

Theory based interventions to enhance oral hygiene behaviour

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Overview

Origins: Kay & Locker (1997)

Cochrane review: Renz et al (2007)

European Workshop on Periodontology

XI: Newton & Asimakopoulou (2014)

GPS model: Empirical tests.

The effectiveness of oral health promotion (Kay & Locker 1997)

Aim

To provide a systematic overview of what is worth doing to promote oral health and what works best under what circumstances

Method

Searched 5 databases, hand searched 94 journals, personal contacts

Categorised papers by

- Outcome measure
- Methods
- Population studied
- Setting
- Quality

Both qualitative and quantitative synthesis
(weighted well designed studies higher)

Findings

192 papers (163 evaluated treatments)

36 RCTs, 80 quasi-experimental, 33 single group studies

No evidence of education for caries reduction if fluoride not involved

School based education not shown to be effective

OHP to improve oral hygiene reduces plaque but changes are difficult to sustain

OHP increases knowledge

No evidence that greater knowledge changes behaviour

Effects of OHP on attitudes unclear

Attempts to control consumption of sweet foods and drinks are not well evaluated. When directed to individuals such interventions are of limited value

No convincing evidence of effectiveness of mass media programmes on oral health

Recommendations

Use of fluoride toothpaste

Oral hygiene advice should only be given to adults with periodontal disease

Local campaigns should reinforce daily brushing with fluoride toothpaste

Dental Health education in schools should aim to improve knowledge rather than behaviour

Advocacy required for fluoridation of water, salt or milk

Blanket OHP will widen social inequalities in health

Cochrane review (Renz et al 2007)

Aim

To determine the impact of interventions aimed to increase adherence to oral hygiene instructions in adult periodontal patients based on psychological models and theoretical frameworks

Method

Systematic Review:

Searched 6 databases

Only considered Randomised Controlled Trials

Only interventions based on a psychological model were considered (16 theoretical models of health behaviour were identified).

Findings

Search identified 456 non-duplicate studies, of which only 4 fulfilled the criteria of the review

All interventions delivered by individuals not in the immediate care team

Overall methodological quality low:

- Poor reporting of randomisation method

- No sample size determination

- Poor masking

- No allocation concealment

- Per protocol analysis

Study	Theoretical Framework / intervention	Sample size	Clinical findings	Behavioural findings
Little et al 1997	Social Learning •Feedback on oral health status (BoP) •Define goals behaviourally	107	Decreased plaque Decreased gingival bleeding	Increased self reported brushing frequency Increased flossing
Stewart et al 1991	Cognitive Behavioural Therapy •Verbal reinforcement •Cognitive restructuring •Problem solving for barriers •Use of cues	100	No effect on plaque	Increased self reported brushing
Stewart et al 1996	Stages of Change Three arms •Control •Education •4 * 40 minutes with a psychologist	117	Not assessed	No effect on knowledge Enhanced self efficacy for flossing No effect on brushing self efficacy (ceiling effect)
Weinstein et al 1996	Behaviour theory C1 – OHI C2 – OHI+contact with periodontologist E1 – As C2+feedback and praise E2 – As E1 + self monitoring checklist	20	Experimental groups decreased plaque	Not assessed

European Workshop on Periodontology 2014 (Newton & Asimakopoulou 2014)

Aims

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.

Method

Systematic Review:

Searched 4 databases: Cochrane register,
Medline, Embase, PsychInfo

Observational studies and trials were included

Only studies specifically adopting a psychological model were considered (19 theoretical models of health behaviour were identified).

Findings

Search identified 722 non-duplicate studies, of which only 15 fulfilled the criteria of the review. Two manuscripts reported data from the same study. So in total there were 15 reports of 14 studies.

The studies covered 7 different theoretical frameworks.

10 Trials

5 observational studies.

Risk of bias was generally low for the observational studies

Risk of bias in trials markedly improved since the previous review – low risk in more recent studies.

