The Current Status of Health Promotion Lifestyle and Its Related Factors in Chinese Residents

Qianqian Liu

Shandong University

Shusheng Huang

Shandong University

Xiaoyuan Qu

Henan University

Aitian Yin (✉ yaitian@sdu.edu.cn)

Shandong University

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Abstract

Objectives: This study aimed to explore the current status of Chinese residents' health promotion lifestyle and its influencing factors, especially explore how health attitudes affect health promotion lifestyle, thus can make targeted recommendations for health promotion in China and similar areas.

Study design: This study was based on a household survey of 1769 adults aged 18 and over from Shandong Province of China conducted in 2018.

Methods: A cross-sectional, face-to-face survey design was used. The between-group measured data were compared by One-way ANOVA or *t*-tests. The correlation between the health attitude and health promotion lifestyle was examined by Pearson correlation. Logistic regression model was used to examine the related factors influencing Chinese residents' health promotion lifestyle.

Results: The health promotion lifestyle of residents in Chinese residents was not good. Significant differences existed in health promotion lifestyle among different genders, education levels, income levels, marital status, and health attitude ($P_s < 0.001$). Multivariable Logistic regression model found that gender, education level, annual family per capita income, affection and behavioral intention in health attitude were key factors influencing Chinese residents' health promotion lifestyle ($P_s < 0.001$).

Conclusions: Individual health responsibilities need to be further strengthened. More affective factors and operable measures should be added to enhance health affection and health behavioral intention, so as to enhance health promotion lifestyle.

Introduction

Several studies have demonstrated that lifestyle play a vital role in explaining health and disease, especially concerning the onset of disease, seeking help, disease management, and health outcomes [1–3]. Recent research revealed that the two biggest killers of human health are cigarette smoking and physical inactivity, accounting for more than 800,000 premature deaths in the United States annually, also exerting enormous adverse economic impact [4]. Poor lifestyle is the pathogenic factors constituting 70% of the top ten causes of diseases in the United States, while in China, the corresponding figure is 44.7% [5]. Thus, by examining the health promotion lifestyle of Chinese residents, the characteristics of residents' health promotion lifestyle in different groups can be identified to formulate a series of intervention measures to enhance the residents' health behaviors.

A majority of research suggests a significant link between attitude and health promotion lifestyle [6, 7]. According to several leading behavioral change frameworks including knowledge belief and attitude practice (KAP) [8], the theory of planned behavior (TPB) [9, 10], health attitude can affect their health promotion lifestyle to a certain extent, thereby affecting their health. An influential theory is that the structure of attitude includes three components—cognition, affection, and behavioral intention [11–13]. But many studies only focused on the cognitive aspects of health attitude. This study used 1769 adults aged 18 and over to explore the current status of Chinese residents' health promotion lifestyle and its influencing

factors, especially explore how health attitude affect health promotion lifestyle. Relevant suggestions will be proposed to promote residents of China and similar areas to form health promotion lifestyle.

Methods

Sample Group

We selected residents of Shandong Province as investigation samples in this study. Shandong is an economically developed province of China, ranking third in China's GDP in 2018 [14]. Shandong Province has put great emphasis on residents' medical concern for several years, and has established a basic medical care system [15]. Furthermore, the economic status and employment category of residents can represent the status of the majority of Chinese residents.

We used a multistage stratified, cluster random sampling method to select the study population of the area. Based on the level of socioeconomic development, Jiaonan, Qufu, and Ningyang of Shandong Province were selected as sample counties. Based on the level of economic development, one street, one town, and three villages in each city/county were selected randomly for research. 600 people were selected from each city/county, adding up to 1800 people in total. A survey was conducted in community health centers or township health centers from March to May, 2018. Before the survey, the investigators had been trained to conduct preliminary publicity and introduction. The survey was conducted anonymously, and household cleaning products worth approximately 20CNY were provided to the participants as a reward after the survey. The study was conducted and approved by Ethics Committee of Centre for Health Management and Policy Research, School of Public Health, Cheeloo College of Medicine, Shandong University, and all the participants had given their informed consent. The study was conducted according to the guidelines of the Declaration of Helsinki.

