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Managing oral hygiene as a risk factor for periodontal disease: a systematic review of psychological approaches to behaviour change for improved plaque control in periodontal management

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Abstract

Background: Plaque control in patients with periodontal disease is critically dependent upon self-care through specific oral hygiene-related behaviours.
Objectives: To determine the relationship between adherence to oral hygiene instructions in adult periodontal patients and psychological constructs. To determine the effect of interventions based on psychological constructs on oral health-related behaviour in adult periodontal patients.
Data Sources: The Cochrane Oral Health Group's Trials Register, MEDLINE, EMBASE and PsycINFO.
Study Appraisal and Synthesis Methods: Studies were grouped according to the study design, and appraised using an appropriate methodology, either the Newcastle-Ottawa assessment for observational studies, or the Cochrane criteria for trials.
Results: Fifteen reports of studies were identified.
Limitations: There was a low risk of bias identified for the observational studies. Older trials suffered from high risk of bias, but more recent trials had low risk of bias. However, the specification of the psychological intervention was generally poor.
Conclusions and Implications of Key Findings: The use of goal setting, self-monitoring and planning are effective interventions for improving oral hygiene-related behaviour in patients with periodontal disease. Understanding the benefits of behaviour change and the seriousness of periodontal disease are important predictors of the likelihood of behaviour change.

Key words: adherence; behavioural science; compliance; periodontal disease; social cognitions

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Conflict of interest and source of funding

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Periodontal health is critically dependent upon the behaviour of the patient, both in terms of the maintenance of good oral hygiene and in treatment seeking when disease exists (Newton 2013). Clinicians working with individuals with periodontal disease are faced with the challenge of encouraging compliance with their oral hygiene instruction. There is good evidence that the adoption of specific psychological interventions based on theories of health-related behaviour provides superior outcomes when compared with non-theory based, and in particular simple educational, interventions (Abraham et al. 2009). Renz et al. (2007) reported the findings of a systematic review of randomized controlled trials which had sought to improve the oral hygiene-related behaviour of patients with periodontal disease, through the adoption of interventions based on psychological theories and models. The review concluded that, "There is tentative evidence that psychological approaches to behaviour management such as the use of reinforcement, goal setting and the provision of feedback can improve oral hygiene and oral hygiene-related behaviours". However, the review also highlighted problems with the application of psychological theories, in particular the operationalization of the theoretical constructs.

Following the Renz et al. review and with the growing involvement of psychologists in the dental field, there has been an increasing interest in this area. There are numerous psychological models and theories that provide an important framework for increasing our understanding of the determinants of adherence to recommendations concerning health behaviours. Social cognition models (SCMs) in particular have been repeatedly applied to predict and explain behaviour changes such as screening attendance, dieting and oral hygiene behaviour (Conner & Norman 2005). "Social cognitions" are beliefs, thoughts and attitudes concerning behaviours, which are believed to be related to whether or not a person undertakes a particular behaviour. All these models share the common assumption that an individual's behaviour is best understood by examining their attitudes and beliefs. The models are summarized in Renz & Newton (2009). This study seeks to expand upon previous systematic and narrative reviews in this area by determining the degree to which the psychological constructs identified in the social cognition models can be found to correlate with or predict oral health-related behaviour, and further explore the effectiveness of interventions based on such constructs in enhancing oral health-related behaviour. Therefore, the aim of this study is to determine the role that psychological constructs play in adherence to oral hygiene instruction in patients with periodontal disease. This will be achieved through addressing two related research questions 1. What is the relationship between social cognitions and oral health-related behaviour (including proxies of oral health-related behaviour such as clinical status)? 2. What is the effect of interventions based on social cognition models on oral health-related behaviour in individuals with periodontal disease, compared to educational interventions, no intervention or other psychological interventions?

Methods

No registered protocol exists for this systematic review.