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

Risk of bias - trials

	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 Allocation concealment	HIGH HIGH	HIGH HIGH	HIGH HIGH	LOW LOW	HIGH 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 Authors Independency	UNCLEAR Independent Researcher LOW	UNCLEAR Independent Researcher LOW	UNCLEAR Independent Researcher LOW	NONE Independent Researcher LOW	UNCLEAR Independent Researcher LOW

Risk of bias - trials

	Jonsson et al (2006)	Jonsson et al (2009; 2010)	Godard et al (2011)	Stenman et al (2012)	Brand et al (2013)
Cochrane criteria:					
SELECTION BIAS Sequence generation Allocation concealment	LOW LOW	LOW LOW	LOW 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 Authors Independency	Research council Independent Researcher LOW				

Psychological Model	Authors (Reference)	Sample Size	Study Design	Operationalisation of psychological constructs	Measure of Adherence	Findings
Health Belief Model	Kuhner & 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	Randomised 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	Randomised 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	Randomised 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
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	Randomised 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	Randomised 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	Randomised Controlled Trial	Individual psychoeducation and tailored intervention delivered by hygienist including goal setting and self monitoring	Plaque Index, Pocket Depth, self reported interdental cleaning	Intervention group showed improvement in all measures compared to controls
	Jonsson et al (2009b, 2010)	113	Randomised Controlled Trial	Multiple sessions of individualised 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.
Motivational Interviewing	Godard et al (2011)	51	Randomised Controlled Trial	Single session of MI delivered by periodontist	Plaque Index	Greater Plaque reduction in MI group at one month
	Stenman et al (2012)	44	Randomised 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	Randomised 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

Conclusions

Proposed a simple model of behaviour change for use by oral healthcare practitioners:

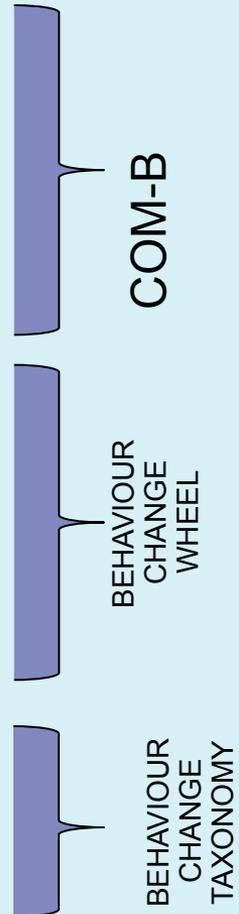
G – Goal Setting

P – Planning

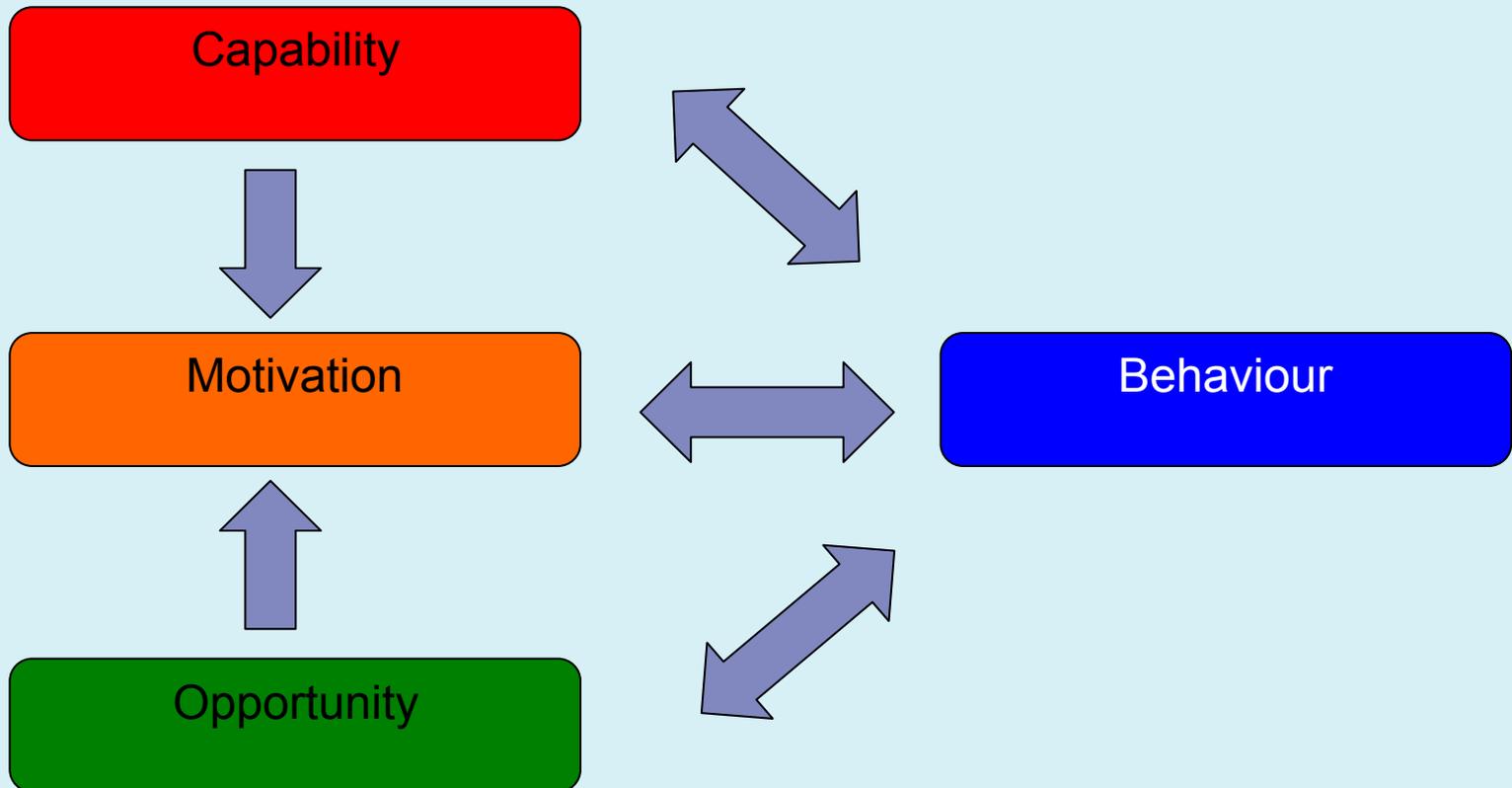
S – Self monitoring

The 8 steps of behaviour change (UCL centre for behaviour change 2014)

1. Define problem in behavioural terms
2. Select target behaviour
3. Specify target behaviour
4. Identify what needs to change
5. Policy categories
6. Barrier change techniques
7. Mode of delivery



