



## Research Article

# Transtheoretical Model-based Nursing Intervention on Lifestyle Change: A Review Focused on Intervention Delivery Methods



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## SUMMARY

**Purpose:** The transtheoretical model (TTM) was used to provide tailored nursing for lifestyle management such as diet, physical activity, and smoking cessation. The present study aims to assess the provision of intervention delivery methods, intervention elements, and stage-matched interventions, in order to identify ways in which information technology is used in the TTM-based research.

**Methods:** The relevant literature was selected by two researchers using inclusion criteria after searching for “TTM (transtheoretical or stage of change)” and “nursing” from the databases PubMed and CINAHL. The selected studies were categorized in terms of study characteristics, intervention delivery method, intervention element, and use and level of stage-matched intervention.

**Results:** A total of 35 studies were selected including eight studies that used information communication technology (ICT). Nine different intervention delivery methods were used, of which “face-to-face” was the most common at 24 times. Of the 35 studies, 26 provided stage-matched interventions. Seven different intervention elements were used, of which “counseling” was the most common at 27 times. Of all the intervention elements, tailored feedback used ICT the most at seven instances out of nine, and there was a significant difference in the rate of ICT usage among intervention elements.

**Conclusions:** ICT is not yet actively used in the TTM-based nursing interventions. Stage-matched interventions and TTM concepts were shown to be in partial use also in the TTM-based interventions. Therefore, it is necessary to develop a variety of ways to use ICT in tailored nursing interventions and to use TTM frameworks and concepts.

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## Introduction

According to 2008 statistics released by WHO, noninfectious diseases account for 63% of all causes of death in the world. In particular, chronic diseases such as cardiovascular diseases (48%), cancers (21%), chronic respiratory diseases (12%), and diabetes (3.5%) are the main culprits [1]. Chronic diseases such as these are costly to manage [2]. As a result, it is becoming increasingly important to prevent and manage chronic diseases.

A number of studies have shown that chronic diseases can be prevented and treated by managing lifestyles [2,4–6]. According to WHO's publication on global health risks, behavioral risk factors that affect chronic diseases occurrence include lifestyles such as

smoking, lack of physical activity, unhealthy diets, and excessive alcohol consumption [7]. Clinical practice guidelines for chronic diseases such as obesity, hyperlipidemia, hypertension, and diabetes, also include lifestyle changes as an indispensable part of the primary treatment [8,9].

Work continues to be done in search of effective intervention methods that can bring about lifestyle changes [10]. Tailored interventions—defined as “any combination of strategies and information intended to reach one specific person, based on characteristics that are unique to that person, related to the outcome of interest, and derived from an individual assessment” [11]—are one such method. In tailored interventions, the needs and abilities of the client can be assessed through preliminary evaluation of individual characteristics, and tailored feedback can be provided based on the primary evaluation. In turn, the clients can be motivated if they perceive the tailored feedback is appropriate for them, and the efficacy of the intervention is increased as they perceive that they are participating in the process of intervention [12,13]. Tailored

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interventions are increasingly researched and used, in line with the recent developments in information technology and related theories [14].

The collection of client information necessary for tailored interventions and the provision of interventions themselves have expanded from face-to-face interactions and telephone conversations to computer programs, websites, email, and short message service (SMS) [15,16]. Web sites and mobile applications allow automated collection of client information which can then be used to formulate more personalized interventions [17]. In addition, the use of information communication technology (ICT) in intervention provision makes it possible to apply multiple intervention elements, such as education, feedback, and self-monitoring at once [18]. It also increases the deliverability of information by providing the content in various media such as sound, video and animation, and promotes the efficacy of attention and understanding by repeatedly conveying the same information [15,17]. The effectiveness of tailored interventions using ICT has been established by various studies [18,19].

Many health behavior theory concepts, such as stages of change from the transtheoretical model (TTM), self-efficacy from social cognitive theory, perceived susceptibility from the health belief model, and attitudes, social norms, and behavioral intentions from the theory of reasoned action and planned behavior, are used as strategies for tailoring in order to determine the direction of assessment and intervention [10,14,20]. Of these, the stages of change from the TTM are the most frequently used in tailored interventions targeting lifestyle change [20].