Eligibility criteria

Types of studies

- Randomized controlled trials, controlled clinical trials, cohort studies or case–control studies including the analysis of empirical data (either primary or secondary) including the constructs outlined in the following psychological models exploring adherence to oral hygiene advice:

  - Health Belief Model (HBM) (Rosenstock 1966, 1974)
  - Theory of Reasoned Action (TRA) (Fishbein & Ajzen 1975)
  - Theory of Planned Behaviour (TPB) (Ajzen 2002)
  - Self-Efficacy Model (Bandura 1977)
  - Transtheoretical Model (Stages of Change) (Prochaska & Di Clemente 1984)
  - Protection Motivation Model (Rogers 1975)
  - Health Locus of Control (HLOC) (Wallston & Wallston 1982)
  - Implementation Intentions (Gollwitzer 1993)
  - Unrealistic Optimism Bias (Weinstein 1980)
  - Self-Regulatory Model (Leventhal & Cameron 1987)
  - Health Action Process Approach (HAPA) (Schwarzer 1972; Schwarzer 1999)
  - Precaution Adoption Process Model (PAPM) (Weinstein et al. 1998)
  - Outcome Expectancy (Bandura 1977)
  - Cognitive Hypothesis Model of Compliance (Ley 1982)
  - Social Learning Theory (Bandura 1986)
  - Operant and Classical Conditioning (Skinner 1938).
  - Interventions adopting techniques from Cognitive Behaviour Therapy
  - Motivational Interviewing (Miller 1983)
  - COM-B model (Michie et al. 2011)

- Studies exploring smoking cessation were not included.
- Considered papers had to clearly state that a psychological model or theory had been used, and target at least one variable identified in the theory or the model in the intervention. Judgements were made on the basis of available information regarding the adherence to the model framework.

Types of participants

- Participants aged 18 or over.
- Patients with periodontal disease. "Periodontal disease" for this review was defined on the basis of diagnosis from a dental clinician. This included diagnoses of gingivitis and periodontitis.

Measures of adherence

To determine participants oral hygiene-related behaviour, a mixture of measures were considered for this review (Michie & Abraham 2004).

- Observational outcomes – Behaviour as observed by the researcher

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Table 1. Search terms for medline

1	psychol$.mp. [mp = title, original title, abstract, name of substance, mesh subject heading]
2	cognit$.mp. [mp = title, original title, abstract, name of substance, mesh subject heading]
3	health belief$.mp.
4	theory of planned behaviour.mp.
5	theory of reasoned action.mp.
6	self efficacy.mp. or Self Efficacy/
7	transtheoretical model.mp.
8	stages of change.mp.
9	locus of control.mp. or Internal-External Control/
10	self-regulatory model.mp.
11	implementation intentions.mp.
12	protection motivation.mp.
13	optimistic bias.mp.
14	unrealistic optimism.mp.
15	health action process approach.mp.
16	precaution adoption process model.mp.
17	social learning.mp
18	"Conditioning (psychology)"/ or conditioning classical/ or conditioning operant/
19	(behavio$ adj 4 intention$) or (behavio$ adj4 modificat$) or (behavio$ adj4 change $).mp. [mp = title, original title, abstract, name of substance, mesh subject heading]
20	BEHAVIOUR THERAPY/ or COGNITIVE THERAPY/
21	patient education.mp
22	OR/1-21
23	Gingivitis/ or Gingi$.mp.
24	exp Periodontal Diseases or periodon$
25	exp dental prophylaxis/
26	((plaque adj3 control$) or (plaque adj3 remov$)) and (dental or teeth or tooth).mp. [mp = title, original title, abstract, name of substance, mesh subject heading]
27	exp Oral Hygiene or oral hygiene/
28	Dental Plaque/ or plaque.mp.
29	dental and (hygiene or care or education).mp. [mp = title, original title, abstract, name of substance, mesh subject heading]
30	OR/23-29
31	adherence.mp.
32	compliance.mp. or COMPLIANCE/ or PATIENT COMPLIANCE/
33	concordance.mp.
34	(patient$ adj6 complian$) or (patient$ adj6 adherence) or (patient$ adj6 cooperation) or (patient$ adj6 Cooperation).mp. [mp = title, original title, abstract, name of substance, mesh subject heading]
35	OR/31-34
36	22 and 30 and 35

or automated recording of behaviours.

