

REVIEW

The Application of Theoretical Models in the Studies of Physical Activity Behaviors of the Elderly in China

Yuquan Chen¹ Yuqi Wang¹ Fanxuan Meng¹ Zifei Du² Qun Zuo^{1*}

1. College of Public Health, Hebei University, Baoding, Hebei, 071000, China

2. College of Traditional Chinese Medicine, Hebei University, Baoding, Hebei, 071000, China

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ABSTRACT

By using the method of literature review, this paper introduces the popular theoretical models which have shown to better explain physical activity behaviors at a certain degree, summarizes the dominating theoretical models in the studies of physical activity behaviors of the elderly in China. In addition, shortcomings and future prospects are pointed out at the end.

1. Introduction

At present, China is the country with the largest number of elderly population. By the end of 2017, there are 241 million elderly people aged 60 years and above,^[1] accounting for 17.3% of the total population. The trend of aging is still aggravating. It is estimated that the elderly population will reach 350 million by 2030.^[2] It is well known that physical function of the elderly declines, and the incidences of chronic diseases are greatly increasing. In addition, older adults are psychologically troubled by pessimism, loss and loneliness, and then the mental and psychological problems are popular. The task of healthy aging in China is very arduous. At the

same time, lack of physical activity, one of the four risk behavioral factors for many chronic diseases, has become a worldwide recognized public health and social problem, especially in developing countries. Less than 30% of the elderly in China exercise regularly. Under this serious situation, to actively improve the physical activity with a healthy lifestyle in older adults in China, cannot only enhance the physical fitness of the elderly and regulate their emotions, but also prevent and treat psychological diseases, in the end improving the quality of life and social adaptability. It has become one of the main strategies for China to achieve healthy aging.

In the 1940s and 1950s, the medical circles opened up the academic field of lifestyle risk factors of chronic

*Corresponding Author:

Qun Zuo

College of Public Health, Hebei University, Baoding, Hebei, 071000, China;

E-mail: zuoqun2006@126.com.

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diseases. As a health-related lifestyle, physical activity behaviors have entered the research fields of public health and preventive medicine scholars. To carry out the analysis of the characteristics of physical activity behaviors of the elderly, to explore the influencing mechanism of their behavioral patterns and to improve the intervention strategies and measures are not only the theoretical research needs of explaining the physical activity behaviors of the elderly, but also the practical needs of carrying out social intervention and promoting healthy aging. At present, in the research of physical activity behaviors of the elderly carried out by Chinese scholars, many foreign theories and models of physical activity behaviors are used for reference, and they are devoted to localization and cross-cultural research. Our study was based on major databases, including PubMed, EMBASE, Cochrane Library, Wan Fang, CNKI, and VIP, were searched for studies published in English or Chinese between January 2000 and December 2018. No other sources or search strategies were sought. A search of article titles and abstracts was conducted by the primary author. The keyword terms used in the search included “physical activity”, “exercise”, “running”, “walking”, “cycling”, “Tai Chi” or “Tai Ji”, “Qigong”, “brain”, “older adults”, “elderly”, “Chinese”, “Transtheoretical Model”, “Health Belief Model”, “Social Cognitive Theory”, “Theory of Planned Behavior”, “Locus of Control”, “Protective Motivation Theory”, “Social-ecological Model” and “Health Action Process Orientation Theory”. Review articles were also used as a source in a search or additional studies. So as to attempt to summarize and analyze the application status of different theoretical models in the study of physical activity behaviors of the elderly in China, as well as the shortcomings of the study and the future development direction.

