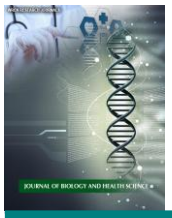

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Review Article

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Application of Multi-Theory Model (MTM) Health Behavior Change: A Scoping Review

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Abstract

Background: Since its proposal in 2015, MTM has received a lot of attention in health behavior change research both at home and abroad, but the model is still in the exploratory stage. Furthermore, the majority of current health promotion research focuses on a particular health habit, using a rather simple theoretical model. Learning from the evolution of MTM, the study of various behavioral changes is an area of health promotion research that requires careful cultivation. The purpose of this review is to discuss the application of MTM theory in health behavior change. By synthesizing relevant literature, we can improve the understanding of multi-theory model of health behavior change, make up for the shortcomings of existing studies and provide suggestions for future studies.

Methods: We conducted a scoping review of the literature using the Joanna Briggs Institute (JBI) framework and followed PRISMA-ScR guidelines to report findings. Databases such as PubMed, Embase, The Cochrane Liberary, Web of Science, Ovid, CNKI, Wanfang, Vip and Sinomed. In addition to the traditional scoping review, we also evaluated the quality of the included literature.

Results: MTM is summarized by literature review and the application status of MTM is reviewed. A total of 68 studies were included in this study, including 50 quantitative investigations, 12 quantitative interventions and 6 qualitative studies.

Conclusion: The field of application for MTM is extensive and it demonstrates a relatively high level of prediction accuracy and intervention effectiveness. Consequently, it can be effectively utilized to advance health behavior promotion and health education initiatives.

Keywords: Health behavior change; Multi-theory model; Hybrid teaching; Physical health; Mental health

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Introduction

The World Health Organization (WHO) and Elsevier's Public Health Practice (2024) published a joint call to action calling for a more evidence-based and people-centred approach to health behaviour. Health behavior change is the process by which an individual gradually shifts from a behavior pattern or habit that is detrimental to physical and mental health to a behavior pattern or habit that is beneficial to health in order to prevent disease and maintain his or her health, including the behavior change manifested and the change in his or her psychological consciousness [1]. The empirical study demonstrates that an intervention based on the theory of health behavior change can effectively promote health behavior change [2,3]. It has undergone four generations of change and the

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focus of the first three generations of theory has changed from focusing on information therapy to skill development and awareness building to evidence-based technology [3,4]. However, fourth-generation trends integrate multiple constructs from multiple theories for precise interventions, utilizing technology and focusing on specific behavior change [5]. Nowadays, the focus of the modern medical model has changed from the treatment of the disease itself to the management of health behavior and the development and reform of the theory has been in line with this reform trend. Multi-Theory Model (MTM), as a fourth-generation theory, is a behavioral theoretical model developed in recent years and first proposed by Sharma in 2015. It splits health behavior change into two stages: initiation of health behavior changes and sustenance (or continuation) of health behavior change [6].

Three main constructs influence this initiation of health behavior change. The first is the participatory dialogue derived from Freire's (1970) model of adult education [7]. Participatory dialogues are bilateral conversations initiated by health educators about the pros and cons of health behavior change to assess subjects' perceptions of the benefits and barriers associated with such behaviors. This two-way communication or mutual exploration enables patients to fully understand the benefits of changing their health behaviors and to viscerally identify with those benefits based on their current situation. The second construct is behavioral confidence, derived from Bandura's (1986) self-efficacy and Ajzen's (1991) perceived behavioral control [8]. Behavioral confidence can stem from internal sources or external influences, such as influential individuals or groups in a person's life and health educators. At the same time, behavioral confidence can be used as an indicator of an individual's certainty about future involvement in changing their health behaviors. It is distinct from perceived behavioral control, which focuses on assessing obstacles associated with performing the intended behavior. The third and final construct for initiation of a behavior is the changes in the physical environment, which is derived from Bandura's (1986) construct of the environment, Prochaska's (1979) construct of environmental reevaluation and environmental factors in Fishbein's (2009) integrative model, among others [9,10]. Changes in the physical environment require changes in the availability, accessibility, convenience and readiness of resources in the physical environment associated with promoting desired behaviors. Behavioral change to maintain health includes long-term manifestations of behavioral change (such as lifelong participation in physical activity). In order to sustain behavior change, we need to channel our emotions into goals, constantly strive for change and need the support of the social environment.

