear of needles* and *fear of drilling*. The relationships between relevant DFS concepts and the DCSQ-15 factors were reasonable, indicating the preliminary concurrent validity of the DCSQ-15.

The limitation of the study relates to the relatively small urban sample from four public dental clinics and there may therefore be difficulties when it comes to generalizing the results. However, during this stage of instrument testing, it is important to be able to explore the psychometric properties of a questionnaire. Further analysis of the DCSQ-15 should be accomplished to verify its validity and reliability. Three of the items (7, 9 and 11) in the factor analysis had high loadings in more than one factor and they belonged to three different coping strategy factors. Since the instrument is under development, it is too early to draw any conclusions about these three items. The factor analysis showed five factors, of which two, *praying* and *optimism* had relatively few items/coping strategies. These factors need to be extended and further replicated in other studies.

The strength of the study is the small number of missing values and a shorter instrument with a higher explained total variance compared with the DCSQ-20. Furthermore, we have not found any other study on coping strategies that include patients with regular as well as irregular dental care. Knowledge of the way these patients think and act during dental treatment is of great importance in developing treatment methods for dental fear or preventing the progression to dental phobia.

One implication for future research is what will emerge if we compare the results from the DCSQ between patients with dental fear and the normal population or other more specific populations.

Although the present study has focused on coping strategies, we believe that dental fear is best seen as a complex multifactorial problem [48] that takes place in a social context. There are many factors, both internal and external, that may influence a person's coping behavior [21]. Internal resources could be a person's personality or level of catastrophic thinking [19,20,24]. The most obvious external resource in the dental situation is the dental team. In the dental treatment situation, the caregivers' role is of great importance for communication, empathy and respect. A competent dentist, dental hygienist or dental nurse might have the opportunity and knowledge to help the patient to find and maintain adaptive strategies, e.g. optimism, that may keep the dental fear at a manageable level and make it possible for the patient to obtain regular dental care.

Acknowledgments

Our deepest gratitude goes to Professor Ulf Berggren, deceased May 2009, who made a major contribution to the study. Special thanks go to the participating public dental service clinics in Olskroken, Hisings Kärra and Björkekärr and to the Clinic of Oral Medicine. This study was supported by the Research and Development Council of the counties of Göteborg and Södra Bohuslän.

Declaration of interest: The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

References

[1] Milgrom P, Fiset L, Melnick S, Weinstein P. The prevalence and practice management consequences of dental fear in a major US city. J Am Dent Assoc 1988;116:641–7.

[2] Hakeberg M, Berggren U, Carlsson SG. Prevalence of dental anxiety in an adult population in a major urban area in Sweden. Community Dent Oral Epidemiol 1992;20:97–101.

[3] Moore R, Birn H, Kirkegaard E, Brodsgaard I, Scheutz F. Prevalence and characteristics of dental anxiety in Danish adults. Community Dent Oral Epidemiol 1993;21:292–6.

[4] Poulton R, Waldie KE, Thomson WM, Locker D. Determinants of early- vs late-onset dental fear in a longitudinal-epidemiological study. Behav Res Ther 2001;39:777–85.

[5] Oosterink FM, de Jongh A, Hoogstraten J. Prevalence of dental fear and phobia relative to other fear and phobia subtypes. Eur J Oral Sci 2009;117:135–43.

[6] Hakeberg M, Klingberg G, Noren JG, Berggren U. Swedish dentists' perceptions of their patients. Acta Odontol Scand 1992;50:245–52.

[7] Vassend O. Anxiety, pain and discomfort associated with dental treatment. Behav Res Ther 1993;31:659–66.

[8] Hagglin C, Berggren U, Hakeberg M, Ahlqwist M. Dental anxiety among middle-aged and elderly women in Sweden. A study of oral state, utilisation of dental services and concomitant factors. Gerodontology 1996;13:25–34.

[9] Lazarus RS. Emotions and interpersonal relationships: toward a person-centered conceptualization of emotions and coping. J Pers 2006;74:9–46.

[10] Folkman S. Personal control and stress and coping processes: a theoretical analysis. J Pers Soc Psychol 1984;46:839–52.

[11] Lazarus RS. Coping theory and research: past, present, and future. Psychosom Med 1993;55:234–47.

[12] Bernson JM, Elfstrom ML, Berggren U. Self-reported dental coping strategies among fearful adult patients: preliminary enquiry explorations. Eur J Oral Sci 2007;115:484–90.

[13] Rosenstiel AK, Keefe FJ. The use of coping strategies in chronic low back pain patients: relationship to patient characteristics and current adjustment. Pain 1983;17:33–44.

[14] Hastie BA, Riley JL, 3rd, Fillingim RB. Ethnic differences in pain coping: factor structure of the coping strategies questionnaire and coping strategies questionnaire-revised. J Pain 2004;5:304–16.

[15] Irachabal S, Koleck M, Rascle N, Bruchon-Schweitzer M. [Pain coping strategies: French adaptation of the coping strategies questionnaire (CSQ-F)]. Encephale 2008;34:47–53.

[16] Utne I, Miaskowski C, Bjordal K, Cooper BA, Valeberg BT, Rustoen T. Confirmatory factor analysis of the coping strategies questionnaire-revised in samples of oncology outpatients and inpatients with pain. Clin J Pain 2009;25: 391–400.