2. The Academically Popular Theoretical Models of Physical Activity Behaviors

Academia began to pay attention to the study of mass physical activity behaviors in the 1940s and 1950s, and started to study the relationship between sports behaviors and physical health, which is mainly based on the theory of healthy behaviors. By the 1960s and 1970s, many scholars from the perspective of leisure, through a large sample survey, from the macro level to explore the status and role of physical exercise in leisure life. Since the 1970s and 1980s, scholars have turned their focus on the study of physical activity behaviors to the micro-level, applied the theoretical model of social behavior to the study of physical activity behaviors, and created theoretical models of physical activity behaviors with high explanatory value, such as Transtheoretical Model, Rational

Behavior Theory, Planned Behavior Theory, Social Cognitive Theory, etc. According to Yanping Duan, Brehm and Wagner’s research summary, the theoretical models of physical activity behaviors can be summarized into two categories: Continuous Theoretical Model and Stage Theoretical Model.^[3]

According to the above classification, Health Belief Model, Social Cognitive Theory, Rational Behavior Theory, Planned Behavior Theory, Control Point Theory and Protection Motivation Theory belong to the Continuous Theoretical Model, while Transtheoretical Model, Berlin Exercise Stage Theory and Health Action Process Theory belong to the Stage Theoretical Model. Continuum Theory regards the change of exercise behavior as a relatively static process. It assumes that a predictive model is suitable for all, and that the change of cognition and behavior seems to be a linear model. Although it can better explain the variance of intention, it cannot better explain the variance of behaviors. In the intervention of exercise behaviors, the use of unified content and measures cannot be based on the individual stage of exercise to adopt targeted intervention strategies. The Stage Theory Model considers exercise behaviors comprehensively from three aspects: cognition, behavior and time. It regards the change of exercise behaviors as a dynamic process of non-linear change, and takes into account the corresponding intervention strategies for the stage of individual health behavior change.^[4] The following will select several most representative models to describe, in order to explain the two categories in detail.

2.1 Health Belief Model

Health Belief Model (HBM) was first proposed by Rosenstock, an American psychologist, and revised by Becker and Maiman. It emphasizes the assessment of disease threat perception and behavior, namely, whether an individual takes healthy behavior depends on the individual’s perception of the seriousness of potential disease threat on the one hand, and the assessment of the necessary costs and benefits of action on the other.^[5] Although this theory explains to some extent the reasons why people participate in or do not participate in physical exercise, its application is different from the actual situation, and there are many disputes, such as the retrospective study, confusion in empirical research on perceived danger and perceived vulnerability. And when dealing with relatively serious health threats, the utility of health belief models has also been questioned.^[6] At the same time, due to the theoretical generality of HBM and the lack of clarity of the relationship between related concepts, the predictive power of HBM to exercise motivation and behavior is very low, which limits

its application in the field of exercise behaviors.^[7]

2.2 Transtheoretical Model

Transtheoretical Model of Behavior Change (TTM) was proposed by Prochaska, a professor of psychology at the University of Rhode Island, USA, and he compared and analyzed the essence theories of 18 psychotherapies and behavioral changes in 1979, and integrated the changing process and principles of different intervention theories. Finally, He proposed a complete method of behavioral change.^[8] And it has become the most widely used stage theory in the field of exercise behaviors. Its content structure is divided into four parts: change stage, change procedure, self-efficacy and decision-making balance. Among them, the change stage is the core organizational structure of the model, dividing the whole exercise process into five stages of cyclic change.^[9] The most attractive aspect of TTM is that it provides detailed and specific strategies for how to intervene at different stages. However, the distinction of TTM stages lacks the support of evidence, there are still ambiguities and ambiguities, and to a large extent, it is descriptive rather than explanatory. At the same time, TTM pays too much attention to the influence and function of psychological factors, but neglects the influence of environmental factors.

2.3 Social-ecological Model

Social-ecological Model (SEM) is also called Ecosystem Theory in sociology and social work. It is a theory used to study the interaction between human behavior and social environment. The theory regards the social environment in which human beings grow and live (such as family, institution, group, community, etc.) as a kind of social ecosystem, and emphasizes the importance of the ecological environment (human survival system) for the analysis and understanding of human behaviors. It is one of the important basic theories of social work to pay attention to the interaction of various systems between human beings and the environment and its significant impact on human behaviors.^[10] All-round multi-level intervention strategies are most effective for behavioral change, and the factors they play a role may be a direct one-to-one relationship or a one-to-many relationship.^[11] At present, Social-ecological Model has become one of the hotspots of foreign scholars.