Three main constructs influence the sustenance of health behavior change. The first construct is derived from the self-motivation construct of emotional intelligence theory (Goleman, 1995) [11]. Emotional transformation is overcoming self-doubt, inertia and impulsivity by focusing your feelings and emotions on healthy behavioral changes that lead you to your goals. Guide emotions to assist the change of healthy behaviors, so that patients' emotions do not easily retreat, do not act rashly and try to maintain a relaxed and happy state to change healthy behaviors. The second construct is derived from Freire's (1970) adult education model's praxis and is called practice for change [5]. The practice of behavior change emphasizes reflective behavior, including continuous and thoughtful consideration of behavior change, combined with continuous correction to eliminate ineffective strategies and address barriers. Such as recording the improvement of patients at various stages, so that patients can quantitatively see their own changes, encourage and support patients. The third and final construct is derived from constructs of the environment (Bandura, 1986), helping relationships (Prochaska, 1979), social support (House, 1981) and so on [12-14]. Social environment change refers to the establishment of social support in the environment. Changes in the social environment may be natural or man-made and health educators can help in this process.

There are six steps in the analysis of a theory: identification of theoretical roots; Explore the meaning of the theory; analyze the logical sufficiency of theory to determine the usefulness of theory; Clarify the degree of generalization and minimalism of the theory; Determine the testability of the theory. Previous studies of MTM theory mainly focused on the first three points of theoretical analysis, mainly on the theory itself. However, we want to conduct a comprehensive theoretical analysis by way of scope review: the practicability and help degree that MTM theory can provide, the scope that MTM theory can be extended and whether MTM theory can be supported by empirical data [15]. In addition, as far as we know from the scientific literature we have searched, there are very few scoped reviews specifically focused on MTM. Therefore, we want to review the application research of MTM in relevant fields at home and abroad through a comprehensive review of this method, discuss the progress of MTM in the practice research of health behavior change and have a more comprehensive and in-depth understanding of the MTM theory of health behavior change. Doing so can provide a fair reference for future empirical research in this field, lay a foundation for future optimization of the theory and identify future applied research needs, thereby promoting a better understanding and more flexible application of MTM.

Therefore, in this paper, we use the method of scope to discuss the research application of MTM theory in health behavior change. By synthesizing relevant literature, we can improve the understanding of multi-theoretical models of health behavior change, make up for the shortcomings of existing studies and provide suggestions for future studies. The ultimate aim is to enhance comprehension of these components, enabling informed decision-making, adaptation and development of effective strategies tailored to specific situations by decision

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makers, practitioners and researchers. The sub-questions constituting the specific objectives of this study are as follows: What are the research groups and associated behavior types within the MTM theory of health behavior change? Which evaluation tools are employed for assessing the MTM theory of health behavior change? What research methods does the MTM theory utilize to evaluate changes in health behavior?

Methods

Study design

Scope review, also known as scoping review, is a method of synthesizing knowledge and identifying evidence based on the principles of evidence-based practice. It serves as the initial step in literature research. Conducting a scope review necessitates systematic methodological design and standardized reporting of research findings [16]. Simultaneously, it does not impose strict requirements on the type or quality of included information resources, thereby addressing issues that cannot be analyzed through systematic reviews and bridging gaps where evidence needs summarization but may not align with systematic review applicability. Furthermore, compared to traditional reviews, scope reviews offer more comprehensive and systematic retrieval processes. This study aims to analyze the target population and behavior types related to MTM theory of health behavior change by summarizing the evidence in all different design types of studies in this field, as well as the assessment tools and research methods used to evaluate the impact of MTM theory on health behavior change. Therefore, a scope review is selected for detailed examination. A systematic scoping review was conducted to examine studies that reported theories, models or frameworks related to health systems integration, following the JBI guidance recommended by Cochrane [17]. The review process for scoping reviews, based on PRISMA-ScR and Arksey and O'Malley's five-stage approach, was employed. Additionally, Peters' guidance methods and Pollock et al.'s recommendations for scope reviews were consulted during data extraction and analysis [15,18-20]. We also registered the protocol with PROSPERO international prospective register of systematic reviews.