[17] Abrahamsson KH, Berggren U, Hallberg L, Carlsson SG. Dental phobic patients' view of dental anxiety and experiences in dental care: a qualitative study. Scand J Caring Sci 2002; 16:188–96.

[18] Hodne CJ. The influence of cognitive coping and neuroticism on coping with dental treatment stress. PhD dissertation. University of Iowa; 2000.

[19] de Jongh A, Muris P, Schoenmakers N, ter Horst G. Negative cognitions of dental phobics: reliability and validity of the dental cognitions questionnaire. Behav Res Ther 1995;33:507–15.

[20] Sullivan MJ, Neish NR. Catastrophizing, anxiety and pain during dental hygiene treatment. Community Dent Oral Epidemiol 1998;26:344–9.

[21] Lazarus RS, Folkman S. Stress, appraisal and coping. New York: Springer; 1984.

[22] Krohne H. In: Krohne H, editor. Attention and avoidance: Strategies in coping with aversiveness. Seattle: Hogrefe and Huber; 1993.

[23] de Ridder D, Depla M, Severens P, Malsch M. Beliefs on coping with illness: a consumer's perspective. Soc Sci Med 1997;44:553–9.

[24] Van Damme S, Crombez G, Eccleston C. Retarded disengagement from pain cues: the effects of pain catastrophizing and pain expectancy. Pain 2002;100:111–8.

[25] Keefe F, Somers T, Kothadia S. Coping with pain. Pain: Clinical updates 2009;17:1–5.

[26] Woby SR, Watson PJ, Roach NK, Urmston M. Coping strategy use: does it predict adjustment to chronic back pain after controlling for catastrophic thinking and self-efficacy for pain control? J Rehabil Med 2005;37:100–7.

[27] Cramer P. Coping and defense mechanisms: What's the difference?. J Pers 1998;66:919–46.

[28] Corah NL. Development of a dental anxiety scale. J Dent Res 1969;48:596.

[29] Corah NL, Gale EN, Illig SJ. Assessment of a dental anxiety scale. J Am Dent Assoc 1978;97:816–9.

[30] Kleinknecht RA, Klepac RK, Alexander LD. Origins and characteristics of fear of dentistry. J Am Dent Assoc 1973; 86:842–8.

[31] Kleinknecht RA, Bernstein DA. The assessment of dental fear. Behavior Therapy 1978;9:626–34.

[32] Hagglin C, Hakeberg M, Ahlqwist M, Sullivan M, Berggren U. Factors associated with dental anxiety and attendance in middle-aged and elderly women. Community Dent Oral Epidemiol 2000;28:451–60.

[33] Locker D, Liddell A, Dempster L, Shapiro D. Age of onset of dental anxiety. J Dent Res 1999;78:790–6.

[34] Hakeberg M, Berggren U. Dimensions of the Dental Fear Survey among patients with dental phobia. Acta Odontol Scand 1997;55:314–8.

[35] Berggren U. General and specific fears in referred and self-referred adult patients with extreme dental anxiety. Behav Res Ther 1992;30:395–401.

[36] Scheier MF, Carver CS. Optimism, coping, and health: assessment and implications of generalized outcome expectancies. Health Psychol 1985;4:219–47.

[37] Brennan FX, Charnetski CJ. Explanatory style and Immunoglobulin A (IgA). Integr Physiol Behav Sci 2000;35:251–5.

[38] Stone AA, Cox DS, Valdimarsdottir H, Jandorf L, Neale JM. Evidence that secretory IgA antibody is associated with daily mood. J Pers Soc Psychol 1987;52:988–93.

[39] Ylostalo P, Ek E, Knuuttila M. Coping and optimism in relation to dental health behaviour–a study among Finnish young adults. Eur J Oral Sci 2003;111:477–82.

[40] Gustavsson G. Tro, samfund och samhälle. Örebro: Libris; 1997.

[41] Andersson G. Chronic pain and praying to a higher power: useful or useless? J Relig Health 2008;47:176–87.

[42] Ashby JS, Lenhart RS. Prayer as a coping strategy for chronic pain patients. Rehabilitation Psychology 1994;39:205–9.

[43] Locker D, Liddell AM. Correlates of dental anxiety among older adults. J Dent Res 1991;70:198–203.

[44] Fredriksson M, Annas P, Fischer H, Wik G. Gender and age differences in the prevalence of specific fears and phobias. Behav Res Ther 1996;34:33–9.

[45] Boyd JH, Rae DS, Thompson JW, Burns BJ, Bourdon K, Locke BZ, et al. Phobia: prevalence and risk factors. Soc Psychiatry Psychiatr Epidemiol 1990;25:314–23.

[46] Boman UW, Lundgren J, Berggren U, Carlsson SG. Psychosocial and dental factors in the maintenance of severe dental fear. Swed Dent J 2010;34:121–7.

[47] Keefe FJ, Kashikar-Zuck S, Robinson E, Salley A, Beaupre P, Caldwell D, et al. Pain coping strategies that predict patients' and spouses' ratings of patients' self-efficacy. Pain 1997;73:191–9.

[48] Thomson WM, Poulton RG, Kruger E, Davies S, Brown RH, Silva PA. Changes in self-reported dental anxiety in New Zealand adolescents from ages 15 to 18 years. J Dent Res 1997;76:1287–91.