Perceived Self-Efficacy and Health-Promoting Behaviors Among Chinese People at Risk for Metabolic Syndrome

การรับรู้สมรรถนะแห่งตนและพฤติกรรมสร้างเสริมสุขภาพในประชาชนจีนที่มีความเสี่ยงต่อกลุ่มอาการเมแทบอลิก

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Abstract

A descriptive correlational study was used to explore health-promoting behaviors and perceived self-efficacy, and their relationship, among Chinese people at risk for metabolic syndrome. Purposive sampling was used to select 154 participants from the health management center at the First Affiliated Hospital of Kunming Medical University, the People's Republic of China. The instruments consisted of a Demographic and Clinical Information Form, the Chinese version of the Health-Promoting Lifestyle Profile II (HPLP-II), and the General Self-Efficacy Scale (GSES). The Cronbach's alpha coefficients for both the Chinese version of the HPLP-II and the GSES were .94. Data were analyzed using descriptive statistics, the Pearson product-moment correlation coefficient, and Spearman's rank-order correlation test.

The results indicated that overall health-promoting behaviors were at a moderate level ($\overline{X}$ = 104.21, SD = 17.50) whereas the mean score for perceived self-efficacy was 26.02 (SD = 5.14). There was a significantly positive relationship between overall health-promoting behaviors and perceived self-efficacy at a moderate level ($r = 0.46$, $p < 0.05$). Regarding each dimension, stress management, health responsibility, spiritual growth, and interpersonal relations were significantly positively related with perceived self-efficacy at a moderate level (r = 0.42, 0.32, 0.46, r_s = 0.31, $p < 0.05$, respectively).

The study findings suggest that increasing self-efficacy among Chinese people at risk of developing MS may be beneficial for modifying health-promoting behaviors.

Keywords: Health-promoting behaviors, Metabolic syndrome, Perceived self-efficacy

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บทคัดย่อ

การศึกษาเชิงพรรณนาหาความสัมพันธ์ครั้งนี้มีวัตถุประสงค์เพื่อศึกษาพฤติกรรมสร้างเสริมสุขภาพ การรับรู้สมรรถนะแห่งตน และความสัมพันธ์ระหว่างพฤติกรรมสร้างเสริมสุขภาพและการรับรู้สมรรถนะแห่งตนในประชาชนจีนที่มีความเสี่ยงต่อกลุ่มอาการเมแทบอลิก การคัดเลือกกลุ่มตัวอย่างใช้วิธีการสุ่มแบบเจาะจง จำนวน 154 ราย จากศูนย์บริหารจัดการสุขภาพ โรงพยาบาลสังกัดที่ 1 แห่งมหาวิทยาลัยการแพทย์คุนหมิง สาธารณรัฐประชาชนจีน เครื่องมือที่ใช้ในการวิจัย ประกอบด้วย แบบฟอร์มข้อมูลส่วนบุคคลและคลินิก แบบวัดการปฏิบัติพฤติกรรมสร้างเสริมสุขภาพฉบับภาษาจีน และแบบวัดการรับรู้สมรรถนะแห่งตนทั่วไปฉบับภาษาจีน ค่าสัมประสิทธิ์แอลฟ่าของครอนบาคของแบบวัดคุณภาพชีวิตที่เกี่ยวข้องกับสุขภาพและแบบวัดการรับรู้สมรรถนะแห่งตนทั่วไปฉบับภาษาจีนเท่ากับ .94 วิเคราะห์ข้อมูลโดยใช้สถิติเชิงพรรณนา สถิติ Pearson product-moment correlation coefficient และสถิติ Spearman's rank-order correlation test

ผลการศึกษาครั้งนี้พบว่า พฤติกรรมสร้างเสริมสุขภาพโดยรวมอยู่ในระดับปานกลาง ($\bar{X}$ = 104.21, SD = 17.50) ส่วนค่าเฉลี่ยของการรับรู้สมรรถนะแห่งตน เท่ากับ 26.02 (SD = 5.14) พฤติกรรมสร้างเสริมสุขภาพโดยรวมมีความสัมพันธ์ทางบวกกับการรับรู้สมรรถนะแห่งตน ในระดับปานกลางอย่างมีนัยสำคัญทางสถิติ ($r = 0.46$, $p < 0.05$) โดยในมิติของการจัดการความเครียด ความรับผิดชอบต่อสุขภาพ การพัฒนาทางจิตวิญญาณ และความสัมพันธ์ระหว่างบุคคล มีความสัมพันธ์ทางบวกกับการรับรู้สมรรถนะแห่งตน ในระดับปานกลางอย่างมีนัยสำคัญทางสถิติ ($r = 0.42, 0.32, 0.46$, $r_s = 0.31$, $p < 0.05$, ตามลำดับ)