Systematically searched all relevant literature published in PubMed, Embase, The Cochrane Liberary, Web of Science, Ovid, China National Knowledge Infrastructure (CNKI), Wanfang, VIP Database for Chinese Technical Periodicals (VIP) and Sinomed (5 English databases and 4 Chinese databases) since their establishment. Two members of the research team developed a search strategy based on keywords, which was endorsed by a third research member, mainly using the following keywords for searching Multi-Theory Model (MTM), multi-theory model, Boolean logic operators and or for combining these words. Take Pubmed as an example, the search method is as follow:

Multi-theory model or MTM.

Inclusion and Exclusion Criteria

In order to make the literature research more systematic and comprehensive, we adopt two frameworks for comprehensive research. The literature inclusion criteria were formulated based on the SPIDER (Sample, Phenomenon of Interest, Design, Evaluation, Study Type) and PCC (Population, Concept, Context) frameworks as outlined in **Table 1** [21,22]. The SPIDER framework encompasses diverse population groups and focuses on the application of MTM theory for health behavior change. Methodological approaches include questionnaire adjustments, scale evaluations, interviews and dialogues among others. Outcome indicators evaluated encompass participatory dialogue outcomes, behavioral confidence levels, changes in material environment and emotions experienced by individuals undergoing behavior change practices along with alterations in social environments. Both quantitative and qualitative research methodologies were employed. Within the PCC framework contextually applied to this study's scope; population refers to all individuals involved while concept primarily describes MTM theory for health behavior change.

Table 1: SPIDER framework and PCC framework.

SPIDER (Sample Phenomenon of Interest Design Evaluation study type)	
Sample	All groups
Phenomenon of interest	Application of MTM theory to health behavior change
Design	Questionnaire adjustment, scale evaluation, interview dialogue and so on
Evaluation	Outcomes such as participatory dialogue, behavioral confidence, change in physical environment, emotional transformation, practice for change and change in social environment were evaluated
Study type	Quantitative survey and qualitative survey
PCC (Population Concept Context)	
Population	All groups
Concept	MTM theory of health behavior change
Context	Application of MTM theory to health behavior change

The search excluded studies that did not adhere to the principles of MTM theory, those that were categorized as multi-theory rather than solely MTM theory and articles for which full-text access could not be obtained. At the same time, exclusion criteria for literature selection included:

- Incomplete data or unattainable outcome measures either directly or through conversion;

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- Duplicate publications reporting data from the same year, region and population;
- The article excludes grey literature;
- Article search excluded relevant information from newspapers;
- Non-chinese and non-English articles are excluded.

In order to enhance the scientific rigor of the study, we meticulously traced all references and relevant citations in the included literature to comprehensively gather research populations investigating the MTM theory of health behavior change, as well as pertinent literature on behavior types, assessment tools and evaluation research methods.

Study Selection

In order to enhance the comprehensiveness and scientific rigor of the results, this scoping review encompassed all relevant literature published to date. Following a thorough familiarization with the existing body of literature, specific inclusion and exclusion criteria were established to ensure their applicability across all pertinent studies. The inclusion criteria comprised qualitative, quantitative and interventional studies grounded in multiple theoretical models.

Two researchers independently extracted data from the included literature based on a pre-designed data extraction table, encompassing:

- Fundamental information of the literature such as title, author, impact factor, year of publication;
- General study details such as study type, sample size, subjects, intervention and control measures;
- Outcome indicators including measurement methods, tools and time. Subsequently, retrieved documents were meticulously screened and assessed in strict adherence to predetermined inclusion and exclusion criteria. Any differences of opinion were resolved through consultation. In case of persistent disputes, a final decision was reached after discussion or consultation with a third party.

