

Research on the impact of commercial health education and promotion activities on consumer health behavior

Yuzhuo Wang

Shanxi Jinzhong Institute of Technology, No. 839 Chuangye Street, Jinzhong, Shanxi

Abstract: The Chinese government emphasizes the importance of public health and disease prevention under the Healthy China strategy. According to data, cardiovascular diseases, cancer, and chronic respiratory diseases are the leading causes of death among both urban and rural residents in China, and the number of patients with chronic diseases and medical expenses continues to rise. The Healthy China strategy advocates a shift from treatment to prevention, emphasizing the importance of health education and promotion. However, the development of China's health industry is relatively late, and academic research related to health lags behind. Currently, research in the field of health education in China is mainly focused on school health education, prevention and control of chronic diseases, and intervention in major diseases. There is relatively limited research on the impact of commercial health education and promotional activities on the daily health behaviors and health consumption behaviors of the general population. This study aims to investigate the impact of commercial health education and promotional activities on Chinese consumers.

1. Introduction

With the development of society and economy, people are paying more attention to health problems. On 19th August 2016, Chinese president Xi Jinping attended the National Health and Wellness Conference and delivered an important speech. He emphasized that the Chinese government is determined to give strategic priority to developing people's fitness and accelerating the development of a Healthy China strategy. Since October 2016, with a series of policies released by the Chinese government, the development of the Healthy China strategy entered a new phase. Chinese government pointed out that ensuring people's health should be given a strategic priority development position and emphasizes the importance of the promotion of public health and disease prevention, in "The 14th Five-Year Plan for National Economic and Social Development and the Long-Range Objectives Through the Year 2035" [1]. According to the "China Health Statistics Yearbook 2020", cardiovascular and cerebrovascular diseases, cancer, and chronic respiratory diseases are the main causes of death for both rural and urban residents in China [2]. Moreover, the number of discharged patients with chronic diseases and medical costs per capita continue to rise. The "Report on Nutrition and Chronic Diseases Status of Chinese Residents (2020)" shows that in 2019, chronic diseases accounted for 88.5% of total deaths in China. Moreover, the issue of overweight and obesity among residents continues to be prominent. National surveys conducted between 2015 and 2019 showed that the overweight rate and the obesity rate

reached 16.4% among Chinese adults aged above 18 [3]. In addition, the demand for medical and healthcare services has been increasing as a proportion of China's consumption structure. According to statistical data from the National Bureau of Statistics from 2015 to 2020, only the consumption of housing and medical care has continued to increase among the eight consumer items, including food, housing, transportation, communication, education, and culture [4].

The Healthy China strategy emphasizes the importance of the promotion of public health and disease prevention, which represents a strategic shift from treatment to prevention, highlighting the importance of health education and health promotion. Health education interventions can support people with chronic health problems such as diabetes, hypertension, and hypercholesterolemia [5]. Moreover, the data show that investing 1 RMB in health prevention can now yield a return of 3 to 6 times in the future. The actual benefits can reach up to 8 times the investment if taking into account the resulting increased labor productivity resulting [6]. However, relying solely on hospitals and communities is far from sufficient since currently, a significant portion of medical resources are still being allocated toward patient care, not health prevention. Therefore, commercial health education and promotion will play a crucial role in disease prevention for healthy individuals.

However, the health industry in China started relatively late, and academic research on health-related topics is lagging behind. Currently, research in the field of health education in China, represented by

wangyuzhuo17@sina.com

high-frequency keywords, mainly focuses on school health education, prevention and control of chronic diseases, and interventions for major diseases [7]. There is relatively little research on the impact of commercial health education and promotion activities on the daily health behaviors and health consumption behaviors of healthy populations. Therefore, this study aims to investigate the impact of commercial health education and promotion activities on consumers in China.

In this study, the author collaborated with seven operators from Company P in Shanxi Province to conduct health education and promotion activities. During these activities, questionnaires were distributed, and body fat scale data were collected. A total of 103 valid questionnaires and 284 body fat scale data were collected from the participants of these activities. Additionally, the author randomly distributed questionnaires through the WeChat social platform and collected 81 valid questionnaires. Based on whether the respondents had participated in commercial health education and promotion activities, they were divided into two groups. By comparing the responses of the two groups in the questionnaire regarding daily health behaviors and health consumption behaviors, the impact of commercial health education and promotion activities was analyzed.

Based on the analysis, it was found that commercial health education and promotion activities have a positive impact on individual daily health maintenance and health-related consumption behavior. The author discusses the impact from three aspects: (1) Individuals who participated in these activities are more satisfied and confident about their health status. (2) The participants in these activities exhibit more proactive daily health maintenance behaviors, such as more frequent monitoring of physical indicators, a higher frequency of health check-ups, and greater participation in health-related activities. (3) Individuals who participated in these activities showed a stronger willingness to pay for health-related products or services, and their households had a relatively large proportion of economic expenditure on health.

The remaining of this paper is organized as follows. Section 2 introduces behavior change and behavior change model and summarizes the influencing factors of behavior change. Section 3 introduces the method of data collection in this paper. In Section 4, the authors summarize the main findings of this study from three aspects. Conclusions are drawn in Section 5 with discussions of several main research directions in the field of health education and promotion in China and points out the significance and limitations of this paper.

2. Literature review

Behavior Change and Model of Behavior Change

Health behavior change refers to the motivational, volitional, and actional processes of abandoning such health-compromising behaviors in favor of adopting and maintaining health-enhancing behaviors. It encompasses a variety of social, emotional, and cognitive factors [8].

Models of health behavior change postulate a pattern of factors that may improve motivation and, thus, eventually lead to sustained behavior change. A person's behavior is the outcome of an intention. Intention forming is seen as being determined by beliefs and attitudes [9]. The knowledge-attitude-behavior model (KABP) intuitively divides behavior change into three consecutive processes: acquiring knowledge, forming beliefs, and adopting behaviors. In the "KAB" model, "knowledge" refers to the cognitive understanding of relevant information, serving as the foundation of this model. "Attitude" represents beliefs and attitudes, where a positive attitude acts as a driving force for behavior change. Finally, "behavior" refers to the actual actions taken, which are the ultimate goal. This model assumes that disseminating health information to the target audience can change their beliefs and attitudes, thus leading to behavior change.