Data Collection Tools

Basic Sociodemographic Characteristics

The questionnaire mainly involves gender, age, annual family per capita income, marital status, residence, education level, whether suffering from chronic diseases, and medical insurance status.

Health Promotion Lifestyle Profile

We used the Chinese version of the Health Promotion Lifestyle Profile (HPLP-IICR) [16]. The original version of the HPLP was developed by Walker et al. [17, 18], contains 52 items. The Chinese version of the HPLP-IICR has been simplified by Deng and Yen [16], which contains 30 items, and five subscales, including Spiritual Growth (6 items), Physical Activity (6 items), Health Management (9 items), Nutrition (5 items), and Health Responsibility (4 items). A higher score indicates greater health promotion, using a 4-point Likert scale with choices ranging from never = 1 to always = 4. The overall Cronbach's alpha is 0.90, with 0.69 to 0.87 for the subscales [16]. In the present study, the expression mode of some items has been

adjusted to make it easy to be understood. Adjusted Cronbach's alpha for the total profile is 0.88, with subscales ranging from 0.71 to 0.85. The total score ranges between 30–120, in which 30–52 represents poor, 53–75 represents average, 76–98 represents good, and 99–120 represents excellent.

Health Attitude Questionnaire

A self-designed Health Attitude Questionnaire was used in the study, which using a 5-point Likert scale with choices ranging from totally disagree = 0 to totally agree = 4 [19, 20]. The original questionnaire was designed according to health promotion lifestyle, contained 30 items. The final questionnaire contains 23 items and, the Cronbach's α is 0.81. We extracted three factors—Health Cognition (8 items), Health Affection (8 items), and Health Behavioral Tendency (7 items), which respectively explained 12.71%, 15.37%, and 23.80% of the total variance. The confirmatory factor analysis of the three-factor model resulted in an acceptable model fit (Tucker–Lewis Index = 0.90, Comparative Fit Index = 0.92, Normed Fit Index = 0.93, Expected Cross-Validation Index = 0.35, Root-Mean-Square Error of Approximation = 0.068). The item loadings range from 0.72 to 0.83, and correlation coefficients among the three factors range from 0.54 to 0.70. The total score is between 0–92, in which 0–30 represents poor, 31–61 represents average, and 62–92 represents good.

Data Analysis

In this study, the database was built using Access 2010 software; the data was recorded two times and compared to ensure data integrity and accuracy. The statistical analysis was performed using the Statistical Package for the Social Sciences version 24.0 (SPSS, Inc., Chicago, IL, USA). The independent variables of this study are individual-level factors (e.g., gender, age, education level, and so on.), which were summarized using descriptive statistics. The statistical description of the measurement data was expressed by mean and standard deviation (SD). Besides, the analysis of variance or *t*-test was used to compare the between-group measured data. All tests were bilateral, and the test level was set at $\alpha = 0.05$. The Pearson correlation coefficient was used to analyze the correlation between the health attitude and health promotion lifestyle. Multivariate logistic regression model was used to explore the related factors affecting Chinese residents' health promotion lifestyle. The results were exhibited as adjusted odds ratios (ORs) with their 95% confidence intervals (CIs).

Results

Basic Sociodemographic Characteristics

In this study, 1800 questionnaires were distributed, of which 1784 were collected, with 1769 valid responses (effective rate, 98.28%). Among the 1769 respondents, 790 (44.66%) are male and 979 (55.34%) are female; the mean age is 45.6 (SD = 9.12). Table 1 presents the sociodemographic data of study participants.