We imported the literature into Note Express literature management software for organization, reviewed the article titles, removed any duplicate references, further screened the literature that potentially met the requirements and ultimately selected the final set of relevant articles.

Data Analysis

Based on the research questions, the literature content was organized, encompassing author and country information, publication year, journal, research objectives, population characteristics, time frame, study type, tools and methods employed for data collection and analysis techniques used. Furthermore, the research findings including main discoveries were extracted from two relevant articles by two independent researchers to create a preliminary data extraction table. After thorough discussion among the team members, necessary modifications were made to refine the contents of the table. Subsequently reviewed by the entire research team for accuracy and completeness, a final version of the data extraction table was established to extract all pertinent information presented in each paper. Additionally, an assessment of article quality or risk of bias was conducted.

The data were presented in the form of descriptive analysis, including:

- **Basic information:** Title, first author, corresponding author, country of origin, publication year, journal name and impact factor;
- **Research population characteristics:** Demographic details and target subjects;
- **Research methods employed:** Quantitative investigation research, quantitative intervention research, qualitative research *etc.*;
- **Research content addressed the following questions:**
  - What are the populations studied and behavior types associated with MTM theory of health behavior change?
  - What evaluation tools are utilized for assessing health behavior change based on MTM theory?
  - What research methodologies are used to evaluate health behavior change according to MTM theory?

The methodological quality of all eligible studies was assessed using the JBI critical appraisal tools [15]. Two independent reviewers conducted the critical appraisal and any discrepancies were resolved by a third reviewer following Lockwood et al.'s (2020) recommendation. The final appraisal outcome was reached through consensus. No studies were excluded.

Results

Study characteristics

A total of 13,759 articles were retrieved from various databases: PubMed (1,744), Embase (2,475), The Cochrane Library (207), Web of Science (2,100), Ovid (1,475), CNKI (3,366), Wan Fang (1,648), VIP (474) and Sinomed (266).

After removing duplicates and irrelevant literature based on title and abstract screening, a total of 8,681 articles remained for further analysis. After reading the full text and excluding studies that did not align with the research theory or main focus on types of health behaviors or had inaccessible full texts or conference abstracts only available, a final set of 68 relevant literatures were included in this study. The PRISMA screening process is illustrated in **Figure 1**.

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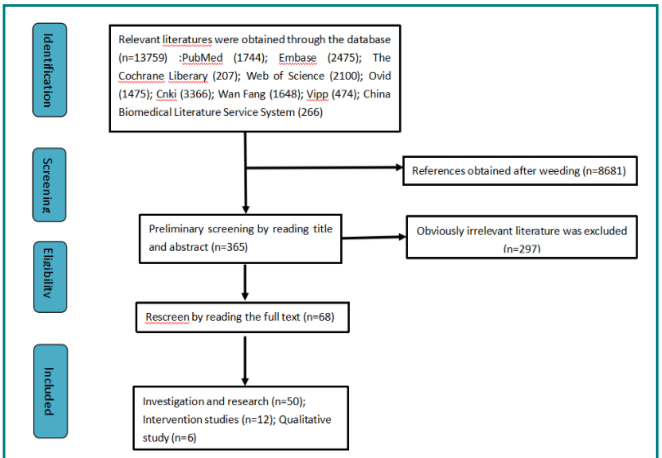

Figure 1: Flow chart.

During the literature search, a total of 68 articles pertaining to this research question were identified. The majority of these articles were published in 2021 (n=16), followed by 15 in 2022, 10 in 2023 and 9 in 2024. Additionally, there were eight publications in 2020 and four in 2019. Three articles were retrieved from the year 2018, while one each was found for the years 2016 and 2017. Notably, no relevant publications were obtained for the year 2015. **Figure 2** illustrates the annual publication trend over recent years. Manoj Sharma introduced the multi-theory model of health behavior change back in 2015 and has since conducted extensive research on it [5].

