

A Systematic Review of the Application of Health Behavioural Models in Smoking Cessation

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ABSTRACT

Smoking significantly increases the risk of illness and mortality. Such a measure to reduce the tobacco epidemic at both the national and global levels is health education by health promotion. Objectives: The study's goals included a comprehensive evaluation of the literature to find models for altering health behaviour and assessing the evidence for those models' efficacy in helping people quit smoking. Four peer-reviewed papers outlining two smoking cessation behavioural interventional models—the transtheoretical model (TTM) and the health belief model (HBM)—that were published between 2008 and 2018 were found after a comprehensive assessment of the literature. Trip database, Google Scholar, and MEDLINE (PubMed) electronic databases were used.

There were two nonrandomized controlled interventional studies and two randomised controlled trials. High levels of homogeneity were seen in the study's design, definition of smoking and smoking cessation, execution, and comparison of research. Since the outcome of each included study was assessed according to the stage of changes (a TTM model component), the overall smoking rate has decreased. There was a larger risk of bias in the

results since study participants were not blinded in all of the investigations. Between the TTM-based interventional group and the control group, there was a statistically significant difference in the rate of smoking cessation. The smoking cessation rate did not differ statistically significantly between behavioural therapy based on HBM and TTM. Trainings based on HBM and TTM were proven to be effective in promoting smoking cessation and progressing through the stages.

Keywords: Health behavioral model, smoking cessation, systematic review.

INTRODUCTION

The tobacco epidemic, which results in 9 million deaths annually, is one of the most serious public health threats the world has ever seen. By the end of 2030, it is estimated that smoking would be responsible for more than ten million fatalities, with 70% of those deaths occurring in developing nations. In India, about 19.0% of men and 2.0% of women currently smoke tobacco, according to the most recent Global Adult Tobacco Survey Fact Sheet. [1] According to a meta-analysis, 13.9% of people in our nation smoke cigarettes (21.7% of men and 3.6% of women). Smoking habits, both active and passive, are a serious health concern for both adults and children and are the leading cause of avoidable illnesses and deaths worldwide. [2,3] Smokers who give up before the age of 35 seem to benefit the most from quitting because their mortality rates are comparable to those of non-smokers.

To combat the tobacco epidemic, the World Health Organization has undertaken crucial micro and macro initiatives. [4] The effort to promote quitting smoking must be a part of a much larger national tobacco control plan that places a strong emphasis on prevention, as this would result in the greatest reductions in tobacco-related morbidity and mortality. There are many well-established methods for quitting smoking, including a variety of pharmacotherapies like varenicline, bupropion, and nicotine replacement therapy as well as behavioural techniques like group or individual counselling and self-help books.

A straightforward explanation of human behaviour, in Daly's opinion, follows from the accession/acquisition of knowledge. It influences attitudes, values, and beliefs, which then influence how one behaves or performs. [5] Sullivan asserts that any changes in a person's health affect their conduct, and vice versa. Individuals attribute and behavioural patterns

reflect the health state in this situation. [6] Social, economic, and environmental condition all play a significant part in disparities. Since health professionals have no influence over these factors, health education, which is utilised to disseminate knowledge and affect behavioural changes in people, is a feasible strategy for illness prevention. [7]

An effective way to curb the global and national tobacco pandemic is through health promotion and education. It primarily emphasises the importance of behavioural, cultural, social, and economic aspects in determining the cause of disease. Theoretically addressed anomalous behaviours should be the emphasis of an effective behavioural intervention strategy, along with endangered and high-risk groups. [8]

According to the current study, health behaviour models evaluate more evidence-based strategies for developing people's personal skills and health literacy across health education. Interventional strategies were deemed to be superior to noninterventional ones in behaviour modification research by Prochaska and Velicer[9]. Studies comparing model-based health behaviour modification to other standard health education approaches that may be implemented at the individual level and are appropriate in a dental clinical environment have found that model-based health behaviour modification produces better results. These behavioural models are based on psychological theories of motivation, self-efficacy, therapy, and behaviour modification. With some effectiveness, these approaches have been used to smoking cessation.