Table 1
Characteristics of study participants ($n = 1769$)

Characteristics	<i>N</i> (%)	Characteristics	<i>N</i> (%)
Age		Education level	
<30	133 (7.5)	University and above	598 (33.8)
30–50	1243 (70.3)	High school	724 (40.9)
> 50	393 (22.2)	Junior middle school and below	447 (25.3)
Annual family per capita income (CNY)		Marital status	
<10,000	506 (28.6)	Married	1396 (78.9)
10,000–20,000	587 (33.2)	Unmarried/Divorced	182 (10.3)
> 20,000	676 (38.2)	Widowed	191 (10.8)
Chronic disease		Medical insurance	
No	957 (54.1)	Urban and Rural Basic Medical Insurance	1244 (70.3)
Yes	812 (45.9)	Urban Employee Medical Insurance	506 (28.6)
		Uninsured	19 (1.1)

Status of Health Promotion Lifestyle

The mean (SD) of HPLP-IICR total score of 1769 was 82.12(16.63). In 1769 residents, 254 scored poor, accounting for 14.36%; 710 scored average, accounting for 40.14%; 612 scored good, accounting for 34.60%; 193 scored excellent, accounting for 10.91%. After standardized calculation, the mean (SD) of items was 2.73(0.78), 3.08 (0.74) for Nutrition 2.97 (0.79) for Physical Activity, 2.85 (0.78) for Health Management, 2.60 (0.88) for Spiritual Growth, and 2.42 (0.89) for Health Responsibility. As shown in Table 2, one-way ANOVA and *t*-test were used to compare differences in health promotion lifestyle among residents with different characteristics. The residents' health promotion lifestyle was significantly different ($P_s < 0.001$) among different genders, education levels, annual family per capita income, marital status, and health attitude.

Table 2

One-way ANOVA or t-test of different sociodemographic factors on health promotion lifestyle and attitude in Chinese residents

Predictor	Spiritual growth Mean $\pm$ SD	Physical activity Mean $\pm$ SD	Health management Mean $\pm$ SD	Nutrition Mean $\pm$ SD	Health responsibility Mean $\pm$ SD	Health promotion lifestyle Mean $\pm$ SD
Gender						
Male	2.58 $\pm$ 0.53	2.86 $\pm$ 0.85	2.76 $\pm$ 0.98	3.12 $\pm$ 0.54	2.28 $\pm$ 0.68	78.22 $\pm$ 19.56
Female	2.71 $\pm$ 0.93	3.04 $\pm$ 0.74	2.93 $\pm$ 0.93	3.09 $\pm$ 0.44	2.47 $\pm$ 0.94	86.12 $\pm$ 14.32
<i>P</i>	< 0.001	< 0.001	< 0.001	0.482	< 0.001	< 0.001
Age						
< 30	2.89 $\pm$ 0.87	3.01 $\pm$ 0.61	2.88 $\pm$ 0.72	3.04 $\pm$ 0.98	2.38 $\pm$ 0.88	83.76 $\pm$ 15.07
30–55	2.56 $\pm$ 0.63	2.57 $\pm$ 0.43	2.84 $\pm$ 0.75	3.01 $\pm$ 0.53	2.47 $\pm$ 0.77	82.72 $\pm$ 14.41
> 55	2.78 $\pm$ 0.56	2.98 $\pm$ 0.94	2.79 $\pm$ 0.71	3.22 $\pm$ 0.81	2.41 $\pm$ 0.56	82.89 $\pm$ 13.91
<i>P</i>	< 0.001	< 0.001	0.341	< 0.001	0.071	0.122
Residence						
Rural	2.41 $\pm$ 0.88	2.99 $\pm$ 0.97	2.92 $\pm$ 0.91	3.04 $\pm$ 0.91	2.39 $\pm$ 0.75	82.05 $\pm$ 14.02
Urban	2.76 $\pm$ 0.85	2.89 $\pm$ 0.82	2.77 $\pm$ 0.98	3.10 $\pm$ 0.54	2.45 $\pm$ 0.72	83.17 $\pm$ 15.18
<i>P</i>	< 0.001	0.055	< 0.001	0.071	0.229	0.157
Education level						
Junior middle school & below	2.63 $\pm$ 0.98	2.67 $\pm$ 0.53	2.58 $\pm$ 0.90	2.82 $\pm$ 0.74	2.40 $\pm$ 0.79	80.92 $\pm$ 14.78
High school	2.58 $\pm$ 0.97	2.87 $\pm$ 0.84	3.02 $\pm$ 0.83	2.99 $\pm$ 0.78	2.41 $\pm$ 0.82	82.54 $\pm$ 13.78
University & above	2.75 $\pm$ 0.89	2.97 $\pm$ 0.87	2.79 $\pm$ 0.93	3.12 $\pm$ 0.85	2.46 $\pm$ 0.85	85.16 $\pm$ 16.85
<i>P</i>	< 0.001	< 0.001	< 0.001	< 0.001	0.331	< 0.001
Annual family per capita income						