The core concepts of the TTM are stages of change, processes of change, decisional balance, and self-efficacy [21]. “Stages of change” is the process in which the individual adopts positive behavior in five stages, precontemplation, contemplation, preparation, action, and maintenance. The individual's cognitive and behavioral levels differ from stage to stage. TTM-based tailored interventions are delivered by first identifying the individual's stage of change regarding willingness to change lifestyle and the degree of lifestyle changes, during the assessment process. Based on the assessment results, the concepts of the processes of change, decisional balance, and self-efficacy are differently arranged so that stage-matched interventions can be delivered [22]. TTM-based tailored interventions have been used for smoking cessation, physical activity, and recovery from drug addiction, and studies continue to be published demonstrating their positive effects [23–25].

As can be seen, tailored interventions using the ICT and various behavioral theories, especially the TTM, are in wide use as well as studied and published. However, there have been no studies published regarding the use of tailored interventions that take both ICT and the TTM into account. With this background, it is necessary to understand the use and type of ICT in TTM-based tailored interventions, what intervention elements are used, and whether it affects level of stage-matched interventions according to use of ICT.

Thus, in the present study, we aim to conduct a systematic review of TTM-based nursing interventions used for diet, physical activity, and smoking cessation management. We would like to determine whether or not ICT was used as an intervention delivery method, which intervention elements were used, whether or not each intervention qualifies as a stage-matched intervention, and the relationships of use of ICT with stage-match and intervention elements.

## Methods

### Design

We conducted a systematic review according to the guidelines of the Centre for Reviews and Dissemination [26] to perform a

descriptive synthesis of TTM-based nursing interventions that were applied to diet, physical activity, and smoking cessation management.

### Study process

The study process consisted of four steps, including search strategy, study selection, data extraction, and data synthesis.

### Search strategy

We searched from the two most popular literature databases (PubMed, CINAHL) for literature in nursing from February to March 2013. The search keywords used to retrieve articles on TTM-based nursing interventions were “nursing”, “transtheoretical model”, “stage of change” and “TTM” based on the works of Spencer et al. [24], Ficke and Farris [27]. Language was limited to English, but publication date was not limited.

### Study selection

Two researchers reviewed all searched literature using inclusion and exclusion criteria. First, in total, 250 studies were identified from the search. Second, studies that did not use randomized controlled trials or quasi-experimental studies, or those that were not involved with lifestyle changes (diet, physical activity, and smoking cessation) were excluded. This left 43 studies. Third, two researchers reviewed the full text of the 43 studies selected during the first step, and found that eight research groups had published two papers from the same intervention studies at different times on different clients. As the main focus of the present study is the interventions used, we decided to include the eight most recently published papers from the same study groups and exclude the eight older papers. For this study, 35 papers were finally identified as shown in Figure 1.

### Data extraction

Two researchers reviewed the full text of 35 papers. They collected and coded the information on target lifestyle problem, study subject, study design (number of groups), year of publication, intervention delivery method, use of stage-matched intervention and intervention element. Any discrepancies during the coding process were resolved by reaching a consensus between the two researchers.

### Data synthesis

Descriptive analysis was performed on the data extracted from each study. First, we categorized the intervention studies by study characteristics such as target lifestyle problem, study subject, study design and year of publication. Second, we categorized the intervention studies by intervention delivery methods used and further categorized whether ICT was used as an intervention delivery method. Third, we categorized the intervention studies according to whether the stage of change was identified during the assessment phase, whether tailored intervention was provided based on identified stage of change during the intervention phase, and whether the stage of change was assessed during the evaluation phase. In addition, we categorized the intervention studies by the types of the other TTM concepts used rather than the stages of change during the intervention phase. Fourth, we categorized the intervention studies by the intervention elements used in each study based on the criteria used in the previous study [18] (Table 1). Lastly, we examined the relationships of use of ICT as an

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