- Behavioural outcomes – Self-reported and observed measures of adherence to oral hygiene instructions (e.g. changes in toothpaste weight, as an indicator of the patients' brushing behaviour and therefore their adherence).
- Attitude and belief outcomes – Primary outcomes: changes in the patients' attitudes and beliefs and their intentions to change oral hygiene behaviours. Secondary outcomes: changes in pain, patient satisfaction and quality of life.
- Clinical status outcomes – Changes in plaque scores, pocket probing depth, attachment levels and indices of gingival inflammation such as redness, oedema or bleeding.

Information sources

The Cochrane Oral Health Group's Trials Register (2014), MEDLINE (from 1966 to June 2014), EMBASE (from 1980 to June 2014) and PsycINFO (from 1966 to June 2014). Reference lists from relevant articles were searched and the authors of eligible trials were contacted to identify trials and obtain additional information. No language restriction was applied.

Search

To locate studies for inclusion in the review, a detailed search strategy for use in MEDLINE was devised. This search strategy was revised accordingly for use on each of the other selected databases. Conduct of the search strategy involved using both MeSH (fixed vocabulary) and free-text terms. Table 1 lists the search terms adopted.

Study selection

Searches were conducted by one author (JTN) who also assessed the studies, by examining titles, keywords and abstracts. Any papers that were not deemed suitable were rejected at this stage. Full reports of studies were retrieved for all studies that appeared to meet the inclusion criteria. Further review led to the rejection of some papers at the full text stage.

Data collection process

Data for each study were collected on a data sheet by a single author. For each study the following data points were collected:

- Study Design
- Sample size
- Psychological constructs assessed and theoretical framework adopted
- Measures of periodontal status assessed
- Measure of adherence adopted
- Degree of association between psychological constructs and adherence (for observational studies)
- Effect of intervention on adherence (for trials)

Risk of bias in individual studies

Risk of bias was evaluated for interventional trials according to the checklist suggested by the Cochrane

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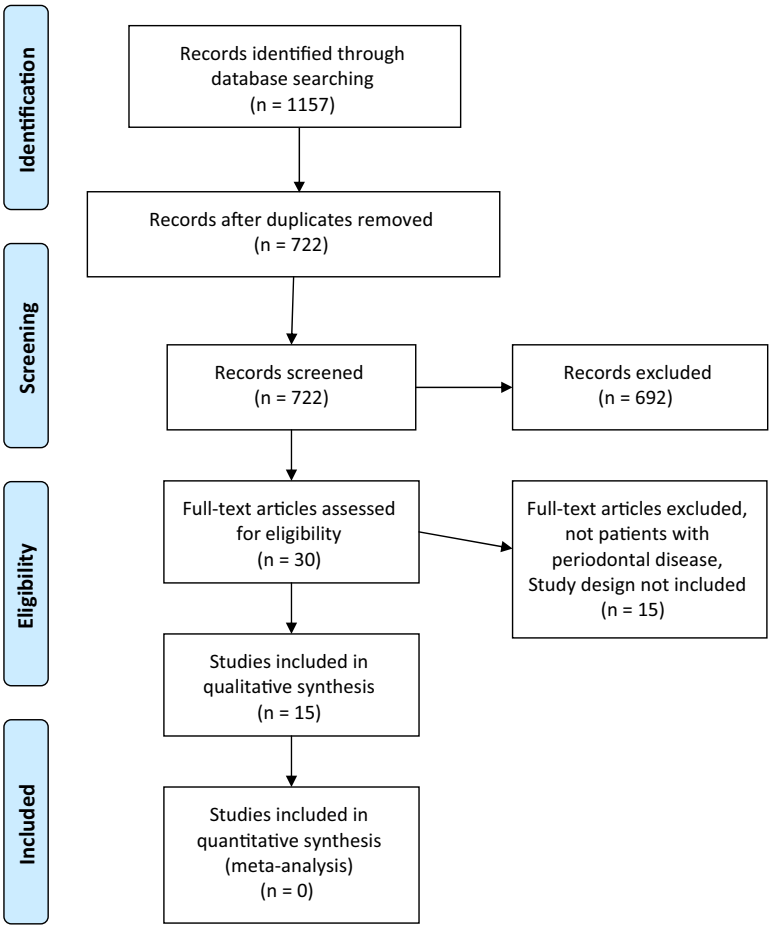

Fig. 1. Flow chart.