Previous research has focused on transtheoretical model (TTM)- and health belief model (HBM)-based behavioural approaches as smoking cessation interventions. The HBM paradigm works well for stopping problematic habits that raise health-related issues. It describes the connection between a person's beliefs and behaviours as well as the influence of personal motivation on health habits at the level of decision-making. Additionally, HBM has been used to support the creation of messages that are likely to persuade a person to make a healthy choice. [10-12]

The stages of change (SOC), the process of change, perceptions of benefit and loss of decisional balance or change, self-efficacy in the behaviour change, and motivating factors for quitting smoking are all identified in the TTM-based practises, which were first described by Prochaska and DiClemente[13].

The purpose of this study was to conduct a systematic evaluation of the literature in order to pinpoint models for altering health behaviours and assess the data supporting those models' efficacy in helping people quit smoking. This study will shed information on how behavioural models for quitting smoking function in clinical settings.

MATERIALS AND METHODS

Research protocol

Using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines, a systematic review of health behavioural models for quitting smoking was undertaken and registered with the Prospective Register of Systematic Reviews (reg. number: CRD 146452).

The main inquiry driving this review was if health behavioural models played any part in smokers quitting.

Analytic framework

The PICO analysis was used to conduct the evaluation. Smokers over the age of 18 make up the population. Health education is a behavioural intervention that uses theoretical or scientific concepts or methods. Changes in smoking behaviour are the result.

Eligibility criteria

Inclusion criteria:

- Studies assessing the efficacy of interpersonal and individual health behavioural models on quitting smoking
- Studies evaluating the impact of health behavioural models on quitting smoking for at least six months
- Original studies based on individual and interpersonal theoretical models carried out among individuals over the age of 18
- There were randomised and comparative studies, systematic reviews, and meta-analyses included.
- Articles published only in English language
- Only studies released between 2008 and 2018 (a span of 10 years) were incorporated.

Exclusion criteria:

- Literature from conference proceedings, dissertations, government reports, editorials, letters, articles in abstract form only, narrative reviews, editorials, letters, pieces designated as preliminary reports when results are published in later versions, and unpublished articles were eliminated.
- Studies that solely offer observational information or that only use therapy as their intervention
- Non-English publications that were published before 2008 were not included.

Search strategy

The terms "health behavioural model," "Tobacco," "Smokers," "smoking cessation," and "health behavioural modification approaches," as well as "behavioural intervention," "health education," and "psychological models, AND/OR," were used in an electronic search of the MEDLINE (PubMed), Google Scholar, and Trip databases. Follow-up on pertinent cross-references was done. 2008 and after were the only search dates allowed. Both authors scanned all electronically recognised records by title, abstract, and/or keywords, and full-text publications were included. The papers that emerged from this search were categorised according to the type of intervention used: (i) studies utilising the self-efficacy model, (ii) studies based on TTM, (iii) studies based on the self-regulatory model, and (iv) studies based on the HBM. In order to make sure that no pertinent research were overlooked, contact with a subject matter expert was also established. We also manually checked the references of all included research to find any more pertinent studies.

Study selection

All identified studies' titles and abstracts (where available) were independently reviewed by two calibrated reviewers. Abstracts, keywords, and titles that were pertinent were evaluated. The studies that were found through the literature search were reviewed by both authors. Based on the inclusion criteria, studies were included.

The full-text paper was retrieved and evaluated after the publication was determined by either author to fit the inclusion criteria. Two separate reviewers' disagreement was resolved by dialogue. After reading the titles, 133 articles were evaluated. After reading the abstract, a

total of 81 articles were disqualified. 52 studies had full-text articles retrieved. Finally, depending on the eligibility requirements, four studies were chosen.

Data extraction process

The two reviewers independently extracted the data using a specially created data extraction form. Two review authors made decisions regarding the studies' quality rating criteria in accordance with the CONSORT recommendations. Data on participant characteristics (including gender and age), sample size, study type, methodological description, follow-up, the theoretical construct/intervention model used to measure cigarette cessation, and results/outcome measures were collected.

Methods to appraise the quality of individual studies

The Cochrane Handbook for Systematic Reviews (Higgins and Green. Cochrane reviewers handbook, 2009) evaluation method was used to evaluate each study. Two reviewers independently evaluated the trials that were included for quality. Random sequence generation, allocation concealment, assessor blinding, dropouts, and bias risk were the domains that were investigated.

Each domain was given a risk of bias rating of low, high, or unclear. As a result, each study's overall level of risk was categorised as low (if it did not record a "yes" in three or more of the four main categories), moderate risk of bias (if it did not record a "yes" in two out of the four categories), low risk (if all four categories recorded were adequate), or "unclear" (unclear risk of bias for one or more domains).