However, it is common for individuals not to behave in line with their intentions. The gap between intentions and behaviors is often referred to as the intention-behavior gap [10], representing a complex and prolonged process from acquiring knowledge and information to ultimately changing health behaviors. Various factors can either hinder or facilitate the translation of intentions into actions during the postintentional phase. In the practice of promoting health behavior formation or changing harmful behaviors through health education, situations of "knowing but not believing" and "believing but not acting" are frequently encountered. Only by comprehensively understanding the transformation process of knowledge, attitudes, and behaviors and promptly mitigating inhibiting factors can the goal of behavior change be achieved.

The HAPA (The Health Action Process Approach) model explicitly includes postintentional mediators to overcome the intention-behavior gap. It was originally developed in the late 1980s by integrating many theories, such as social-cognitive theory and the theory of reasoned action and so on. This approach suggests a distinction between preintentional motivation processes that lead to a behavioral intention and postintentional volition processes that lead to the actual health behavior. The motivational phase encompasses three sets of social cognitive constructs implicated in intention formation: outcome expectancies, action self-efficacy, and risk perceptions. Accordingly, the HAPA incorporates two components that operate in the volitional phase involved in the enactment of intentions: self-efficacy and planning [8]. Research has identified positive relations between these factors and intentions, particularly outcome expectancies and action self-efficacy [11].

Social demographic factors and health behavior change

Social demographic factors refer to factors related to people's age, gender, educational level, occupation, income level, and so on. These factors are closely related to individuals' and populations' health behaviors and can have a significant impact on behavior change. There are some common relationships between social demographic factors and health behavior change:

Age: With increasing age, people's health behaviors often change. Higher levels of health literacy were associated with younger age [12]. The relationship between aging and reduced health literacy could be influenced by reduced independence, social skills and the media used by elderly individuals. Moreover, Li and Liu found that people who are older and have higher income or good health status are more likely to have preventive behaviors [13].

Gender: There may be differences between males and females in health behaviors. For example, females are more likely than males to use electronic media to seek health information, including utilizing the internet, mobile applications, and social media platforms [14]. Women were almost three times more likely to use Web 2.0 for health information than men [15]. For instance, during the COVID-19 pandemic, Branquinho found media use increased from in both genders but with differences [16]. Men showing a higher level in TV hours per day, social networks and online games. While women stand out in the use of mobile phone per day during the pandemic. Furthermore, to cope with stress, male have a higher consumption of tobacco, alcohol and drugs [17-19]. While female are more susceptible and vulnerable to sleep difficulties during this period [20-21].

Education: Much of the education-health research has been grounded in the fundamental cause theory, which posits that social factors such as education are fundamental causes of health and disease [22]. For instance, some scholars found that less educated adults report worse general health and more chronic conditions [23]. One explanation might be that education leads to better, more stable jobs that pay higher income and allow families to accumulate wealth that can be used to improve health.

There are many other social demographic factors that can influence health behavior change, such as socioeconomic status and income. Income level affects people's lifestyle and access to available health resources. Additionally, health insurance status is another factor. Health insurance can significantly increase the utilization of primary healthcare services, outpatient care, and inpatient services for insured individuals [24]. Chinese scholars have also found that health insurance in China helps improve insured individuals' healthcare expenditure levels [25]. Moreover, changes in cost sharing in one part of the insurance system can affect healthcare utilization [26]. The relationship between these social demographic factors and health behavior change is complex and diverse and influenced by many other factors. Therefore, health behavior change is a complex process with multiple intertwined factors affecting it.

Health Education, Health Promotion and Behavior Change

Glanz, Rimer and Viswanath argue that health education plays a facilitating role in the formation of health behaviors [27]. Health education defined as the planned provision of information and training to promote healthy choices and behaviors among individuals, families, groups, organizations, and communities [28-29]. This definition emphasizes the importance of using

education and training to drive health decision-making and behaviors. Health education is for people to improve the effectiveness of curative and disease-preventive interventions. Furthermore, the target of health education is to help people realize the negative consequences for the health of their behavior, especially on individuals and single behaviors. Health promotion is a more recent term compared to health education. As defined by Green and Kreuter, health promotion is any combination of health education and related organizational, economic, and environmental support for the behavior of individuals, groups, or communities conducive to health [30].

In fact, in the United States, the terms health promotion and health education are often used interchangeably. In most cases, it is believed that these two terms are closely related and difficult to distinguish. Many scholars' research indicates that many of the short-term, targeted interventions within the larger studies were found to be effective [31]. The U.S. government has made significant efforts in public health education and promotion. For instance, as early as 2000, the United States Department of Health and Human Services issued Healthy People 2010. The goal of this initiative was to improve the health of all Americans by setting specific, measurable objectives to be achieved by the year 2010. These activities have indeed yielded certain results. For example, blood pressure control has improved, and mean population blood cholesterol levels have declined. Alcohol-related motor vehicle deaths and deaths due to automobile crashes and drowning have continued to decrease [27]. The collective efforts of those in health education and public health have indeed made a difference.

Most recently, experts have explicitly recommended that interventions on social and behavioral factors related to health should link multiple levels of influence, such as individual, interpersonal, organizational, community, and public policy [32]. However, there is currently limited research on the influencing factors of individual health behaviors in China. The existing research primarily focuses on epidemiological health education, with a lack of studies on commercial health education and health promotion. Foreign studies on health behavior lack consideration of the Chinese context, and directly applying their findings may not be suitable. Therefore, this study aims to investigate the impact of commercial health education and health promotion activities on consumers in China.

3. Research methodology

Data collection for questionnaire

The questionnaire consists of 31 questions and is divided into four parts. Part 1 consists of Q1-Q3 and aims to gather descriptive statistics about the respondents, including their gender, age, and educational level. Part 2 consists of 8 questions (Q4-Q11) and focuses on the basic health behaviors of the respondents, such as self-rated health status, frequency of health check-ups, and household health consumption patterns. Q12 categorizes the respondents into two groups, the

Participate Group and the Non-Participate Group, based on whether they have participated in commercial health education and promotion activities. Part 3 includes Q13-Q15 and is specifically designed for the Non-Participate Group, addressing their use of healthcare products and exercise habits. Q16-Q31 are mainly aimed at the Participate Group, focusing on motivations, health management needs, participation frequency, satisfaction, and other related aspects. After excluding invalid questionnaires, a total of 184 questionnaires were collected. This paper primarily focuses on the comparative analysis of the first two parts of the questionnaire to explore the impact of commercial health education and promotion activities on individual health behaviors.