Table 2. Table of excluded studies

Study	Reason for exclusion
Almomani et al. (2009)	Participants were not diagnosed with periodontal disease, participants were individuals with enduring mental illness. The presence of periodontal disease was an exclusion criterion
Borkowska et al. (1998)	Cross-sectional study design
Galgut et al. (1987)	Participants not diagnosed with periodontal disease
Jonsson et al. (2009a)	Report of two case studies
Kneckt et al. (1999)	Participants not diagnosed with periodontal disease
Lalic et al. (2012)	Participants not diagnosed with periodontal disease
McCaul et al. (1988)	Participants not diagnosed with periodontal disease
Odman et al. (1984)	Cross-sectional study design
Rayant & Sheiham (1980)	Cross-sectional study design
Schüz et al. (2006)	Participants not diagnosed with periodontal disease
Sniehotta et al. (2007)	Participants not diagnosed with periodontal disease
Stewart et al. (1996)	Participants not diagnosed with periodontal disease
Tedesco et al. (1991)	Cross-sectional study design
Tedesco et al. (1993)	Cross-sectional study design
Wolfe et al. (1991)	Participants not diagnosed with periodontal disease

reviewers' handbook (Higgins et al. 2011). For cohort and case–control studies the Newcastle-Ottawa Quality Assessment scale was used to assess risk of bias (Wells et al. 2009).

Synthesis of results

Due to the high degree of heterogeneity in the included studies, both in terms of the outcome measures and psychological models adopted, it was impossible to conduct a meta-analysis. Therefore, a narrative summary of the studies was undertaken.

Results

Study selection

Figure 1 shows the flow chart for study selection. An initial total of 722 articles were screened, and 30 selected for full text review. At this point 15 were excluded because it was not clear that the participants had diagnosed periodontal disease or on the basis of the study design (see Table 2). There were two reports that covered data from a single trial. Thus, there were fifteen reports drawing on 14 separate studies.

Study characteristics

Table 3 describes the characteristics of the studies identified for review. There were a total of 15 reports across seven theoretical models of health-related behaviour. A broad range of periodontal measures were included in the studies and measures of adherence were largely self-report or measures of disease status.

Risk of bias within studies

The risk of bias within the studies is described in Tables 4 and 5 separately for clinical trials and observational studies. Overall for the observational studies there was a low risk of bias. In contrast, whereas early randomized controlled trials were generally at high risk of bias, more recent trials have been at much lower risk.

Results summarized by social cognition model

Health Belief model

Two studies (Kühner & Raetzke 1989, Barker 1994) suggest that the Health Belief Model plays a small role in predicting the oral hygiene-related behaviour of individuals with periodontal disease. Perhaps the most important variable is beliefs about the "benefits" of oral hygiene. Both studies included measures of clinical status as proxy measures of adherence, rather than assessing oral hygiene behaviours directly. There

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Table 3. Summary of key studies exploring the relationship between psychological models of health-related behaviour and the behaviour and diseases status of patients with periodontal disease.

Psychological Model	Authors (Reference)	Sample Size	Study Design	Operationalization of psychological constructs	Measure of Adherence	Findings
Health Belief Model	Kühner & Raetzke (1989)	96	Cohort study	Questionnaire	Bleeding on Probing	Motivation Seriousness Benefits predicted change in Bleeding on probing
	Barker (1994)	43	Cohort study	Questionnaire	Plaque score Bleeding score	Benefits Combined Benefits+ Susceptibility score predicted change in periodontal status
Health Locus of Control	Bajwa et al. (2007)	55	Cohort Study	Questionnaire	None	No change in patients' locus of control following treatment
Social Learning Theory	Little et al. (1997)	107	Randomized controlled trial	Group intervention delivered by hygienist including feedback and goal setting.	Plaque index Gingival Bleeding Pocket Depth Attachment level	Intervention based on principles of social learning was superior to control
	Weinstein et al. (1996)	20	Randomized controlled trial	Dentist gave praise and feedback, as well as encouraging goal setting	Plaque score	Intervention based on principles of social learning was superior to control
	Stewart et al. (1991)	100	Randomized controlled trial	Psychologist led intervention involving cognitive restructuring, verbal reinforcement, use of cues to facilitate behaviour, and problem solving to address barriers	Plaque index	Intervention based on principles of social learning was not significantly different to an attention control