COM-B model

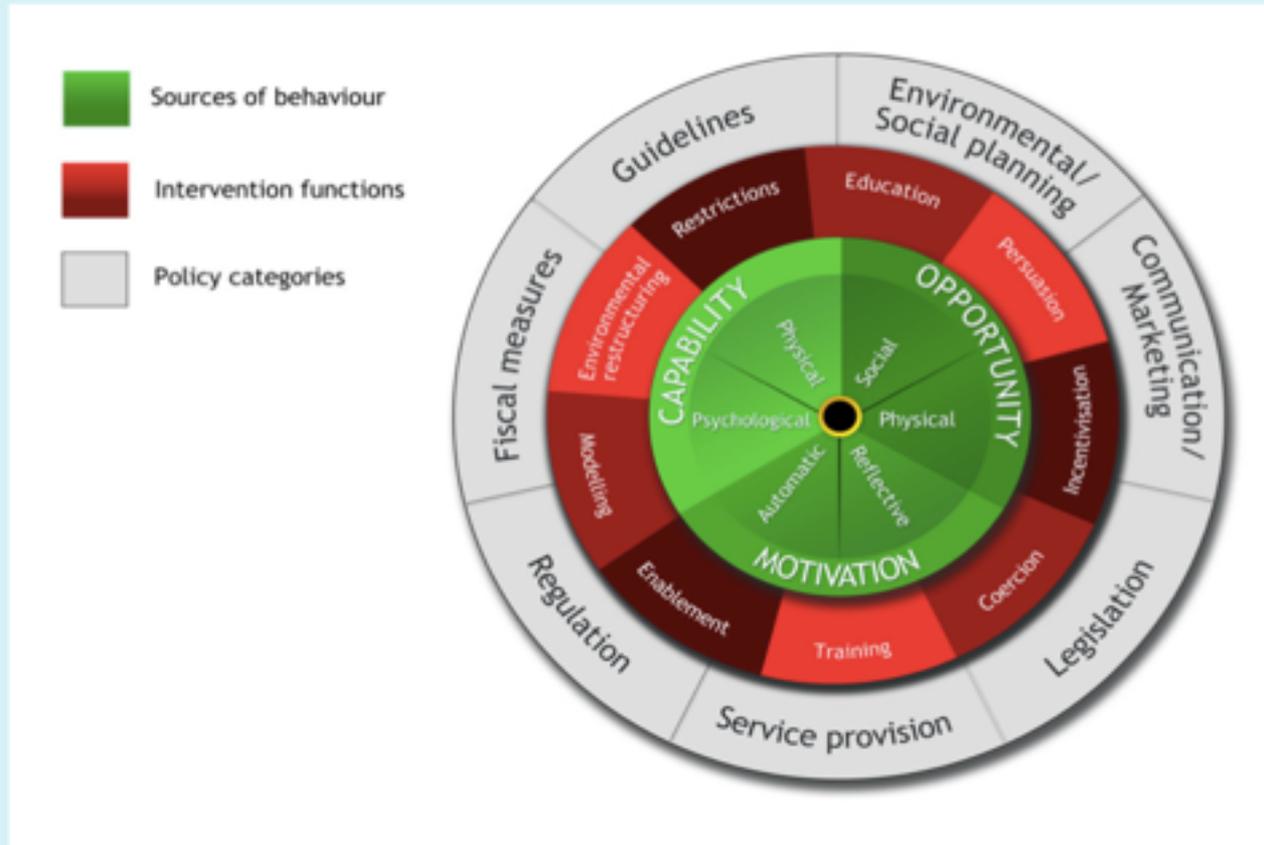


Michie, van Stralen and West (2011 p.4)

COM-B model

- *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 Behaviour Change Wheel



(Michie and West 2013, p.12)

Behaviour Change Taxonomy (Michie et al 2013)

Behaviour Change Technique Cluster	Examples of specific techniques defining the cluster
1. Scheduled consequences	Punishment, extinction, shaping, negative reinforcement, differential reinforcement
2. Reward and Threat	Social, material or self reward, non-specific reward, anticipation of future rewards or removal of punishment, threat
3. Repetition and Substitution	Habit reversal or formation, graded tasks, behavioural rehearsal / practice
4. Antecedents	Restructuring the physical or social environment, avoidance or changing exposure to cues for the behaviour
5. Associations	Classical conditioning, cues, discriminative cue
6. Covert learning	Vicarious reinforcement, covert conditioning
7. Natural consequences	Health, social, emotional consequences, salience of consequences
8. Feedback and Monitoring	Biofeedback, feedback on behaviour, self-monitoring of behaviour
9. Goals and planning	Action planning, problem / coping planning goal setting, behavioural contract, review behaviour or outcome goal
10. Social Support	Practical, general, emotional social support
11. Comparison of Behaviour	Modeling Social comparison Information about others' approval
12. Self-Belief	Focus on past successes, mental rehearsal of successful performance
13. Comparison of outcomes	Pros and cons, persuasive argument, comparative imagining of future outcomes
14. Identity	Self-affirmation, identification of self as role model, cognitive dissonance, reframing
15. Shaping knowledge	Behavioural experiments, antecedents, reattribution,
16. Regulation	Regulate negative emotions, pharmacological support, conserving mental resources

Asimkaopoulou et al (2015)

Aim:

To compare the effects of a routine periodontal assessment consultation vs. a routine consultation + individualised risk assessment communication intervention on patient thoughts and emotions about periodontal disease.