The questionnaire was distributed through two methods, online and offline. Online distribution mainly utilized the social media platform WeChat, while offline distribution primarily relied on the assistance of the operators from P Company. P Company, a foreign-funded enterprise engaged in the field of large-scale health technology, has its own research institute, technology companies, and health companies. With the assistance of seven business operators of Company P in Shanxi

Province, the author distributed the questionnaires during their regularly organized health promotion activities.

Descriptive Statistics for questionnaire

Table 1 presents the summary statistics of the 184 participants involved in this study. The table demonstrates that there is a higher proportion of female respondents, particularly in the Participate Group. In terms of age, the members of the Participate Group have a higher average age compared to the Non-Participate Group. Furthermore, among the respondents below the age of 30, 73.81% stated that they had not participated in any health management activities. Regarding educational level, since most of the 7 business operators contacted by the author are located in county-level cities within Shanxi Province, where the economic development level is relatively average, the educational level tends to be average as well. In the Participate Group, 67.96% of the respondents had a high school education or lower. However, in the Non-Participate Group, the respondents have a relatively higher educational level, with 71.6% having a college degree or higher. This may be related to the fact that the respondents in the Participate Group are generally older.

Table 1: Summary statistics of the 184 participants in the questionnaire

Items		Number	Percentage	Participate Group		Non-Participate Group	
Sex	Male	57	30.98%	23	22.33%	34	41.98%
	Female	127	69.02%	80	77.67%	47	58.02%
Age	Below 30	42	22.83%	11	10.68%	31	38.27%
	31 - 40	20	10.87%	11	10.68%	9	11.11%
	41 - 50	42	22.83%	31	30.10%	11	13.58%
	51 - 60	66	35.87%	40	38.83%	26	32.10%
	Above 60	14	7.61%	10	9.71%	4	4.94%
	Junior high school and below	28	15.22%	26	25.24%	2	2.47%
Education background	Senior high school	57	30.98%	44	42.72%	13	16.05%
	Junior college	24	13.04%	16	15.53%	8	9.88%
	Undergraduate	50	27.17%	8	7.77%	42	51.85%
	Postgraduate and above	25	13.59%	9	8.74%	16	19.75%
Participated commercial health management or not	Yes	103	55.98%	103	100%		
	No	81	44.02%			81	100%

Data collection for body fat scales

The data from the body fat scales were also collected with the assistance of the 7 operators. While helping distribute the questionnaires, the 7 operators provided the author with data from the body fat scales during the data collection period. This approach ensures a significant overlap between the respondents of the body fat scales and the questionnaires, as both utilize anonymous methods that cannot be directly matched. A total of 284 data samples were collected. The body fat scales use bioelectrical impedance analysis to detect the distribution and proportion of fat and muscle in the user's body, which was used to understand the basic health condition of the consumers. The collected information includes 30

parameters, such as height, weight, body fat percentage, and muscle mass. Longitudinal comparisons cannot be made since many of these monitoring indicators are absolute values and are influenced by individual differences such as gender, age, and height. Therefore, the author mainly analyzed the following six relative values: 1. BMI, 2. Body fat percentage, 3. Visceral fat index, 4. Weight control (percentage), 5. Fat control (percentage), and 6. Muscle control (percentage).

Based on the China Blue Paper on Obesity Prevention and Control, the expert group diagnosed overweight and obesity in Chinese adults as follows: BMI below 18.5 indicates underweight, BMI between 18.5 and 23.9 indicates normal weight, BMI between 24.0 and 27.9

indicates overweight, and BMI greater than 28 indicates obesity [33]. 2. Body fat percentage refers to the proportion of body fat weight in the total body weight, reflecting the amount of fat in the body. The normal range for body fat percentage is generally 20% - 25% for females and 15% - 18% for males. 3. The visceral fat index is graded based on the size of the fat area around the viscera and generally falls within the range of 1 - 9 as normal. 4. Weight control (percentage) = weight control (KG)/current actual weight (KG)*100%. It represents the proportion of weight that the user needs to gain or lose in relation to their current total weight. 5. Fat control (percentage) = fat control (KG)/weight control (KG)*100%. It represents the proportion of fat that the user needs to gain or lose in relation to their weight control. 6. Muscle control (percentage) = muscle control (KG)/weight control (KG)*100%. It represents the proportion of muscle that the user needs to gain or lose in relation to their weight control.

Statistics for body fat scales

From Table 2, it can be seen that out of the 284 participants, female participants account for 77.11%, which may reflect that the main consumers are women. Looking at the overall situation shown in the table, it can be concluded that users in general have issues of overweight and high body fat percentage, which confirms the aforementioned problem of overweight and obesity faced by Chinese residents.

BMI measures the degree of obesity by considering a person's weight and height. The results showed that more than half of the respondents had issues with being

overweight or obese, particularly among males. For the body fat percentage, the situation is even more severe: only 1/10 respondents did not have issues with exceeding the recommended fat levels. Therefore, more than 80% of the respondents have a need to lose weight. It is worth noting that over 90% of the respondents have a fat control (percentage) exceeding 100%, indicating that the main cause of overweight is excessive fat. Among them, the issue of hidden obesity is worth paying attention to. These individuals have a fat control (percentage) greater than 100%, which means that they not only need to reduce fat but also require muscle gain. Typically, these users have a normal BMI, but their body fat percentage exceeds the recommended levels. Therefore, regular weighing scales cannot detect the problem. Finally, regarding muscle issues, the majority of respondents had sufficient muscle mass and did not need to control it, especially among female users. A small percentage of male users (15%) need to increase muscle while losing weight.

Overall, the data reflected in the table show that consumers generally have issues of overweight and excessive body fat, with the majority having a need to reduce weight and fat. Additionally, a small portion of users need to increase muscle mass while reducing weight, with a relatively high proportion of male users in this category. Moreover, although some female users fall within the normal weight range, they have a higher body fat percentage, indicating hidden obesity, which deserves more attention.