ผลการศึกษาชี้ให้เห็นว่าการส่งเสริมการรับรู้สมรรถนะแห่งตนในประชาชนจีนที่มีความเสี่ยงต่อการเกิดกลุ่มอาการเมแทบอลิก อาจจะเป็นประโยชน์ในการปรับเปลี่ยนพฤติกรรมส่งเสริมสุขภาพ

คำสำคัญ: พฤติกรรมสร้างเสริมสุขภาพ กลุ่มอาการเมแทบอลิก การรับรู้สมรรถนะแห่งตน

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Background and significance

Metabolic syndrome (MS) has become a common public health problem in China. A national study in China reported that the prevalence of metabolic syndrome was 24.5% in people aged 15 years and older (Li et al., 2016). Metabolic syndrome is characterized by a cluster of metabolic risk factors, including impaired glucose tolerance, dyslipidemia, high blood pressure, and increased body weight (Chinese Diabetes Society, 2004). Evidence suggests that these factors can contribute to the development of MS. When a person has one risk factor, such as poor glucose tolerance, additional risk factors are more likely to develop (Grundy, 2016). With the presence of MS, the risk of cardiovascular events and diabetes mellitus increased by approximately two times and five times, respectively (Grundy, 2016).

Current guidelines suggest that people at risk for MS should be encouraged to take a lifestyle-based intervention in the premorbid state (Grundy, 2016). Lifestyle modification can be promoted by practicing health-promoting behaviors (HPBs). Pender (2011) proposed the Health Promotion Model (HPM) to explain HPBs and related factors. In the HPM, HPBs refer to multidimensional actions and cognition patterns that may reflect an incorporated, comprehensive pattern of healthy behaviors in individuals' daily lives, and include six aspects: 1) nutrition involves maintaining healthy diets; 2) physical activity involves regular exercise; 3) stress management entails controlling tension effectively; 4) interpersonal relations mean the intimacy and closeness within meaningful relationships; 5) health responsibility involves an active sense of accountability for one's health; and 6) spiritual growth focuses on pursuing goals (Pender, Parsons, & Murdaugh, 2011). Nutrition and physical activity contribute to maintaining the balance of calorie intake and consumption while good stress management, spiritual growth, and interpersonal relations are beneficial to mental health, reducing the risk of obesity, hypertension, and impaired glucose tolerance (Joseph-Shehu, Ncama, & Irinoye, 2019). Health responsibility is the motivation for healthy behaviors. Previous studies have proven that HPBs and their six aspects can improve risk factors, which reduces the risk of MS (Leung, Lee, Lai, Kwok, & Chong, 2020). Therefore, determining the situation of HPBs among the risk group and the related factors is essential for managing the risk group. Perceived self-efficacy (SE) is an important related factor for health-promoting behaviors in HPM. SE refers to an individual's judgment of their ability to achieve a certain level of performance (Pender et al., 2011). Because of its ability to strongly predict HPBs and modifiability, perceived SE has received a great deal of interest in nursing research (Choo & Kang, 2015).

In China, an increasing number of people are adopting unhealthy lifestyles, putting them at risk of developing MS. Chinese culture is rooted in Confucian culture and is depicted as family-style collectivism (Cheung & Kam, 2012). The unique social and cultural environment focuses on the benefit and harmony of groups instead of one's welfare or self-enhancement, which may lead to differences in HPBs and perceived SE between Chinese people and people outside China.

These differences also exist between mainland China and other regions, such as Hong Kong (Cheung & Kam, 2012). However, there were few studies about HPBs and perceived SE among those at risk for MS in mainland China. To fill the gap, this study selected Chinese people at risk of MS according to the criteria of the Chinese Diabetes Society (Chinese Diabetes Society, 2004), and then determined the situation of HPBs and perceived SE, and their relationships, in Chinese people at risk of MS. This could provide basic knowledge to develop interventions for the prevention of MS.