Rationale for pooling results of included studies

Six to twelve months was the average follow-up period across all included trials, and both HBM-based and TTM component-based outcome measures were consistently used. As a result, results have been combined and evaluated for quantitative comparison.

RESULTS

Study selection process

According to the keyword search, the search method found 3633 studies. With the aid of abstracts and titles, every one of them was screened. 52 studies were judged to be eligible for this review and were given additional consideration. 4 studies were included out of a total of 52 investigations. 28 studies were deemed unrelated to the review after careful consideration. Twenty studies were omitted because they didn't meet the criteria for inclusion. Four articles were subjected to a systematic review based on eligibility standards.

Study characteristics

The studies that are included were completed and released between 2008 and 2018. Two randomised controlled trials[15,16] and two nonrandomized controlled interventional studies[17,18] were used as study designs.

Except for one study that used prior trial data to attract participants, three out of the four included studies recruited individuals based on whether they would volunteer to participate in the study. [18] Participants in all research who just smoked tobacco or cigarettes without utilising any kind of smokeless tobacco were included. In research conducted by Aveyard P et al., Koyun A et al., and Bakan BA et al., respectively, the mean number of cigarettes per day in included studies was 19.5,[18] 13.5,[15] and 16-20[17], while the final study made no mention of the number of cigarettes consumed daily. [16] The papers that were all considered had study samples ranging from 60[16] to 2471. [18] The participants' ages ranged from 18 to 41 years old. The majority of participants (55.7%–100%) were female, while one study only had female participants. [15]

The definition of quitting smoking as an outcome varied greatly. In addition to SOC, one of the four studies also employed the Fagerstrom Nicotine Dependence Scale to characterise smoking cessation. [17] In one study, self-reported smoking status was verified using the number of cigarettes smoked daily. [15] To determine smoking status, all studies used the same TTM components (stage of change). [16-18] The majority of the studies[15,16,18] used TTM-based health behavioural counselling as their primary method of intervention, with the exception of Bakan and Erci's study, which examined HBM- and transtheoretical-based health behavioural counselling among smokers.[17] With the exception of one trial, which had a 6-month follow-up, three of the four included studies had 12 months of intervention follow-up[16–18]. Over the course of 6–12 months of smoking cessation, all the included trials received 3–4 counselling sessions. It was challenging to determine whether there was a

relationship between the number of sessions and the success of quitting smoking because of the various study methods.

Transtheoretical model-based intervention

The behavioural therapy based on TTM was utilised as an intervention in each of the four research that were included (Bakan and Erci compared health belief and TTM approach). [15-18] According to Koyun and Erolu, there was no statistically significant difference between the TTM-based intervention and control groups; during the 6-month follow-up, the intervention group's smoking cessation rate was 23.7% as opposed to the control group's 2.6%. [15] However, Gungormous Z et al. discovered that the SOC alone showed a statistically significant difference between the groups, but the Process of Changes Total Score (POC), Decisional Balance Scale (DB), Temptation Score, and Self-Efficacy Score did not (SES). [16] According to Bakan BA et al., the TTM group's PCS and SES scores increased following the training, whereas the DBS scores decreased. Regarding the mean scores for the Self-Efficient Scale and the Temptation Scale, there were no discernible differences between the pretest and posttest. Fagerstrom score in the TTM-based intervention group was 2.34 1.5 before training and fell to 2.16 1.6 after training, but the difference was not statistically significant. It was discovered that both groups' mean ratings for negative attitudes about smoking had increased following the instruction. It was discovered that the HBM group's mean score was greater than the TTM group's. It was determined that the difference was statistically significant (P 0.05). [17] Aveyard et al. discovered that TTM intervention-based group arms were marginally but not significantly more likely than the control arm to make positive stage changes. The mean change score for the TTM group was 0.46 while it was 0.39 for the controls. [18]

Health belief model-based intervention

Bakan and Erci's study contrasted the HBM and TTM approaches to behavioural counselling. Before training, the HBM-based group's mean Fagerstrom score was 2.69 1.5, but after training, it fell to 2.35 1.5. The HBM-based group's mean Process of Behavioral Change Scale score was lower than that of the TTM group. Both the Self-Efficient Scale and the

Temptation Scale showed no significant differences in the posttraining HBM-based group. According to the posttest measurement conducted after the training, the positive attitudes toward smoking mean scores decreased in both groups, as shown by the DBS mean scores. [17]

Appraisal of individual studies' quality

Utilizing the Cochrane Handbook for Systematic Reviews (Higgins and Green. Cochrane reviewer's handbook, 2009), both authors independently evaluated the calibre of the included papers. As a result of their individuals who were not randomly assigned to the intervention, two studies had low risk of bias while others had uncertain risk of bias. The lack of blinding of the research employees or participants in any of the included studies during the allocation of the intervention and data collection increased the likelihood of outcome bias. It should be mentioned, nonetheless, that because of the nature of this behavioural intervention, it is challenging to blind participants and physicians to the intervention.