Table 2: Summary statistics of the 284 participants in body fat scales

Items		Male		Female		Sum	
Total		65		219		284	
BMI	< 18.5	1	1.54%	12	5.48%	13	4.58%
	18.5 - 23.9	22	33.85%	96	43.84%	118	41.55%
	24 - 27.9	38	58.46%	91	41.55%	129	45.42%
	> 27.9	4	6.15%	20	9.13%	24	8.45%
Body fat percentage	Low	1	1.54%	14	6.39%	15	5.28%
	Normal	2	3.08%	16	7.31%	18	6.34%
	High	62	95.38%	189	86.30%	251	88.38%
Visceral fat index	1 - 9	48	73.85%	147	67.12%	195	68.66%
	≥10	17	26.15%	72	32.88%	89	31.34%
Weight control (percentage)	≥ 0	4	6.15%	26	11.87%	30	10.56%
	(-1%) - (-10%)	27	41.54%	103	47.03%	130	45.77%
	(-11%) - (-20%)	34	52.31%	90	41.10%	124	43.66%
	< 0	3	4.62%	5	2.28%	8	2.82%
Fat control (percentage)	0 - 99%	1	1.54%	7	3.20%	8	2.82%
	100%	50	76.92%	199	90.87%	249	87.68%
	> 100%	11	16.92%	8	3.65%	19	6.69%
Muscle control	< 0	11	16.92%	8	3.65%	19	6.69%

(percentage)	= 0	50	76.92%	199	90.87%	249	87.68%
	> 0	4	6.15%	12	5.48%	16	5.63%

4. Research results analysis

Research Finding 1: respondents in the Participate Group are more satisfied with their health conditions

Question 4 in the questionnaire asked respondents about their satisfaction with their current health condition, and they were asked to rate it on a scale of 1-5, with 1 being very dissatisfied and 5 being very satisfied.

Table 3 shows that among the Participate Group, 42.71% of respondents rated their satisfaction level at 4-5, 44.66% rated it as 3, and only 12.62% rated it as 1-2. In contrast, in the Non-Participate Group, only 19.75% of

respondents were satisfied/very satisfied with their health condition, 58.02% rated it as 3, and 22.22% expressed dissatisfaction/very dissatisfaction with their health condition. Additionally, over 70% of users who were satisfied with their health condition had participated in health management courses, while over 77% of users who were very dissatisfied with their health condition had not participated in any health management courses. Therefore, based on the above data, it can be observed that respondents in the Participate Group are more satisfied with their health condition.

Table 3: Respondents' satisfaction with current health conditions

	Participate Group		Non-Participate Group		Sum	
Very dissatisfied	2	1.94%	7	8.64%	9	4.89%
Dissatisfied	11	10.68%	11	13.58%	22	11.96%
General	46	44.66%	47	58.02%	93	50.54%
Satisfied	39	37.86%	14	17.28%	53	28.80%
Very satisfied	5	4.85%	2	2.47%	7	3.80%
Sum	103		81		184	

Research Finding 2: Respondents in the Participate Group exhibit healthier behaviors (in frequency of daily monitoring, health check-ups, and participation in health activities)

Based on finding 1, it is evident that respondents in the Participate Group are more satisfied with their health condition. This raises the question of whether their higher satisfaction is related to their adherence to healthier behaviors. Therefore, a comparison was made

between questions Q5-Q8 in the questionnaire, focusing on the frequency of daily monitoring, health check-ups, and participation in health activities. The results are as follows, and based on the analysis below, the respondents in the Participate Group invest more time and effort in health care overall, which may be related to their more positive evaluation of their own health status.

Daily monitoring

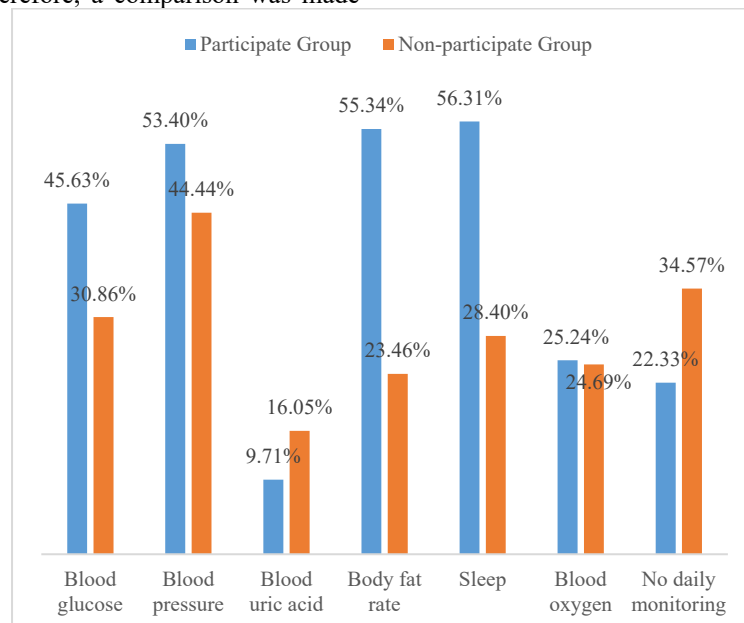


Figure 1 Daily Monitoring

Among the 184 respondents, a total of 51 individuals stated that they never engaged in the six mentioned daily monitoring activities in the questionnaire. Of these, 23 were from the Participate Group and 28 were from the

Non-Participate Group, accounting for 22.33% and 34.57%, respectively (in Figure 1).

Furthermore, among the respondents who conducted daily monitoring, members of the Participate Group

engaged in a higher average number of monitoring activities per person (3.16 activities per person) compared to the Non-Participate Group (2.57 activities per person). It is worth noting that respondents in the Participate Group had a higher proportion of sleep monitoring and body fat monitoring. Among the 81 individuals conducting sleep monitoring, 71.6% were in the Participate Group, and among the 76 individuals conducting body fat monitoring, 75% were in the Participate Group. The author surmises that this may be related to portable health monitoring devices introduced by Company P. Company P has released smart wearable devices such as fitness trackers and body fat scales in recent years.