Objectives

This study aimed to explore the situation of health-promoting behaviors, which includes six aspects, and perceived self-efficacy, as well as their relationships, among Chinese people at risk for metabolic syndrome.

Research Questions

What are the health-promoting behaviors and the perceived self-efficacy for Chinese people at risk for metabolic syndrome? Is there any relationship between health-promoting behaviors and perceived self-efficacy among Chinese people at risk for metabolic syndrome?

Conceptual Framework

The conceptual framework of this study is based on the revised Pender's Health Promotion Model (HPM)(1996). The HPM provides a structure to explain the relationship among characteristics and experiences, behavior-specific cognitions and affects, and behavior outcomes. Health-promoting behaviors, which include six aspects, are the behavior outcomes in HPM. Since China is increasingly transforming in lifestyle and context which leads to unhealthy behaviors, especially for Chinese people who are at risk of metabolic syndrome, health-promoting behaviors are important for these groups regarding disease prevention. Perceived self-efficacy (SE) is an important factor of behavior-specific cognitions and affects the HPM. It can also affect health-promoting behaviors directly by motivating people and strengthening the persistence with which people can perform those behaviors ordinarily. Based on the HPM, this study was performed to explore the relationship between perceived SE and HPBs. When the people at risk of metabolic syndrome in China perceive high self-efficacy, they may regularly perform health-promoting behaviors to prevent various non-communicable diseases caused by the metabolic syndrome.

Methodology

Population and Sample

This descriptive correlational study was conducted with Chinese people at risk for metabolic syndrome at the First Affiliated Hospital of Kunming Medical University (KMU), in Kunming city, Yunnan province, the People's Republic of China. Purposive sampling was used to select participants according to the following inclusion and exclusion criteria.

The inclusion criteria were as follows: 1) having a body mass index (BMI) ≥ 25 kg/m^2 and having one of three risk factors, including (1) dysglycemia: fasting plasma glucose (FPG) ≥ 6.1 mmol/L (110 mg/dl) and/or having been diagnosed as diabetic and undergone treatment; (2) high blood pressure: systolic blood pressure (SBP) ≥ 140 and/or diastolic blood pressure (DBP) ≥ 90 mmHg, and/or having been diagnosed as hypertensive and undergone treatment; or (3) dyslipidemia: blood triglycerides (TG) ≥ 1.7 mmol/L (150 mg/dL) and/or blood high-density lipoprotein cholesterol (HDL-C) <0.9 mmol/L (35 mg/dL) (male) or <1.0 mmol/L (39 mg/dL) (female) (Chinese Diabetes Society, 2004); 2) aged 18 years or above; 3) able to read and write in Chinese; and 4) willing to participate in the study.

The exclusion criteria included: 1) having co-morbidities that impeded physical activity; 2) having significant cognitive impairment; and 3) being pregnant.

The sample size was calculated based on G*power analysis, using two-tailed tests. Because there were no relevant earlier findings, a modest size of 0.3 was adopted for effect size, and a sample size of 134 was obtained. Considering for possible loss of subjects, 20% (27 participants) were added to the sample resulting in a total sample size of 161.

Research Instruments

The questionnaire included three parts:

1. The Demographic Data and Clinical Information Form, including gender, age, marital status, educational level, employment status, family income, smoking condition, alcohol consumption condition; BMI, FBG, SBP, DBP, TG, HDL-C, hypertension history, and diabetes history.

2. The Chinese Version of the Health-Promoting Lifestyle Profile II (HPLP-II), developed by Walker and Hill-Polerecky (1996) and translated by Cao, Guo, Ping, and Zheng (2016). The HPLP-II consisted of 40 items with a four-point Likert scale and included six aspects: health responsibility, physical activity, nutrition, spiritual growth, interpersonal relations, and stress management. A higher score means a higher frequency of HPBs, and the total scores are divided into three levels. The ranges for 40-80, 81-120, and 121 to 160 refer to low, moderate, and high levels, respectively.

3. The Chinese Version of the General Self-Efficacy Scale (GSES), which was developed by Schwarzer and Jerusalem (1995) and later translated into Chinese by Zhang and Schwarzer in 1995. The measurement consists of 10 items and a four-point Likert scale. Scoring ranges from 10 to 40, with higher scores indicating a stronger perceived SE.