Predictor	Spiritual growth Mean $\pm$ SD	Physical activity Mean $\pm$ SD	Health management Mean $\pm$ SD	Nutrition Mean $\pm$ SD	Health responsibility Mean $\pm$ SD	Health promotion lifestyle Mean $\pm$ SD
<10,000 RMB	2.56 $\pm$ 0.97	2.94 $\pm$ 0.88	2.76 $\pm$ 0.83	2.91 $\pm$ 2.01	2.14 $\pm$ 2.78	80.95 $\pm$ 14.78
10,000–20,000 RMB	2.60 $\pm$ 0.92	2.93 $\pm$ 0.77	2.84 $\pm$ 0.65	3.02 $\pm$ 1.78	2.39 $\pm$ 1.83	80.76 $\pm$ 13.94
> 20,000 RMB	2.64 $\pm$ 0.91	3.13 $\pm$ 0.93	2.95 $\pm$ 0.77	3.16 $\pm$ 2.22	3.52 $\pm$ 2.18	87.01 $\pm$ 14.91
<i>P</i>	0.663	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Marital status						
Married	2.68 $\pm$ 0.82	2.66 $\pm$ 0.79	3.07 $\pm$ 0.99	3.06 $\pm$ 0.74	2.51 $\pm$ 0.91	85.29 $\pm$ 15.01
Unmarried/Divorced	2.60 $\pm$ 0.98	3.11 $\pm$ 0.93	2.88 $\pm$ 0.75	3.09 $\pm$ 0.80	2.47 $\pm$ 0.79	83.18 $\pm$ 13.84
Widowed	2.46 $\pm$ 0.90	2.58 $\pm$ 0.84	2.62 $\pm$ 0.96	2.91 $\pm$ 0.77	2.36 $\pm$ 0.64	80.96 $\pm$ 13.10
<i>P</i>	< 0.001	< 0.001	< 0.001	0.056	< 0.001	< 0.001
Chronic diseases						
No	2.72 $\pm$ 0.86	2.95 $\pm$ 0.68	2.56 $\pm$ 0.80	3.06 $\pm$ 0.73	2.36 $\pm$ 2.96	81.90 $\pm$ 15.16
Yes	2.55 $\pm$ 0.75	2.98 $\pm$ 0.92	2.98 $\pm$ 0.78	3.11 $\pm$ 0.85	2.58 $\pm$ 2.29	82.89 $\pm$ 14.03
<i>P</i>	< 0.001	0.696	< 0.001	0.779	< 0.001	0.364
Health attitude						
Poor	2.52 $\pm$ 0.61	2.92 $\pm$ 0.98	2.75 $\pm$ 0.72	3.03 $\pm$ 0.66	2.16 $\pm$ 0.44	80.98 $\pm$ 15.25
Average	2.68 $\pm$ 0.79	2.98 $\pm$ 0.88	2.78 $\pm$ 0.82	3.06 $\pm$ 0.88	2.44 $\pm$ 0.79	81.77 $\pm$ 16.77
Good	2.82 $\pm$ 0.75	3.05 $\pm$ 0.71	2.98 $\pm$ 0.88	3.10 $\pm$ 0.75	2.62 $\pm$ 0.77	86.44 $\pm$ 14.13
<i>P</i>	< 0.001	< 0.001	< 0.001	0.083	< 0.001	< 0.001

Correlation Analysis of Health Attitude and Health Promotion Lifestyle

As shown in Table 3, the three aspects of health attitude are correlated with multiple aspects of health promotion lifestyle, suggesting that health attitude is a significant predictor of health promotion lifestyle.