Frequency of health check-ups

Although the proportion of individuals who have never undergone health check-ups is similar on both sides: 11.65% of respondents from the Participate Group and 11.11% from the Non-Participate Group, the overall frequency of health check-ups is higher in the Participate Group. Looking at the frequency of check-ups ranging from once every six months to once a year, it is 65.05% for the Participate Group and 50.61% for the Non-Participate Group.

It is worth noting that among the Non-Participate

Group, out of the 19 individuals with a frequency of check-ups greater than three years, 11 individuals are under the age of 30, and 9 of them have a bachelor's degree or higher. This indicates that the proportion of younger age and higher education level is relatively high. Additionally, out of these 19 individuals, 8 individuals did not conduct daily monitoring, indicating significant overlap between these two groups. Based on the reasons provided by respondents for having low health check-ups in Q7, it can be seen that young people rely on their good health due to their age and lack awareness of the importance of regular health check-ups (accounting for 56.25% in total). Moreover, economic pressure is also mentioned as one of the reasons by many respondents (25% in total).

Furthermore, the author summarized the reasons for low health check-ups among the Participate Group and found that half of the respondents believe they are currently very healthy and do not need to undergo check-ups. Although the overall health behaviors of the Participate Group may be higher, regular health check-ups are essential. This should be taken seriously, especially by operators who organize health management activities. They should strengthen guidance and education in this area.

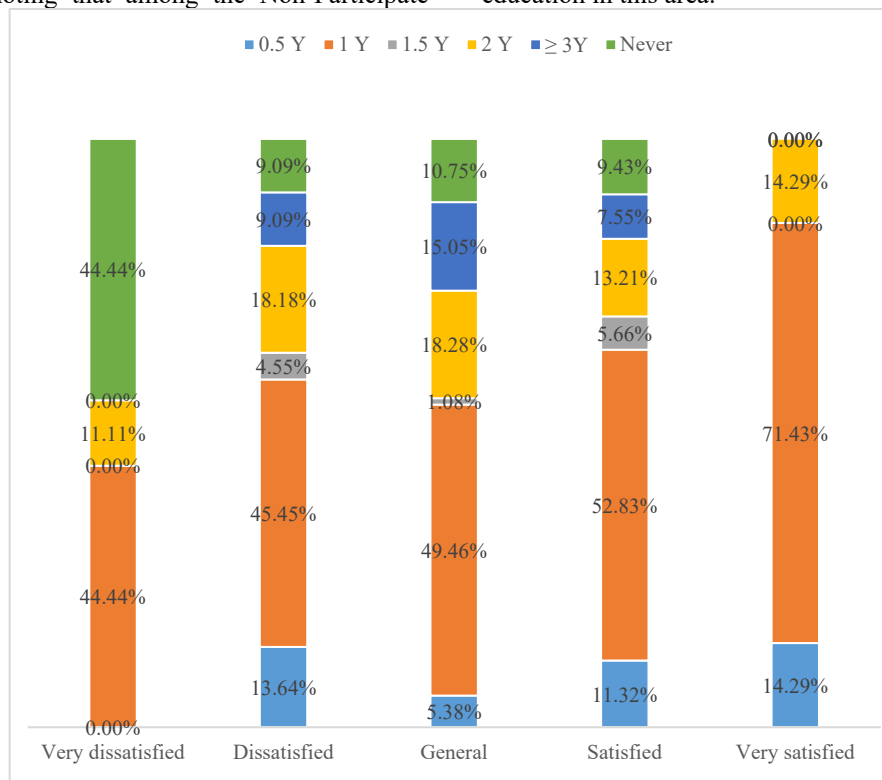


Figure 2: The relationship between self-assessment of health and frequency of health examination

Finally, the author found that respondents who are not satisfied with their health condition have a relatively low frequency of medical check-ups (in Figure 2). Among the respondents who were very dissatisfied with their health, 44.44% had never undergone a medical check-up. The two main reasons for the low frequency of medical check-ups are fear of discovering health problems and lack of awareness. However, in reality, it is even more important for individuals who are not satisfied with their

health to undergo regular health check-ups to monitor their physical condition and detect diseases early for prompt treatment. Therefore, it can be seen that a certain proportion of the respondents have poor awareness of health management and still focus on treatment rather than prevention.

Frequency of participating in health-related activities

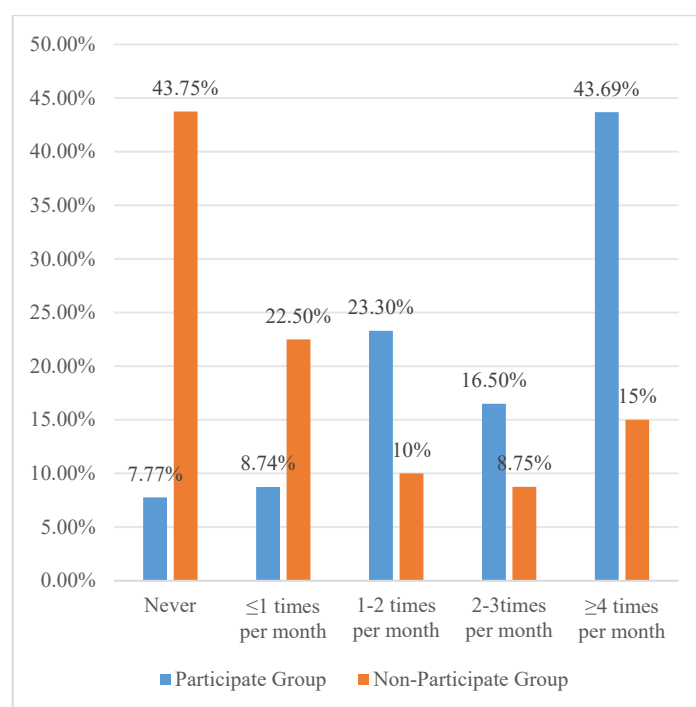


Figure 3: Frequency of participating in health-related activities

Overall, the Participate Group has a higher frequency of participating in health-related activities. In the Participate Group, the proportion of individuals who participate in health-related activities four times or more per month reaches 43.69%, while it is only 15% in the Non-Participate Group (in Figure 3). Additionally, in the Non-Participate Group, the proportion of individuals who do not participate in any health-related activities once a month is 43.75%, compared to only 7.77% in the Participate Group. Therefore, overall, the respondents in the Participate Group invest more time and effort in health care, which may be related to their more positive evaluation of their own health status.