The reliability of the instruments was tested with 10 participants who met the inclusion criteria. The Cronbach's coefficient alpha for the HPLP-II was 0.94, and for each of the dimensions, including nutrition, physical activity, stress management, health responsibility, spiritual growth, and interpersonal relations, was 0.85, 0.85, 0.81, 0.85, 0.87, and 0.87, respectively. The Cronbach's coefficient alpha for the GSES was 0.94.

Ethical Considerations

The study was approved by the Institutional Review Board (IRB) of the Faculty of Nursing,

Chiang Mai University, Thailand. Permission for data collection was then obtained from the First Affiliated Hospital of KMU. The Chinese version of the consent forms was required to be signed by all participants who agreed to participate in this study before data collection. Confidentiality and anonymity of individuals' responses were guaranteed.

Data Collection

The participants were recruited from the Health Management Center in the First Affiliated Hospital of KMU. The researcher selected the prospective participants from the clinical records in the computer system by reviewing their clinical data, such as BMI and FBG, and then met them in a quiet and private meeting room in the center while they were waiting for other health checkups, such as an ultrasonic examination. The researcher explained the study's methods, benefits, and ethical considerations to them, and individuals who agreed to participate in the study were asked to sign informed consent forms. A package of research documents was distributed to all participants, including an information sheet, an informed consent form, and the questionnaires. The participants were asked to complete the questionnaire by reading the questions directly without giving any further explanation to prevent bias. The process took approximately 15-25 minutes (an average of 20 minutes). Clinical data were collected from the medical records on the computer system. The researchers collected and checked the completed consent forms and questionnaires on the spot. The response rate for the questionnaires was 154 (95.65). Seven surveys were not used as three were incomplete (1.86%) and four (2.49%) had TG outlier values.

Data Analysis

The data were analyzed using SPSS 13.0 (English version). The nutrition and interpersonal relations dimensions were non-normally distributed, and for the other aspects, the total scores of HPBs, and the scores of perceived SE were normally distributed. Thus, descriptive statistics, Pearson's product-moment correlation coefficient, and Spearman's rank-order correlation test were used. The correlation coefficient (r/r_s) value was between .10 and .29, demonstrating a weak relationship. The r/r_s value was between .30 and .50, showing a moderate relationship. If the r/r_s value > .50, it would mean a strong relationship (Burns & Grove, 2009).

Results

1. Table 1 shows the demographic characteristics of the 154 participants. The age of the participants in the study ranged from 21 to 78, with a mean of 43.97 (SD = 13.64). Most of the participants were married (74.03%) and were incumbent (74.68%). Over half of them (62.34%) had a family income between 5,000 to 10,000 CNY per month. A bachelor's degree was the most common educational level (45.45%). The BMI for over half of the participants (61.69%) was equal to or greater than 25 with abnormal TG and/or abnormal HDL-C (Table 1).

2. This study showed that the HPBs of participants in this study were at a moderate level ($\bar{X}$= 104.21, SD = 17.50). The average score for items was 2.61 (SD = 0.44). The highest

mean score for an item was for interpersonal relations ($\bar{X}$= 2.91, SD = 0.64), and the lowest mean score was for health responsibility ($\bar{X}$= 2.30, SD = 0.49) (Table 2).

3. The results showed that the possible score for perceived SE was 10-40, and the mean score for perceived SE in this study was 26.02 (SD = 5.14) with a range from 10 to 39.

4. There were positive relationships between perceived SE and HPBs, including the six dimensions in Table 3. The relationships between perceived SE and physical activity and nutrition were weak (r_s = 0.26, r = 0.28, P < 0.01, respectively). The relationships between the overall scores for other dimensions including stress management, health responsibility, spiritual growth, interpersonal relations, and perceived SE were moderate (r = 0.46, 0.42, 0.32, 0.46, r_s = 0.31, P < 0.05, respectively).