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Table 3. (continued)

Psychological Model	Authors (Reference)	Sample Size	Study Design	Operationalization of psychological constructs	Measure of Adherence	Findings
Theory of Planned Behaviour/ Extended Theory of Reasoned Action	Jonsson et al. (2012)	113	Before/After (Data from RCT analysed for TRA constructs but no TRA intervention)	Questionnaire	Self-reported behaviour, plaque index, gingival index, bleeding on probing, pocket depth	
Implementation Intentions	Suresh et al. (2012)	73	Randomized controlled trial	Diary	Self-reported flossing frequency, dental plaque and bleeding scores	Intervention led to positive improvements in all variables
Cognitive Behavioural Interventions	Tedesco et al. (1992)	108	Randomized controlled trial	Trained hygienist delivering psychoeducation and tailored intervention	Plaque index, gingival index	Intervention showed a trend for significant improvement compared to control at 3 months but no difference at 6 month follow-up
	Jonsson et al. (2006)	37	Randomized controlled trial	Individual psychoeducation and tailored intervention delivered by hygienist including goal setting and self-monitoring	Plaque index, pocket depth, self-reported inter-dental cleaning	Intervention group showed improvement in all measures compared to controls
	Jonsson et al. (2009b, 2010)	113	Randomized controlled trial	Multiple sessions of individualized intervention with hygienist including goal setting and self-monitoring	Self-reported behaviour, plaque index, gingival index, bleeding on probing, pocket depth	Intervention superior to control for improvements in self-reported behaviour, gingival index, plaque index, bleeding on probing. No difference in pocket Depth

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Table 3. (continued)

Psychological Model	Authors (Reference)	Sample Size	Study Design	Operationalization of psychological constructs	Measure of Adherence	Findings
Motivational Interviewing	Godard et al. (2011)	51	Randomized controlled trial	Single session of MI delivered by periodontist	Plaque index	Greater plaque reduction in MI group at 1 month
	Stenman et al. (2012)	44	Randomized controlled trial	Single session of MI delivered by psychologist	Plaque index and gingival bleeding	No significant differences found at 2, 4, 12 or 26 week follow-up
	Brand et al. (2013)	56	Randomized controlled trial	Single session of MI delivered by counsellor	Plaque index, bleeding on probing, knowledge	No significant differences at 6 or 12 month follow-up

were no intervention studies based on the Health Belief Model constructs.

Health locus of control

Bajwa et al. (2007) explored changes in health locus of control following periodontal treatment. There was no evidence of any effect.

Social learning theory

Interventions based on social learning included elements such as target setting, introducing cues to behaviour and providing feedback on performance. Three trials in this area showed that such interventions are superior to standard care in producing changes in periodontal status. All three studies were at high risk of bias. Only one study included an attention control (Stewart et al. 1991), there were no differences between the attention control group and the intervention group. It cannot be concluded therefore that the intervention conveys any advantage over an attention control.

Theory of planned behaviour/extended theory of reasoned action

Only one study meeting the inclusion criteria was found. Through the secondary analysis of data from a randomized controlled trial, Jonsson et al. (2012) used Structural Equation Modelling to demonstrate that the extended Theory of Reasoned Action model was a strong predictor of gingival outcome scores at 12 months. High levels of self-efficacy at baseline were associated with higher frequencies of oral hygiene behaviour at 3 months.

Implementation intentions

Only one study to date has explored the role of planning interventions in encouraging adherence to oral health-related behaviours in patients with periodontal disease. Suresh et al. (2012) evaluated the effectiveness of an action-control behavioural intervention (a diary) on adherence to dental flossing in patients with periodontal disease. The intervention led to improvements in self-reported flossing frequency, dental plaque and bleeding scores at 4 weeks post-intervention in 73 patients with periodontal disease.