Research Finding 3: Individuals in the Participate Group are more willing to pay for health-related products or services

Based on finding 1, it can be seen that respondents in the Participate Group are more satisfied with their health condition. Additionally, according to the analysis in finding 2, it is evident that respondents in the Participate Group overall invest more time and effort in managing

their own health. Therefore, the author hypothesized that the respondents in the Participate Group would also have higher financial investment. To investigate this, the author compared Q9-Q11 in the questionnaire to compare the two groups of respondents from an economic perspective. The analysis results are as follows:

Expenditure on health-related products and services by households

The Participate Group has higher overall economic expenditure on health-related products or services. Figure 4 illustrates the economic expenditure on health-related products and services by households throughout the year for both groups. It can be observed that in the Participate Group, the proportion of households with annual expenditures ranging from 10,000 to 30,000 yuan is 36.89%, while in the Non-Participate Group, it is only 10.00%. Furthermore, in the Participate Group, the proportion of households with annual expenditures ranging from 0 to 5,000 yuan is 29.13%, while in the Non-Participate Group, it is as high as 66.25%.

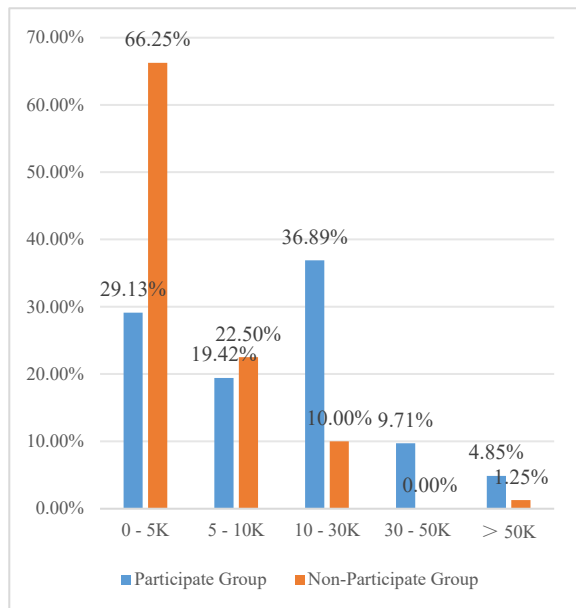


Figure 4: Household Consumption on Health-Related Products And Services

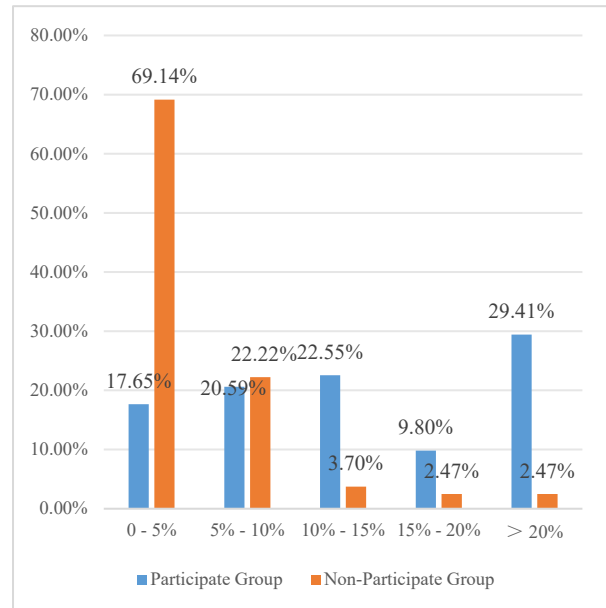


Figure 5: Proportion of Economic Investment in Health to Total Household Income

Moreover, members of the Participate Group allocate a higher proportion of their total household income to health-related expenses (in Figure 5). Among the respondents in the Participate Group, 29.41% indicate that their economic investment in health accounts for more than 20% of their total household income, compared to only 2.47% in the Non-Participate Group. Additionally, in the Non-Participate Group, 69.14% of the respondents state that their economic investment in health accounts for less than 5% of their total household income, whereas in the Participate Group, this percentage is only 17.65%.

Finally, question 11 in the survey examined respondents' willingness to pay for health management-related knowledge (in Figure 6). The results indicate that respondents in the Participate Group are more willing to pay for health management knowledge: 77.67% of the respondents in the Participate Group are willing or very willing to pay, while in the Non-Participate Group, this percentage is only 27.16%. Conversely, many respondents are unwilling or very unwilling to pay in the Non-Participate Group (19.75% in the Non-Participate Group and 4.85% in the Participate Group).

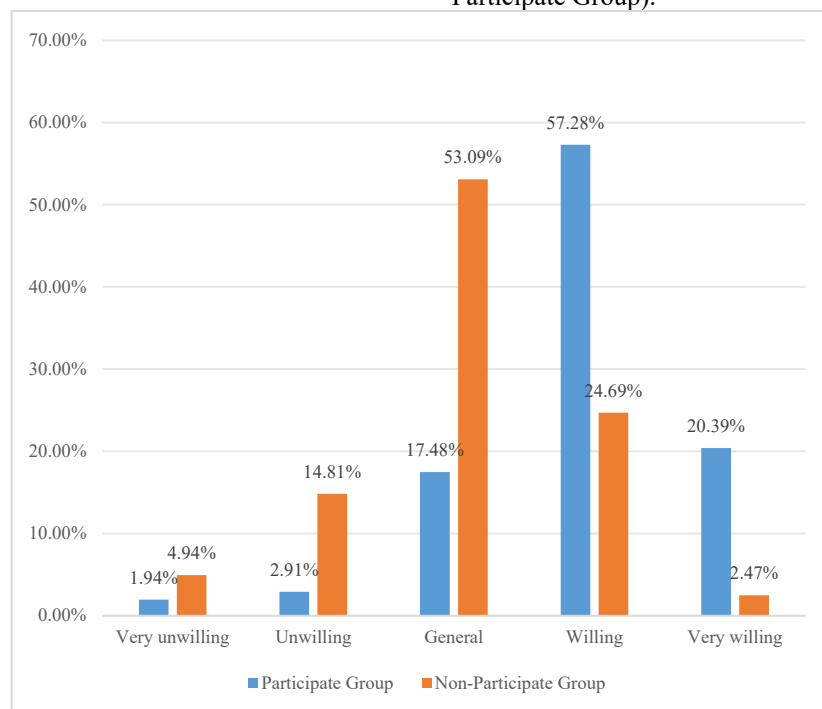


Figure 6: Willingness to pay for health management-related knowledge

The correlation between household income and consumption of health-related products and services