Table1 Frequency and Percentage of Demographic Characteristics of the Participants (n=154)

Demographic Data	Frequency (n)	Percentage (%)
Age (years)		
20-30	30	19.48
31-40	39	25.32
41-50	38	24.68
51-60	28	18.18
> 60	19	12.34
Gender		
Male	81	52.60
Female	73	47.40
Marital status		
Single	28	18.18
Married	114	74.03
Divorced	12	7.79
Educational level		
Junior high school or below	22	14.29
Associate's degree	48	31.17
Bachelor's degree	70	45.45
Master's degree or above	14	9.09
Smoking condition		
No smoking	110	71.43
Yes	44	28.57
Employment status		
Incumbency	115	74.68
Retirement	35	22.73
Other	4	2.60

Table 1 (continued)

Demographic Data	Frequency (n)	Percentage (%)
Family income (CNY)*		
< 5,000 /month	21	13.64
5,000- 10,000 /month	96	62.34
> 10,000 / month	37	24.03
Alcohol consumption condition		
No	100	64.94
Yes	54	35.06
Risk group categories		
BMI ≥ 25 with abnormal TG and/or abnormal HDL-C	95	61.69
BMI ≥ 25 with high SBP and/or high DBP and/or hypertension	24	15.58
BMI ≥ 25 with high FPG and/or diabetes	35	22.73

Table 2 Mean and Standard Deviation, Overall and for Each Dimension of Health-Promoting Behaviors (n=154)

Health-promoting behaviors	Possible score	Total score	Average score of items
		Mean (SD)	Mean (SD)
Overall	40-160	104.21(17.50)	2.61(0.44)
Nutrition	8-32	22.68(4.09)	2.84(0.51)
Physical Activity	8-32	18.90(4.24)	2.36(0.53)
Stress Management	5-20	13.47(2.86)	2.70(0.57)
Health Responsibility	9-36	20.72(4.43)	2.30(0.49)
Spiritual Growth	5-20	13.89(3.25)	2.78(0.65)
Interpersonal Relations	5-20	14.55(3.21)	2.91(0.64)

Table 3 The Relationship Between Perceived Self-Efficacy and Health-Promoting Behaviors (n=154)

Variables	Perceived Self-Efficacy	
	Statistical value	p-value
Overall scores for Health-Promoting Behaviors	$r = .46^{*}$	< .001
Physical Activity	$r = .28^{*}$	< .001
Stress Management	$r = .42^{*}$	< .001
Health Responsibility	$r = .32^{*}$	< .001
Spiritual Growth	$r = .46^{*}$	< .001
Nutrition	$r_s = .26^{**}$	0.001
Interpersonal Relations	$r_s = .31^{**}$	< .001

* The Pearson product-moment correlation test was used

** The Spearman's rank-order correlation test was used

Discussion

Health-promoting behaviors

In this study, the scores for health-promoting behaviors among people at risk of metabolic syndrome were at a moderate level, with a total score mean of 104.21 (SD = 17.50) and an average item score of 2.61 (SD = 4.44) (Table 2). The results were similar to a previous study in the United States (Channel, 2014), and indicate that the participants in this study had moderate frequency of health-promoting behaviors with some of the dimensions of health-promoting behaviors being high. However, there were also some low-scoring dimensions.

Compared with the average score of items, participants achieved the highest scores in interpersonal relations and nutrition, which is inconsistent with previous results for Latinos (Channel, 2014). However, the results are consistent with other studies in China, even if the populations have been different (Chen & Zhang, 2020; Cheng et al., 2015). In China, multiple factors contribute to maintaining a healthy diet, including the increased consumption of good quality protein along with an increasing income, the traditional plant-based diet, and wider availability of fresh vegetables and fruits due to convenient transportation (Chen & Zhang, 2020). Besides, Chinese culture is an example of family-style collectivism, which emphasizes the importance of close relationships with family members and members from the same group in order to maintain a group's harmony. This may be the main reason for the high score in interpersonal relations (Cheung & Kam, 2012). Moreover, most of the participants (74.68%) were married. Therefore, it was easier for them to get support from their family, which also contributes to the high interpersonal relations score.

In this study, the participants received moderate scores for stress management and spiritual growth, with average scores of 2.70 (SD=0.57) and 2.78 (SD=0.65), respectively. The scores were higher than those of Channel's study (2014) in the United States, with the mean scores for stress management and spiritual growth being 2.39 and 2.75, respectively. Suffering is considered necessary for growth in Chinese cultures. However, when stress exceeds one's ability to cope, the concept of "Ming" (fate) is introduced to relieve the pressure. People should accept the results of "Ming," no matter how good or bad, as long as they have already done their best (Shi & Zhao, 2014). This view is beneficial for stress management. Moreover, Chinese culture encourages people to work hard to attain their goals, believing that people's skills are changeable and can be developed with enough effort. These beliefs may explain high spiritual growth scores (Cheung & Kam, 2012).