3. Summary of the Common Theoretic Models in the Study of Physical Activity Behaviors of the Elderly in China

With the development of competitive sports, the theoret-

ical and practical research on the promotion of physical activity behaviors in China has risen. The research started in the early 1980s. Scholars adopt relevant theories and techniques of behavioral science, psychology, sociology, anthropology, communication and other disciplines, and combine the research thinking methods of inductive reasoning and deductive reasoning to carry out research around the characteristics of physical activity behaviors and influence mechanism.

In recent years, with the acceleration of the aging society and the implementation of the national fitness strategy, Chinese scholars have gradually paid attention to the elderly, but it is still in its infancy. In terms of mechanism theory, Chinese scholars draw lessons from foreign sports behaviors theories and models, devote themselves to localization and cross-cultural research, pay attention to the theoretical logic research at the macro level in the early stage, and gradually strengthen the micro-level research and empirical research. At the same time, with the help of relevant theories of behavioral science, organizational behavior, comparative behavior, psychology, anthropology, biology, culture, sociology, communication and economics, this kind of research combines deductive reasoning with inductive reasoning.

In the early stage of theoretical model study, Chinese scholars mainly interpreted the physical activity behavior of the elderly with the more direct and simple models, such as health belief theory, health action process orientation theory and Berlin exercise stage theory. For example, Duan Zhongyang tried to understand and describe the differences in the understanding of the health beliefs of the younger people in Wuhan through a sample survey of the younger people in Wuhan.^[12]

However, due to the insufficiency of explanatory power, scholars turned to Transtheoretical Model, Social Cognitive Theory, Planned Behavior Theory and Self-determination Theory, which emphasized individual psychological factors, to continue explaining and intervening behavior, and the Transtheoretical Model has become the most widely used stage theory in the field of exercise behavior.^[8] Kee-Lee Chou put forward the conclusion that self-efficacy significantly affects exercise behaviors by investigating the exercise behaviors of the elderly in Hong Kong and combining the viewpoint of Transtheoretical Model.^[13] According to the results of interviews, Xie Bin revised the scales involved in the Transtheoretical Model, used cluster random sampling method to measure the physical activity behaviors of the elderly in Xi'an, and summarized the main influencing factors of the physical activity behaviors of the elderly in different stages.^[14]

Nowadays, relying on the Social-ecological Model,

which is one of the hotspots of foreign scholars, Chinese scholars have further explained and intervened the exercise behaviors of the elderly. From the point of view of social ecology, Li Weiguang made a comprehensive analysis of Xiamen's sports for the aged by using "Ali's Principle", "Limiting Factor Law" and "Flower Pot Effect" in the model of social ecology, and explored the existing problems.^[15] Yi Xiangren used the method of qualitative and quantitative analysis to analyze data from three dimensions of individual, society, organization and environmental resources by using partial least square path modeling method, and constructed a Social-ecological Model of habitual physical activity of the elderly in China.^[16] Wang Ming took the elderly in Xuanwu District of Nanjing as the research object. By using the method of questionnaire and Arc GIS spatial technology analysis, he discussed the influence of built environment on the exercise behaviors of the elderly.^[17]

4. Research Deficiencies and Future Development of Directions

4.1 The Methodology of Model Research Lacks Advancement.

In the research design of model application, there are few case-control studies, cohort studies and intervention studies with high intensity of causality test. In order to improve the external validity of the study and to reveal its intrinsic law comprehensively and objectively, the means and methods of evaluation and analysis should be combined.

4.2 The Systematicness and Comprehensiveness of Model Research Are Not Strong

Whether it is the identification of influencing factors or the exploration of the relationship between influencing factors, there is still a lack of comprehensiveness and systematicness. Therefore, it is necessary to pay attention to the theoretical concepts of the models, consider the characteristics of the elderly and their behavioral effects, and investigate, analyze and explore the influencing factors of the elderly's physical activity behavior from the individual, community, society and other levels and angles, so as to truly reflect the behavioral law.

4.3 Localization Research on the Theoretical Models of Physical Behaviors of the Elderly Are Not Enough

There are great differences in social, economic and cultural development between China and Western countries,

especially in public service, community development, family concept, interpersonal communication and so on. However, the exercise behavior of the elderly is closely related to it. When drawing lessons from foreign theories and models, we should devote ourselves to the study of localization and cross-culture.

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