Based on the above analysis, the Participate Group overall invests more in health management. Not only does the Participate Group spend more on health-related products or services, but their investment in health accounts for a larger proportion of their total household income. Moreover, the Participate Group is generally more willing to pay for health management knowledge. As the average age of the Participate Group was higher than that of the Non-Participate group, the author considered whether their high economic investment in

health was related to their higher income level. Therefore, based on the data from questions Q9-Q10, the author calculates the annual income of the respondents and has the following findings:

According to the questionnaire data, the average annual incomes of the two groups do not differ significantly: Participate Group = 137.23K; Non-Participate group = 139.20K. Figure 7 shows the approximate annual income of the two groups. The overall income level of the two groups is similar, and the main income range is between 60-100K.

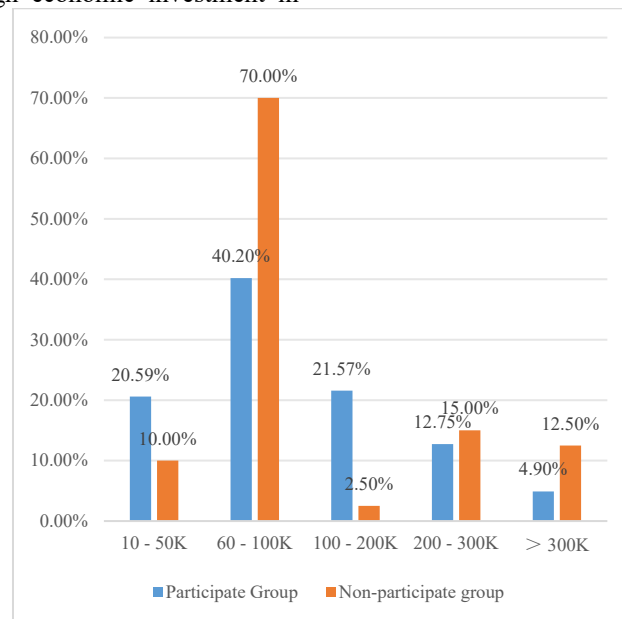


Figure 7: Annual Income

Figure 8 compares the annual income and health-related economic investment of Participate Group and Non-Participate group. By vertical comparing the relationship between annual income and health-related economic expenditure, it can be seen that the population with higher income generally invests more in health than those with lower income levels. However, when

comparing the Participate Group and Non-Participate group horizontally, it can be found that for people with the same income level, the overall health-related economic investment in the Participate Group is higher. Therefore, the Participate Group's higher economic investment in health management is not because of higher income compared with the Non-Participate group.

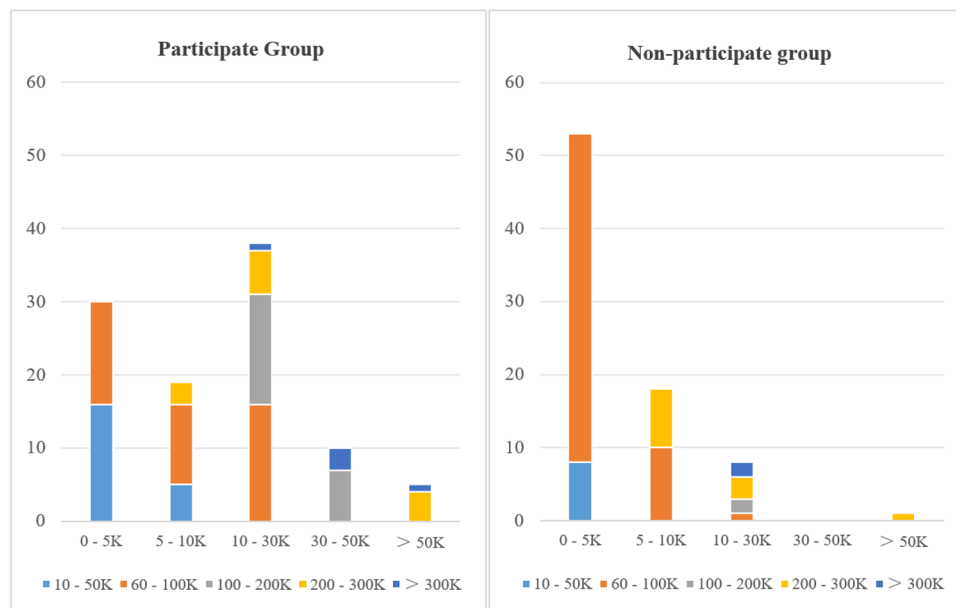


Figure 8: Annual income and health-related economic investment

The author also conducted a comparative analysis of the willingness to pay for health management knowledge and annual income. Figure 9 compares the annual income and willingness to pay for health management knowledge in the Participate Group and Non-Participate group. By

comparing the two groups horizontally, it can be seen that for individuals with the same income level, the respondents in the Participate Group have a stronger willingness to pay.