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Table 4. Quality of reporting of non-experimental studies using Newcastle-Ottawa Assessment

	Kühner & Raetzke (1989)	Barker (1994)	Bajwa et al. (2007)	Jonsson et al. (2012)
Newcastle-Ottawa Assessment criteria				
SELECTION				
Representativeness of the exposed cohort	✓	✓	✓	✓
Selection of non-exposed cohort	✓	✓	✓	✓
Ascertainment of exposure	✗	✗	✗	✓
Demonstration that outcome of interest was not present at start of study	✓	✓	✓	✓
COMPARABILITY				
Comparability of cohorts	✓	✓	✓	✓
OUTCOME				
Assessment of outcome	✗	✗	✗	✓
Was follow-up sufficient	✓	✓	✓	✓
Adequacy of follow-up	✓	✓	✓	✓
TOTAL	6	6	6	8

✓ = Reported, X = Not reported

Cognitive behavioural interventions

Jonsson et al. (2006, 2009a,b, 2010) conducted two separate trials of an individualized approach to behaviour change delivered by a dental hygienist trained in psychological methods. The earlier trial (2006) had a small sample size ($N = 37$) but demonstrated differences in self-reported oral hygiene behaviour, plaque scores and pocket depth over a period of 3 months. This is quite a short period to be able to demonstrate sustained behaviour change. Jonsson et al. (2009a,b, 2010) reports on a larger trial ($N = 113$) receiving the same individualized intervention. Follow-up was increased to 1 year. Again the approach was effective in leading to improvements in both clinical indices of periodontal status and self-reported behaviour.

Motivational interviewing

Three studies reported adopting an approach based on Motivational Interviewing to modify the oral hygiene-related behaviour of individuals with periodontal disease. All three studies were at low risk of bias. Only one study reported a significant effect of Motivational Interviewing on plaque levels, but the follow-up was only at 1 month.

Additional analysis

No additional analyses were undertaken.

Discussion

The evidence suggests that there are several variables across all the models which predict the likelihood of engaging in a behaviour – perhaps most important amongst these are the perceived benefits of a behaviour and an individual's self-efficacy with regard to that behaviour. However, both these constructs are susceptible to alternative interpretations, in particular it is possible that following successful behaviour change an individual modifies his or her belief in the benefits of the behaviour through cognitive dissonance and has an enhanced perception of self-efficacy through the process of enactive attainment (Bandura 1977). Interventions which incorporated elements of goal setting, planning the behaviour change and monitoring of behaviour (either by the self or by a health care professional providing feedback) appear to be effective in creating behaviour change irrespective of the theoretical framework under which they had been subsumed. This would fit with more recent attempts within the field of psychology to synthesize the key components of the various models into an overarching framework which has culminated in the COM-B model (Michie et al. 2011). The basic principle behind this new paradigm is that behaviour change consists of three inter-related components. These are as follows:

- *capability* **(C),** i.e. the person having the *physical* (e.g. strength) and *psychological* (e.g. knowledge) skills to perform the behaviour
- *opportunity* **(O)**, i.e. the *physical* (e.g. access) and *social environment* (e.g. exposure to ideas) are such that the person feels able to undertake the new behaviour
- *motivation* (**M**) refers to the person's *conscious* (e.g. planning and decision-making) and *automatic* (e.g. innate drives, emotional reactions, habits) processes said to underline the emission of any behaviour.

The constructs within each social cognition model fit within these components.

The overall risk of bias for the observational studies was in general low, whereas for the trials there is a distinct trend for the risk of bias for newer trials to be lower than that found for older trials.

The range of interventional approaches adopted did not lend itself to meta-analysis of the effect of psychological interventions. Furthermore, the specification of the psychological interventions was generally poor, with insufficient information to replicate the methodology being provided in most cases. Similarly, there were a number of instances where the spirit of the theory was not complied with in the operationalization of the intervention. The interventions subsumed under "Cognitive Behavioural approaches" and "Motivational Interviewing" are good examples. A number of studies reported adopting a "Cognitive Behavioural" approach to behaviour change with periodontal patients. The specification of the intervention was not always clear, with the studies citing that the intervention was based on the principles of cognitive behaviour therapy rather than citing the elements of the approach that were adopted. Where techniques were specified there was some degree of overlap with alternative psychological models, e.g. the use of goal setting and planning (implementation intentions) and reward (social learning approaches). A recent review of Motivational Interviewing for oral health-related behaviours

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Table 5. Risk of bias in randomized controlled trials using criteria taken from the Cochrane handbook