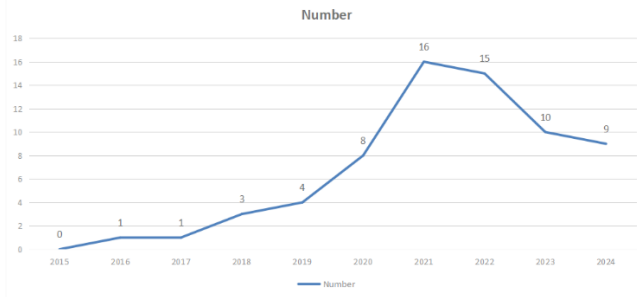

Figure 2: Article per year.

Studies on the MTM theory of health behavior change have been conducted extensively, with the United States having the highest number of publications (n=40), followed by Iran (n=9), China (n=9), India (n=5), Ghana (n=2). Additionally, Germany and the United Kingdom have also contributed to this international trend in research content. Sharma, a renowned scholar specializing in health education and promotion in the United States, has dedicated several years to developing and evaluating interventions for health behavior change based on multiple theories. Therefore, the results of the study show that the United States has more research on this. The distribution of documents issued by each country is illustrated in **Figure 3** below.

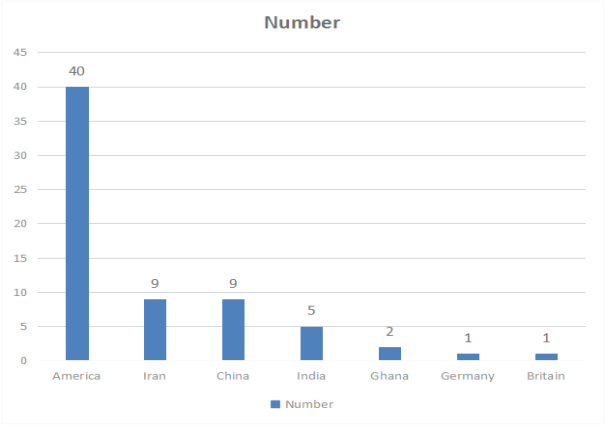

Figure 3: Number of publications by country.

The study included a majority of usage survey categories (n=50) and quantitative interventions (n=12), while the remaining were qualitative in nature (n=6). The article types are presented in **Figure 4**.

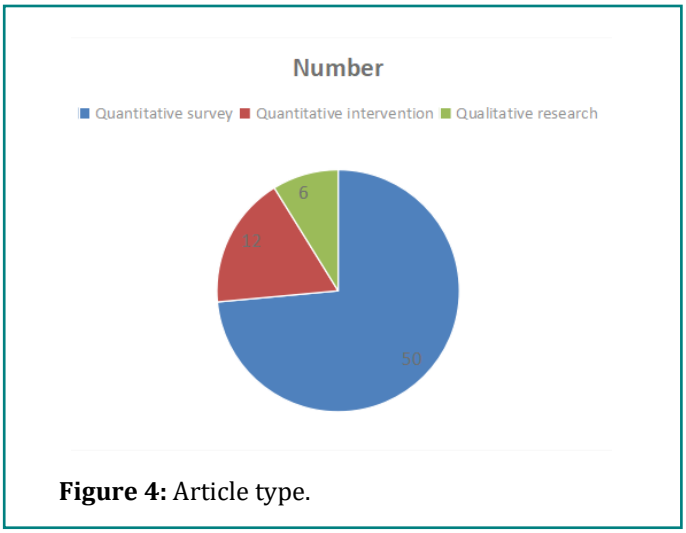

Figure 4: Article type.

In the search of the articles, we found that the authors of the articles appeared most frequently: Manoj Sharma (n=27), Kavita Batra (n=15), Vinayak K. Nahar (n=5), Traci Hayes (n=4). These scholars have done more research on the MTM theory of health behavior change.