In this study, the participants got a lower score on physical activity, with the average score of items being 2.36 (SD = 0.53), which is consistent with a previous study on Latinos (Channel, 2014). Physical inactivity increases the risk of MS, which suggests that the risk group should increase their physical activity. Moreover, three factors, including rapid urbanization, the growth in sedentary jobs, and the primary transportation change from walking and bicycling to driving, have caused a steep decline in physical activity in China (Chen & Zhang, 2020). Regarding health

responsibility, participants in this study achieved the lowest score, with the average score of items being 2.30 (SD = 0.49). This finding is inconsistent with prior research outside China conducted by Channel (2014) but is consistent with a study in China, even though the population was different (Cheng et al., 2015). Health responsibility involves individuals taking positive actions to maintain health, for example, getting related knowledge and seeking assistance from healthcare professionals (Pender et al., 2011). Shortages and maldistribution in the health workforce have already become the main barriers for Chinese people to getting professional assistance and knowledge, contributing to a lower score for health responsibility. Moreover, most of the participants were employed, and over half of the participants were aged between 31-40 (25.32%) and 41-50 (24.68%). People at this stage are the backbone of their work and family. Limited time and energy are also other reasons for lower scores for the two subscales.

Perceived self-efficacy

The results of this study reported that the mean score for perceived SE in this study was 26.02 (SD = 5.14), which was lower than the result of a study in South America ($\bar{X}$ = 33.00, SD=5.12) (Lizama, Villanueva, Martínez, Leiva, & Mella, 2021). A collectivist culture is considered the main reason for lower perceived SE in China compared with Western countries. Preserving harmony and fitting in with a group are more critical in a collectivist society. This can cause a lack of motivation for self-enhancement and cause lower self-efficacy (Ahn, Usher, Butz, & Bong, 2016). However, the score was higher than that of another study in Taiwan ($\bar{X}$= 23.3, SD = 3.60) (Chen et al., 2019). The higher education levels and employment status rates in this study are possible explanations. People can get a sense of accomplishment in their work, and persons with higher education levels are more likely to access related knowledge when they face problems (Xu, Leung, & Chau, 2018).

The relationship between perceived self-efficacy and health-promoting behaviors

This study showed a positive and moderate relationship between perceived SE and total HPBs among Chinese people at risk of MS ($r = 0.46$, $P < 0.05$). This means that the MS risk group has a higher score for perceived SE, and they tend to have higher scores for HPBs. This result is consistent with a study conducted by Mohamad, Mulud, Ibrahim, and Damanhuri (2019). A high level of perceived SE means the person has strong self-confidence and believes that one's ability can help them achieve success. This gives the person stronger motivation, persistence, courage, and determination for HPBs (Pender et al., 2011). Moreover, this study indicated moderate positive relationships between perceived SE and four aspects, including stress management, health responsibility, spiritual growth, and interpersonal relations, implying that these four dimensions could be improved by enhancing perceived SE.

However, the results demonstrated that the relationships between perceived SE and other dimensions, including nutrition and physical activity, were weak. In this study, the effect of perceived SE may be limited by several factors that can be considered perceived barriers. Some

barriers to the practices of physical activity and good nutrition in Chinese people have been demonstrated by a previous study, including traditional Chinese cooking habits which depend on using oil, and a lack of facilities and sites (Luan et al., 2020). In addition, most of the participants in this study were employed. Limited time and energy could also be important reasons for this weak relationship.

Conclusions and implications

This result provides basic knowledge for nursing practice regarding the current situation of health-promoting behaviors and perceived self-efficacy among Chinese people at risk for metabolic syndrome. Based on the findings, 1) the nursing practice may have evidence to improve HPBs for people at risk for MS, mainly in the physical activity and health responsibility dimensions, and 2) the nursing practice can improve health-promoting behaviors by enhancing perceived self-efficacy for people at risk for MS, which in turn, reduces the risk.

Recommendations

1. Further exploration of other factors related to health-promoting behaviors among Chinese people at risk of MS, such as perceived benefits and perceived barriers, is required.

2. It is necessary to study perceived self-efficacy and health-promoting behaviors among people at risk for MS in different cities and settings in China. Because the participants in this study were selected from a specific setting, the results may differ in other settings or cities due to the different samples. This will advance the understanding of the relationship between various factors that may affect people at risk for MS and lead to targeted interventions.

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