Two arm RCT

Control: TAU

Intervention: TAU + Provision of risk of periodontal disease using Previser software.

102 patients attending secondary care facility with moderate / severe periodontitis

Pre- and post- consultation assessment of psychological constructs

	Control arm (N = 42)				Intervention arm (N = 38)			
	Pre-consultation		Post-consultation		Pre-consultation		Post-consultation	
	Mean (SD)	CI _s	Mean (SD)	CI _s	Mean (SD)	CI _s	Mean (SD)	CI _s
PANAS pos. emotion	25.64 (10.34)	22.42–28.87	28.55 (9.97)	25.44–31.65*	25.69 (9.25)	22.57–28.82	30.76 (7.98)	27.98–33.55*
PANAS neg. emotion	23.07 (8.92)	20.29–25.85	21.02 (8.46)	18.39–23.66*	23.83 (12.22)	19.70–27.97	23.26 (11.98)	19.08–27.45
PMT: Seriousness	7.00 (2.29)	6.28–7.72	<i>8.00 (1.75)</i>	<i>7.45–8.55*</i>	7.46 (2.26)	6.71–8.21	<i>8.56 (2.16)</i>	<i>7.80–9.31*</i>
PMT: Susceptibility	8.57 (1.73)	8.03–9.11	9.05 (1.25)	8.66–9.44*	8.86 (1.38)	8.40–9.33	9.29 (1.38)	8.81–9.78*
PMT: treat_effectiveness	8.23–9.10	9.05 (1.12)	8.70–9.40	8.27 (1.84)	7.66–8.88	9.15 (1.52)	8.62–9.68*	
	8.67 (1.39)							
PMT: Self-efficacy	8.66 (1.49)	8.19–9.13	8.93 (1.37)	8.50–9.36	8.92 (1.23)	8.51–9.33	9.32 (1.04)	8.96–9.69*
PMT: Treat_barriers	3.53 (2.54)	2.71–4.34	3.80 (2.93)	2.88–4.73	3.68 (2.87)	2.72–4.63	3.24 (2.89)	2.23–4.24
PMT: Fear	7.48 (2.14)	6.81–8.14	7.95 (1.86)	7.37–8.53	7.59 (2.74)	6.68–8.51	8.41 (2.13)	7.67–9.16
PMT: Intention	9.07 (1.31)	8.66–9.49	<i>9.12 (1.15)</i>	<i>8.76–9.48</i>	9.41 (1.09)	9.04–9.77	<i>9.62 (0.70)</i>	9.37–9.86

Italicized data indicate statistically significant difference between groups [post-consultation: intervention *versus* control arms, $p < 0.05$].

*Statistically significant difference within groups fore-consultation. *versus* post-consultation ($p < 0.05$).

In summary

An individualized risk communication intervention led to patients perceiving:

- i) periodontal disease treatment as more effective than they did pre-consultation ($p < 0.001$),
- ii) greater self efficacy to follow treatment recommendations
- iii) higher intentions to adhere to periodontal management.

Asimakopoulou et al (in preparation)

The effect of three different types of periodontal assessment consultation (TAU, Arm 1; Risk communication, Arm 2; or GPS, Arm 3) on periodontal disease clinical outcomes, self reported oral health behaviours and psychological constructs at 4 and 12 weeks

Preliminary findings

Significant reductions for both intervention groups compared to control for Plaque, bleeding but NOT pocket depths.

Self reported interdental cleaning improved in GPS group compared to controls and Risk only.

Equivalent changes across all three groups in perceived: seriousness, treatment effectiveness, fear, self efficacy

Both intervention groups had lowered sense of susceptibility in comparison to TAU

No change in any group in intention to adhere to behaviour

Thank you