The populations studied and behavior types associated with MTM theory of health behavior change

The sample size of quantitative survey is large. The sample size of the quantitative survey ranges from 70 to 28,000 people, as shown in **Figure 5** below. The number of samples in a quantitative intervention article is 400,150,125,100,94,80(intervention group is 40, regular group is 40),56,54(intervention group is 28, regular group is 26),48(intervention group is 25, regular group is 23) and so on. The sample size of the qualitative class was 79,34,16 and so on.

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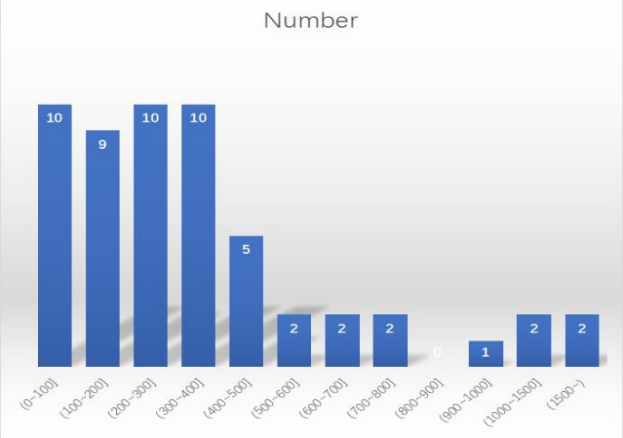

Figure 5: The number of samples in a quantitative intervention article.

Of the 68 literature sources, most were studies that focused on promoting health behaviors. Among them, there are 25 basic health behaviors (n=25). They were 8 activities (n=8), 7 diet (n=7), 3 consumption (n=3), 2 hygiene behaviors(n=2) and 1 sleep (n=1). There were 16 health care behaviors, including 8 vaccine acceptance behaviors (n=8) and 8 physical activity behaviors (n=8) [23-30,45-52]. There were 4 early warning behaviors:4 physical examination behavior(n=4) [53-56]. There were 3 avoid environmental hazards behaviors:3 behavior to improve quality of life (n=3) [57-59]. There were 6 behaviours to get rid of bad habits:6 smoking cessation behavior (n=6) [60-65]. A number of other behaviors were mentioned in the retrieved articles. However, the number of articles devoted to disease is limited, with only two publications identified (n=2). Studies include treatment for sleep apnea and chemotherapy for gastrointestinal malignancies [66,67].

An evaluation tool for MTM theory of health behavior change

In cross-sectional research, questionnaires serve as the primary research instruments. A total of 28 questionnaires were developed based on the theoretical framework of MTM, with each questionnaire comprising approximately 40 to 50 questions. Additionally, other research tools employed in this study included a self-designed MTM instrument, a survey tool devised by university students, an instrument adapted from a previous US study, a questionnaire focusing on children's sleep habits, an open-ended questionnaire guide, an online survey software Qualtrics-generated questionnaire, a PA (Physical Activity) questionnaire and a validated questionnaire. Two studies utilized scales (n=2), while four studies employed hybrid research tools combining the MTM questionnaire with other questionnaires (n=4).

The main research methods employed in this study encompassed reliability and validity analysis, with a total of ten methods being evaluated, verified, analyzed, assessed and investigated by expert groups (n=10). Additionally, four methods utilized Cronbach's alpha coefficient (n=4), while the remaining approaches involved confirmatory factor analysis and alpha evaluation. Two of these techniques incorporated a five-point Likert scale (n=2). Furthermore, one article conducted a reading level assessment using the Flesh-Kincaid readability index (n=1). Lastly, one method applied the Integrated Marketing Communications (IMC) approach (n=1).

The intervention group generally received MTM-based interventions while the comparison group received conventional interventions. The intervention was designed in a rigorous way, through group discussion or expert validation. The type of intervention was a randomized controlled trial. The process of intervention is both online and offline. The results of the intervention proved to be effective. Through the retrieval of intervention articles, it is found that the effective intervention based on the MTM theory can effectively promote the change of health behavior of the intervention subjects compared with the comparison group.