	Little et al. (1997)	Weinstein et al. (1996)	Stewart et al. (1991)	Suresh et al. (2012)	Tedesco et al. (1992)
Cochrane criteria					
SELECTION BIAS					
Sequence generation	HIGH	HIGH	HIGH	LOW	HIGH
Allocation concealment	HIGH	HIGH	HIGH	LOW	HIGH
PERFORMANCE BIAS					
Blinding participants	HIGH	HIGH	HIGH	LOW	HIGH
DETECTION BIAS					
Blinding outcome assessment	HIGH	HIGH	HIGH	LOW	HIGH
ATTRITION BIAS					
Incomplete outcome data	UNCLEAR	UNCLEAR	UNCLEAR	HIGH	UNCLEAR
Funding	UNCLEAR	UNCLEAR	UNCLEAR	NONE	UNCLEAR
Authors	IR	IR	IR	IR	IR
Independency	LOW	LOW	LOW	LOW	LOW

	Jonsson et al. (2006)	Jonsson et al. (2009a,b, 2010)	Godard et al. (2011)	Stenman et al. (2012)	Brand et al. (2013)
Cochrane criteria:					
SELECTION BIAS					
Sequence generation	LOW	LOW	LOW	LOW	LOW
Allocation concealment	LOW	LOW	LOW	LOW	LOW
PERFORMANCE BIAS					
Blinding participants	LOW	LOW	LOW	LOW	LOW
DETECTION BIAS					
Blinding outcome assessment	LOW	LOW	LOW	LOW	LOW
ATTRITION BIAS					
Incomplete outcome data	LOW	LOW	LOW	LOW	HIGH
Funding	Research council	Research council	Research council	Research council	Research council
Authors	IR	IR	IR	IR	IR
Independency	LOW	LOW	LOW	LOW	LOW

LOW, Low risk of bias; HIGH, High risk of bias; UNCLEAR, risk unclear from report; IR, Independent Researcher.

categorized the interventions delivered by Jonsson et al. (2006, 2009a, b, 2010) as falling into Motivational Interviewing, though in the current review they are listed under "Cognitive behavioural interventions". The original authors used both terms, which would be unusual as the two approaches are conceptually distinct (MI tends to be reflective and not to offer direction but to explore with the patient the advantages and disadvantages of change, whereas in the cognitive behavioural tradition the interventions are seen as a collaboration between the patient and health care practitioner and are often highly structured). The current authors were in contact with the Jonsson et al. team who provided additional details regarding the nature of the intervention. All three studies of Motivational Interviewing adopted a single session approach, which is at odds with the spirit and practice of Motivational Interviewing (Miller & Rollnick 2009, Miller & Rose 2009). Furthermore, the interventions were delivered in very short spaces of time for such an approach (approximately 15 min.). It is therefore unsurprising that the use of Motivational Interviewing was found to produce no significant change in behaviour (other than at 1 month in a single study). The three studies, while well designed as randomized controlled trials failed to implement a version of Motivational Interviewing which met the theoretical demands of the framework. There is, however, evidence that brief interventions with high levels of fidelity to the MI approach can be effective in producing oral health-related behaviour change in patients with mental health problems, but without periodontal disease (Almomani et al. 2009). One recommendation arising from the present review is that in future researchers are guided by a consideration of taxonomies of behaviour change to be able to greater specification to the intervention (see e.g. Michie et al. 2013).

Conclusions

Perceptions of the benefits of behaviour change and the seriousness of periodontal disease (including the risk of periodontal disease) are related to adherence to oral hygiene instructions in adult periodontal patients. Interventions based on the use of goal setting, self-monitoring and planning are effective in improving oral health-related behaviours as assessed by oral health status.

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Clinical Relevance

Scientific rationale for study: Oral hygiene related behaviour is important in periodontal health. Clinicians should adopt effective and efficient methods for enhancing patients' adherence to oral health related advice.

Principal findings: Patients' perceptions of the benefits and their self efficacy beliefs predict the likelihood that they will follow advice. Providing patients with clear goals, support to monitor their progress and planning the behaviour change are all related to improved oral hygiene outcomes.

Practical implications: Clinicians can adopt structured approaches incorporating the techniques outlined in the article to maximize patient adherence with oral health related advice.

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