Smoking cessation: the state of the science. The utility of the transtheoretical model in guiding interventions in smoking cessation

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Authors' objectives
To evaluate the use of the Transtheoretical Model (TTM) used in smoking cessation interventions and to discuss the efficacy of this theoretical framework interventions in smoking cessation interventions.

Searching
Searches were conducted of the MEDLINE database, Cumulative Index to Nursing and Allied Health Literature, Psychological Abstracts, relevant citations in published articles, and the Internet between 1995 and 1999. Citations from reviews and synthesis reports were searched and searches specific to investigators in the area of smoking cessation were conducted. Search terms were "smoking cessation" and "models, theoretical". No language restrictions were reported.

Study selection
Study designs of evaluations included in the review
Randomised controlled trials (RCTs), pre-test post-test studies, surveys and cohort studies appear to be included. Seminal and contemporary investigations using structured and correlational models were retained. Research reports consisting of letters, theoretical discourse, instrumentation, comments and editorials were excluded.

Specific interventions included in the review
Interventions incorporated a clear specification of the use of a theoretical framework and a specified treatment (intervention) directed towards changing smoking behaviour. The TTM model identifies five stages of change (pre-contemplation, contemplation, preparation, action and maintenance). TTM was used in the following behavioural interventions aimed at changing smoking behaviour: American Care Society/American Lung Association materials; TM manual; TM manual plus with feedback with or without phone calls from counsellor; variable numbers of stage-tailored letters; self-help guide; no materials provided; counselling sessions, brochures and phone calls according to stage; TTM conditions; action orientated conditions; Quit and Win contest; provision of Quit Kit; support group with game playing, provision of self-help information, teaching of coping and problem solving skills, and offer of nicotine replacement therapy; ALA plus standardised self-help manual; individualised manual matched to stage; interactive experts systems computer reports; personalised intervention with counsellor calls, stage manuals and computer reports; use of bonus prizes; church based self help intervention, counselling and community activities; doctor provided information, strong recommendation to quit, and a cessation pamphlet at first visit; and a population based intervention comparing intensive culturally specific intervention and self help. Co-interventions included financial rewards for participation in study.

Participants included in the review
Participants in interventions included the following groups: white female smokers recruited by ads; smokers with low readiness to change recruited via newspaper ads; smokers from alcohol treatment centres; adolescents (average age 16.5 years) enrolled in smoking cessation program; volunteer smokers; self-changing smokers; low-income pregnant women; African Americans; and African American church attenders. Participants in surveys and cohort studies included cardiac inpatients who smoked, volunteer smokers, and smokers who were or were not planning to quit within 6 months.

Outcomes assessed in the review
Specified outcomes of smoking behaviour change included the following: stage transition; intention to quit; quit rate including self reported and verified by cotinine testing; 24-hour attempt to quit; average number of cigarettes per day; prolonged abstinence defined as those who reported not smoking at two consecutive follow-ups (follow-ups at 1, 6, 12 and 18 months); and factors associated with alterations in change state.

How were decisions on the relevance of primary studies made?
Reports were examined for the following: use of TTM theoretical framework; measurement scale; method; samples;
outcome measures; and effect size.

The authors do not state how the papers were selected for the review, or how many reviewers performed the selection.

**Assessment of study quality**

Validity was assessed using the strength of the treatment and the integrity of the treatment as described by Sechrest et al. (see Other Publications of Related Interest no.1). The authors do not state how the papers were assessed for validity, or how many of the reviewers performed the validity assessment.

**Data extraction**

The following data were presented in tables: author; date of publication; subjects; intervention and results. The authors do not state how data were extracted for the review, or how many of the reviewers performed the data extraction.

**Methods of synthesis**

**How were the studies combined?**

The studies were combined in a narrative review.

**How were differences between studies investigated?**

The authors do not state how differences between the studies were investigated.

**Results of the review**

The authors state that 16 reports were included in the review, though details of twenty two studies (including correlation studies) were presented in tabular format. The authors do not state the design of studies design but from the data extraction tables the following types of studies appear to be included:

- Four RCTs where the unit of randomisation was the individual (1921 participants).
- One RCT where the unit of randomisation was a church (22 churches participated).
- Two controlled trials (one study compared interventions in two populations, and the other involved 820 participants).
- Three pre-test post-test studies (1466 participants).
- Eight surveys (30,556 participants). Four cohort studies (5359 participants).

Across all the intervention studies both the treatment strength (the dose and amount of treatment) and integrity (discrimination between two treatments) was weak. Problems in primary studies included: no independent contribution for stages of change and indicators of addiction level; and the possibility that the intervention may not have been delivered as designed.

Only results from the RCTs are reported below.

One RCT allocated smokers with low readiness to change to three tailored letters, one tailored letter, self-help guide, or no materials and reported that at 6 months both tailored letters led to greater stage transition among immotives, and that three tailored letters led to significantly greater intention to quit.

One RCT compared TTM and action oriented conditions in 135 adolescents enrolled on a two year smoking cessation programme and reported no statistically significant difference between conditions. One RCT allocated volunteer smokers recruited by newspaper ads to standardised self-help manuals (ALA) individualised manuals matched to stage (TTT), interactive expert systems computer reports (ITT), or personalised with four counsellor calls, stage manuals, and computer reports (PITT) and found that, at 18 months, ITT produced more significantly more prolonged abstinence, TTT group were significantly better than ALA, and ITT was significantly better than both ALA and TTT.
One RCT allocated 521 low-income pregnant women to usual care or physician provided information, cessation pamphlet and advice to quit and found there to be no significant differences in stages of change between second and 36th week in either group.

One RCT allocated 22 African American churches either to intensive culturally specific intervention or self-help and found that after 18 months there were no significant differences in quit rates between the groups, though there was significantly more progress along stages of changes and more awareness of and contact with cessation programmes in intervention groups.

Further analysis was reported in the paper, including factors associated with stages of change.

**Authors' conclusions**
The assessment of the research reviewed indicated that TTM has not been fully tested in smoking cessation interventions, nor have the process mediators been used to determine the mechanism of smoking behaviour change.

**CRD commentary**
The aims were stated and unpublished data sought from experts in the field. Some relevant details of the included studies were presented in tabular format. Given the heterogeneity among primary studies with respect to study design, interventions, and participants, a narrative review was appropriate.

Inclusion criteria were stated but did not include any reference to study design. Language restrictions on included studies were not mentioned. Details of correlation studies were not presented separately from intervention studies.

Methods used to select primary studies or extract data were not reported. There was a discrepancy in the number of studies listed in the text and the number presented in the tables. Study design was not clearly stated in many cases. No formal assessment of validity was undertaken and validity was not apparently considered when reporting results from the review. Studies were grouped according to aspect of TTM addressed without consideration of study design, validity, or objectivity of outcomes reported. Heterogeneity was not assessed.

The review was not at all easy to follow or comprehend and the synthesis of results was not clear.

Insufficient information was provided about the methods used to assess outcomes and validity of included studies to comment on the quality of the evidence.

**Implications of the review for practice and research**
Practice: The authors state that the utility of TTM in clinical practice is limited but that clinicians can use strategies targeted towards enhancement of self-efficacy and facilitation of social support to support smoking behaviour decision-making.

Research: The authors state that research is needed to demonstrate that interventions can modify theoretical variables that mediate the effects of programmes and to test this intervention in populations other than white adults.

**Bibliographic details**

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**Other publications of related interest**
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Record Status
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.