Research methods of MTM theory to evaluate health behavior change

The study variables were subjected to descriptive analysis, followed by modeling of the data using structural equation modeling method. The models employed included multiple linear regression model (n=17), stepwise multiple regression model (n=8), hierarchical regression model (n=7), structural equation modeling (n=4), Logit (OL model) (n=1) and path analysis model (n=1). Survey data was primarily analyzed using SPSS software package (n=41); however, SAS software was used in four papers, AMOS software in three papers, MSXQDA software and R Core Team in one paper each. Variable statistics encompassed univariate, bivariate and multivariate methods. Data testing methods comprised independent sample t-test (n=24), Pearson bivariate correlation test (n=15), Chi-square test (n=13), paired sample t physical examination test (n=5) and Spearman correlation coefficient test (n=2) across 24 papers. Other testing methods utilized included Logistic regression test, Shapiro-Wilk test, Fisher Pearson r-test, Welch t-test, Levene variance equality test, two-tailed F-test of econometric variables, Bonferron double comparison tests, Friedman tests and Smirnov-Kolmogorov tests. The statistical techniques employed in this study involved calculating the frequency and percentage for categorical variables as well as computing the mean and standard deviation for measurement variables to describe the data.

The result of literature quality evaluation

We evaluated the quality of all the 68 literatures included and the specific results are as follows. In general, the quality of the included articles was above medium, including 22 articles of high quality, 45 articles of medium quality and 1 article of low quality.

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Discussion

The objective of this review is to examine the application of MTM theory in health behavior change. The findings demonstrate that the MTM serves as a theoretical framework for understanding the factors influencing the initiation and maintenance of health behavior change. Initiation of health behavior change involves transitioning from one behavior to another, encompassing one-time changes such as receiving a single dose vaccination or commencing regular physical exercise. At this stage, individuals must perceive the benefits of behavior change and possess behavioral confidence supported by environmental factors. Maintenance of healthy behavior change entails long-term adherence, such as lifelong engagement in physical exercise, necessitating emotional transformation into goals, continuous striving for improvement and social support.

In the application research of MTM theory of health behavior change, logistic regression method is commonly employed for data analysis. However, the Analytic Network Process (ANP) can be utilized to analyze complex interdependencies and feedback loops among decision factors. ANP offers a more comprehensive and flexible approach by constructing a network model that captures dynamic relationships between decision elements [68]. It can elucidate the relationship between initiation and maintenance phases of the MTM theory of health behavior change as well as among its six dimensions: participatory dialogue, behavioral self-confidence, material environment change, emotional transformation, behavior change practice and social environment change. This enhances precision in applying the MTM theory of health behavior change. Alternatively, Latent Profile Analysis (LPA), a latent variable model used to identify latent or mixed categories based on continuous variables in a dataset, could be considered. When applied to studying MTM theory of health behavior change, LPA facilitates classification of subjects according to explicit variables using a small number of latent variables (class variables) to explain associations with continuous variables [69]. This aids in identifying or approximating potentially meaningful subject subgroups and contributes to better understanding sample heterogeneity.

Lifestyle intervention is an important part of chronic disease management. Studies in intervention articles have shown that effective interventions can promote changes in health behaviors. The intervention method can be carried out by means of online media and PPT is used in two of the retrieved articles [28, 40]. With the development of Internet, comprehensive intervention scheme based on mobile medical technology has become a new trend of chronic disease management model research. Faced with the challenge of increasing complexity and comprehensiveness of intervention, a standard, detailed and comprehensive framework is conducive to deconstruction and analysis of intervention programs, so as to promote the improvement of the quality and effect of intervention [70]. For intervention methods, in the future, we advocate the use of the Internet platform and information means to achieve accurate intervention.