Table 3
Correlation analysis of health attitude and health promotion lifestyle

Predictor	Spiritual growth	Physical activity	Health management	Nutrition	Health responsibility	Health promotion lifestyle
Cognition	0.03	0.06*	0.07*	0.20**	0.02	0.06*
Affection	0.08	0.37**	0.33*	0.10*	0.30*	0.38**
Behavioral intention	0.34**	0.44**	0.09*	0.41**	0.12**	0.33**
Health attitude	0.28	0.38**	0.10*	0.36**	0.34*	0.32**
** $P < 0.01$, * $P < 0.05$						

Logistic Regression Analysis of Relevant Factors Influencing Health Promotion Lifestyle

With health promotion lifestyle (0 = excellent and good, 1 = average and poor) as the dependent variable, significant factors in single-factor analysis were selected as independent variables for multivariate logistic regression analysis, which include gender, education level, annual family per capita income, marital status, and three factors of health attitude: health cognition, health affection, and health behavioral intention. Results indicated that the independent factors influencing health promotion lifestyle include gender, education level, annual family per capita income, health affection, and health behavioral intention. As shown in Table 4, The findings suggested that male (OR = 0.25, 95% CI: 0.12–0.34), high school education level(OR = 0.20, 95% CI:0.17–0.41), junior middle school & below (OR = 0.29; 95% CI:0.12–0.33), annual family per capita income with <10,000 CNY (OR = 2.53, 95% CI:1.24–3.06; OR = 2.14, 95% CI:1.08–3.12), low health affection (OR = 2.99, 95% CI:2.15–4.22), and low health behavioral intention (OR = 3.21; 95% CI: 2.33–5.29) were statistically significant predictors of average or poor health promotion lifestyle.

Table 4

Logistic regression analysis of relevant factors affecting health promotion lifestyle in Chinese residents

Variables	Reference group	B	SE	Wald	<i>P</i>	OR	95% CI	
							Lower limit	Upper limit
Gender								
Male	Female	-1.397	0.295	36.61	< 0.001	0.35	0.12	0.34
Education level								
High school	University & above	-1.471	0.278	15.18	0.002	0.57	0.17	0.41
Junior middle school & below		-1.636	0.293	19.21	< 0.001	0.42	0.12	0.33
Annual family per capita income								
> 20,000 CNY	<10,000 CNY	1.324	0.264	10.25	0.002	2.53	1.24	2.06
10,000–20,000 CNY		0.928	0.377	11.83	< 0.001	2.14	1.08	3.12
Health affection								
Low grouping	High grouping	-1.208	0.241	12.24	0.001	0.39	2.15	4.22
Health behavioral intention								
Low grouping	High grouping	-1.325	0.268	13.15	< 0.001	0.21	2.33	5.29

Discussion

This study has confirmed that mean score for health promotion lifestyle reaches (82.12 ± 16.63), but 54.50% of the participants are in the status of average or poor, so the overall conditions of Chinese adults' health promotion lifestyle is not good. That is consistent with previous studies of Chinese [21, 22], and is lower than studies of Xia, Chen et al. [23, 24]. The score of Nutrition is the highest (3.08 ± 0.74), which is the same as the research results of Chen, Zhao and other scholars [22, 25]. With the increasing improvement of living standards and the popularization of nutrition knowledge, Chinese residents have higher requirements on diet, not only to satisfy their appetite, but also to pay more attention to nutrition ingredients and dietary collocation. The score of Physical Activity is the second highest (2.97 ± 0.79), which is different from previous studies [23, 24]. The reason may be due to the differences between the scales used in this survey and those used in other surveys. After revision, the items that do not conform to Chinese culture had been deleted, so that they were easier to be understood [16]. It was worth noting that Chinese women showed

better physical activity than men, which was different from studies of South Koreans [26] and Americans [27]. Perhaps this is because several Chinese women went square dancing as a way of exercise. Square dancing refers to dancing in an open and public space in China, usually on a flat patch such as a public square [28]. This group exercise has become popular in both urban and rural regions across China in recent 15 years [29, 30] and has been popular, mainly among women [28]. Thanks to its convenience, low cost and social function, square dancing has enabled Chinese women to get physical activity and spiritual satisfaction after work and housework [31]. It is interesting to note that unlike previous studies [32] reporting that living with a partner exerts positive influence on physical activity, this study found that married people's Physical Activity is worse than that of unmarried people. That may be because in Chinese tradition, married people should take more family-oriented economic responsibilities and the responsibility of raising children, which makes them more inclined to spend their spare time and energy on work and raising children. The score of Health Responsibility got the lowest (2.42 ± 0.89), similar results had been reported by Zhang [33], whose study also based on residents of northern China. This may be due to the lack of emphasis on self-responsibility for health in northern Chinese culture.