DISCUSSION

All research that were included in this review[15–18] had their results assessed by SOC (component of TTM model). In the studies that were considered, the intervention group performed better in terms of smoking status, SOC score, and process of changes (POC) as compared to the control group. After an average of 6–12 months of follow-up, all included studies showed improvements in quit smoking status, SOC, POC, SE, and DB scores, and a decrease in the Temptation Scale score in the group training by TTM-based behavioural intervention. [15-18] Maximum scores on the Behavior Change Scale denote the most achievement in the behavioural change process. A higher score on the Self-Efficacy Scale indicates increased resolve to resist engaging in prior conduct, and a lower score on the Temptation Scale indicates decreased propensity to engage in such behaviour. [27] The HBM and TTM approaches to behavioural counselling for quitting smoking were examined in the study by Bakan and Erci,[17] and the authors asserted that HBM and TTM-based training were found to have undeniable effects on both continuing action and quitting smoking for 6 months or more. Compared to the HBM model, TTM-based training appears to have a more pronounced effect on smoking cessation. [17]

According to HBM, the reason for the improved smoking status was insight into a behaviour related with perceived threat in relation to health due to smoking and perceived benefit in relation to accomplishment of protective health behaviour (if quits smoking), internal and external rewards impart with the conceding of the behaviour, and self-efficacy. [20-22]

SOC ratings indicate that the intervention distinct to the stages was virtual, according to TTM. Although the TTM model is a five-step change plan, it requires separate training and counselling at each stage in order to assess whether participants are prepared to regulate themselves cautiously for therapy to stop smoking. [16]

The TTM-based intervention makes the claim that it has a more pronounced impact on smokers who are in the precontemplation stage (concerning smoking's negative effects) and contemplation stage (concerning smoking's effects on the individual and environment, as well as its contribution to quitting smoking). However, through the TTM intervention, those in the preparation stage have raised their level to manage the quitting smoking process more easily, and those in the action and maintenance stages have maintained a higher level to manipulate motivating factors and develop and maintain the alternative behaviour. [18] This is consistent with a study by Kristeller et al. [23] that found that TTM-based interventions resulted in an increase in the mean Behavioral Change Scale scores among smokers. According to a related study by Grimshaw and Stanton[24], which examined the findings of 15 studies on behavioural model-based interventions for teen smoking cessation, the smoking cessation rate in developing nations was 15%. The SOC and smoking cessation programme were found to differ statistically significantly in a research by Lawendowski[25] and Kim[26].

The Fagerstrom Test for Nicotine Dependence (FTND) scores were used in this systematic review to further evaluate the smoking status outcome across all included studies. After the trainings, it was discovered that individuals in the TTM group had lower FTND scores than those in the HBM group. This finding emphasises the physical dependence on nicotine, which may be comparable to the increase in the impending progression through change stages that are regarded as a change in approval of the smoking cessation evidence that behavioural interventions for smoking cessation, particularly those based on TTM, can lower smoking rates among smokers.

Long-term studies are therefore required in the future to evaluate the efficacy of smoking cessation therapies based on different individual- and community-based behavioural model

methods. Additionally, the examined main studies' inability to conduct a meta-analysis to determine the efficacy of models for quitting smoking must be viewed as a restriction, which limits the generalizability of the data from the present study. The strength of this analysis can be attributed to the included studies' use of comparable outcome measures (TTM component based) and follow-up durations (6–12 months) that allowed for quantitative comparison of the outcomes.

CONCLUSION

It was discovered that trainings based on HBM and TTM had a practical impact on both succession between stages and quitting smoking. Additionally, a TTM-based intervention helped to understand the various stages that each person was at with regard to quitting smoking. This review promotes success in quitting smoking by giving the individual the freedom to choose a suitable treatment strategy.

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