Health related behavior refers to any behavior of human individuals or groups related to disease prevention, health promotion, health maintenance and health restoration. According to the influence of the behavior on the health of the actor and others, it can be divided into two categories: promoting health behavior and endangering health behavior [71,72]. Health-promoting behaviors are objectively beneficial to health, while harmful behaviors are objectively detrimental to health. Health promotion behaviors can be divided into five categories:

- **Basic health behaviors:** Refers to a series of basic health behaviors in daily life, such as active rest and sleep, reasonable nutrition and balanced diet [73];
- **Health care behavior:** Refers to the reasonable and correct use of health care services to maintain their own health behavior, such as vaccination, regular physical examination, *etc.* [74];
- **Early warning behavior:** Prevention of accidents and correct disposal after accidents, including self-rescue and other rescue;
- **Avoid environmental hazards:** Environmental hazards are broad, including the natural environment and psychosocial environment in which people live and work that are harmful to the body [75]. Such as leaving the polluted environment, taking measures to reduce environmental pollution and actively dealing with those stressful life events that cause people's psychological stress;
- **Get rid of bad habits:** Bad habits mainly refer to smoking, alcoholism, drug abuse and drug abuse [76]. There are two kinds of harmful behaviors to health: Bad life style and habit and pathogenic behavior pattern.

According to the retrieved articles, it is found that the current research field of this theory is relatively shallow and the number of studies is relatively small. In fact, the MTM theory of health behavior change has been effectively applied to disease management, especially chronic diseases and has produced significant benefits. The disease application of MTM health behavior change theory should be the focus of future research and it has high research value for future research. Therefore, the MTM theory should be encouraged to be flexibly applied in the treatment of diseases in the future, giving full play to its advantages in precise intervention.

The research objects of the MTM health behavior change theory are mainly concentrated in the community, which is the limitation of our research object and it is necessary to expand the research scope to make the research benefit more widely. At the same time, the application of MTM theory in health behavior change is an

ongoing study and attention should be paid to the dynamic nature of the study. In the study of behavior, it mainly involves more motor behavior, which needs comprehensive research, such as diet, mood, *etc.* At present, the multi-theory model of health behavior change is in the stage of development and improvement. Foreign scholars have optimized it through theoretical testing, theory-based intervention, qualitative research and other methods and achieved certain results. However, the research on the multi-theory model of health behavior change in China is still in its infancy. In the future, there is an urgent need to explore assessment tools that are developed based on MTM framework under Chinese cultural background or Chinese and suitable for China's national conditions, add Chinese elements to the development of multi-theory model of health behavior change, reasonably explain the intention status quo and influencing factors of health behavior change of Chinese people and further enrich and expand the connotation and extension of MTM. In order to play a greater value in the field of health management [77].

Strengths and Limitations

This paper gives a comprehensive and systematic introduction to the MTM theory of health behavior change, which provides a valuable reference for future research in this field. The search strategy employed in this study adhered to JBI Methodology for Scoping Review, incorporating detailed steps to ensure inclusion of all relevant studies and conducting quality appraisal for each included study. All authors reviewed, discussed and reached consensus on every step of the review process. However, due to language limitations, only English and Chinese articles were considered while important studies in other languages might have been overlooked, potentially impacting our findings negatively. Furthermore, grey literature, commentaries, books and newspaper reports were excluded as part of the limitations.

Conclusion

This study found that the MTM framework has great potential in predicting the initiation and maintenance of health behavior changes as a comprehensive, two-stage theoretical model. Since its inception, MTM has been validated in various populations abroad and has shown good effects in predicting and intervening in different types of health behavior changes. Currently, the research and application of MTM theory are mainly focused on promoting healthy behaviors and it has been proven to be effective. However, as one of the theories in the field of health management, MTM can also be of great help in treating diseases, so it can be worth considering applying it to research on diseases. Meanwhile, there is an urgent need to explore the development of comprehensive and integrated assessment tools based on the MTM framework that are suitable for various types of applications in the future. MTM clarifies the intentions behind behavior change and its long-term sustainability and is a highly promising theoretical model. This study provides strong evidence for the effective application of MTM theory in the field of medicine.

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