A significant and novel work of this study is to discover whether health attitude can influence health promotion lifestyle. Our main finding is that three aspects of health attitude have certain influence on health behavior, among which health cognition has the least influence, followed by health affection, and health behavioral intention has the greatest influence. The influence of health cognition on health promotion lifestyle has been discussed in many previous studies [34]. This study has found that health affection plays a more important role in the initiation of health promotion lifestyle than health cognition, that was not presented in other studies. The impact of health behavior intention on health behavior has been confirmed by several studies [35], some of which focus on promoting health promotion lifestyle in people without health motivation [36]. However, based on this study, if people can have health related knowledge and health affective experience at the same time and further develop corresponding behavioral intention, it is more likely to have health promotion lifestyle.

In addition to attitude, this study found that female residents may adopt more health promotion lifestyle, corroborating several studies [37, 38]. The effects of education and family income on health behavior are similar to previous studies [39, 40]. Prior studies suggested that poorly educated adults may have difficulty in understanding medical statistics, drug dose requirements, and basic health concepts such as daily nutritional value [41–43]. People with a high school diploma or above, tend to seek and use health information, regardless of their educational level and other sociodemographic factors [44, 45].

In China, as in other countries, inconsistencies in health behavior due to differences in gender, wealth, and education still persist; thus, decreasing the gap should be a top issue of particular urgency to both public and private sectors [46]. Due to the important influence of health attitude on health promotion lifestyle, affection and behavioral intention should be fully considered in the process of health promotion. For example, health promotion programs should be designed with elements that evoke affection in the residents, health-relevant motor manipulations can facilitate health behavior change and higher intention–behavior consistency [47]. Based on the characteristics of Chinese residents' greater emphasis on family responsibilities, more health promotion projects aimed at adolescents and requiring family participation

could be designed. In order to compensate for the lack of health responsibility, while improving the accessibility and quality of health services, the propaganda of "everyone is the first person responsible for his/her own health" should be strengthened.

Limitations

The findings of this study should be considered in light of some limitations. Health attitudes and health promotion lifestyle are self-reported variables, so that report bias may exist. In the study, only Shandong Province residents have been conducted the survey, so that the representativeness may be limited. However, despite these limitations, this study can reflect the current health promotion lifestyle of Chinese residents and, reveal the influence of health attitude on health promotion lifestyle. It also provides relevant suggestions for the formulation of relevant health policies.

Conclusions

This study found that the general health promotion lifestyle in Chinese residents is not good. Of note, gender, education level, annual family per capita income, health affection, and health behavioral intention are significant factors influencing residents' health promotion lifestyle. Furthermore, this study suggests that more affective factors and operable measures should be added to enhance health affection and health behavioral intention. Individual health responsibilities should be emphasized and health promotion projects involving all family members should be designed, so as to enhance health promotion lifestyle.

Abbreviations

WHO: World Health Organization

HPLP: Health Promotion Lifestyle Profile

Declarations

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Author Contributions

Aitian Yin conceived and designed the research, and provided supervision and guidance to the writing of the article. Qianqian Liu designed the questionnaire. Qianqian Liu, Shusheng Huang extracted data, Qianqian Liu drafted the first version of the manuscript. Xiaoyuan Qu gave review suggestions on the

entire writing process. Aitian Yin reviewed, edited and modified the manuscript critically for important intellectual content.

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Conflicts of Interest

The authors declare no conflict of interest.

Availability of data and materials

The datasets used during the current study are available from the corresponding authors on reasonable request.

Ethics approval and consent to participate

The study was conducted and approved by Ethics Committee of Centre for Health Management and Policy Research, School of Public Health, Cheeloo College of Medicine, Shandong University, and all the participants had given their informed consent.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

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