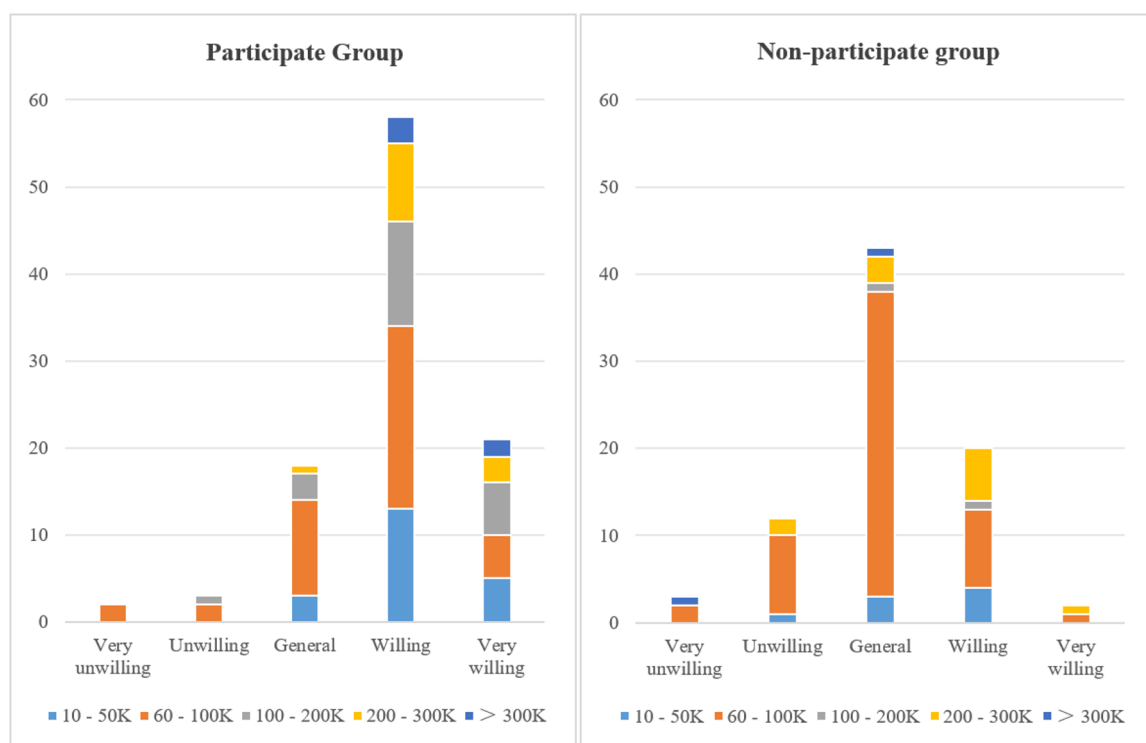


Figure 9: Annual income and willingness to pay for health

Therefore, the overall higher willingness to pay for health management knowledge in the Participate Group is not because they have higher income. The author think that the consumption of health services or products, like other types of goods, is always influenced by individual preference. When people choose to consume medical and health services and products, they will achieve optimal

utility by balancing their current and future health consumption. As individuals have difficulty accurately judging the medical and health services they need and their quality, especially regarding health investment in disease prevention and its future effects, consumers lack sufficient judgment ability to benefit from medical care. Therefore, under the premise of limited information,

consumers hesitate about whether they can benefit from medical and health care. However, as the respondents in the Participate Group regularly participate in health management activities and have certain awareness of the importance of prevention, they may have a more optimistic attitude toward the future efficacy of current health consumption, thus having a stronger willingness to spend on health consumption.

5. Conclusions

Health education originated from hygiene education related to schools, and its core content is to educate people to develop a health consciousness, cultivate good health behaviors and lifestyles, and eliminate or reduce the risk factors that affect health. In the early stages of China, scientific research on health education was mainly limited to studying the level of hygiene knowledge, hygiene behavior, and the effectiveness of health promotion among various social groups. As research work deepened, it gradually shifted toward intervention studies on key populations and major health issues in health education. Currently, research in the field of health education in China, represented by high-frequency keywords, mainly focuses on school health education, chronic disease prevention and control, and intervention for major diseases [7], with less research on commercial health education and promotion activities related to daily health maintenance and health consumer behavior. In this study, a questionnaire was utilized to investigate the impact of commercial health education and promotion activities on individual daily health maintenance and health-related consumption behavior.

The study found that commercial health education and promotion activities have a positive impact on individual daily health maintenance and health-related consumption behavior, mainly manifested in three aspects: (1) Individuals participating in these activities are more satisfied and confident about their health status. However, body fat scale data revealed that the respondents generally had a need to reduce weight and fat. Since a high body fat percentage does not immediately lead to diseases, it tends to be overlooked. Operators should strengthen guidance and education in this aspect. (2) The participants in these activities exhibit more proactive daily health maintenance behaviors, such as more frequent monitoring of physical indicators, a higher frequency of health check-ups, and greater participation in health-related activities. It is worth noting that further analysis of individuals with low health check-up frequency revealed two main reasons: on the one hand, there were individuals dissatisfied with their health condition who were afraid of discovering problems during check-ups and thus avoided them; on the other hand, there were individuals actively participating in health maintenance activities who were overconfident in their health condition and did not prioritize check-ups. The "Basic Knowledge and Skills of Health Literacy for Chinese Citizens" includes a provision that residents should undergo regular health check-ups. However, according to the 2022 "China

Health and Health Statistics Yearbook," the total number of health check-ups nationwide in 2019 was approximately 440 million, with a national coverage rate of only 31.7%. Our research may partly explain why people are unwilling to undergo check-ups, so operators should pay more attention to emphasizing the importance of regular health check-ups in the future. Additionally, the study found that consumers of Company P exhibited more common behaviors in sleep monitoring and body fat monitoring, which may be related to the portable health monitoring devices introduced by Company P. (3) The participants in these activities showed a stronger willingness to pay for health-related products or services, and their households had a relatively large proportion of economic expenditure on health. It is worth noting that the two groups of respondents had no significant difference in income, thus ruling out the influence of income on the willingness for health consumption. The reason for this phenomenon may be that regular participation in health management activities leads to a certain understanding of the importance of prevention, resulting in a more optimistic attitude toward the utility that health consumption can bring in the future, thereby generating a stronger willingness for health consumption.

However, there are some limitations worth noting. Due to the short time span, the number of consumers who can participate in each activity is limited. Therefore, this study has a small sample size, and quantitative analysis is not available. In the future, further research can be conducted by increasing the scale and frequency of events to enhance the sample size to deeply identify the relation between health education and promotion activities with individual health behavior.

Reference

1. The State Council of the People's Republic of China. (2021). The 14th Five-Year Plan for National Economic and Social Development and the Long-Range Objectives Through the Year 2035. Retrieved Nov. 23, 2023, from https://www.gov.cn/xinwen/2021-03/13/content_5592681.htm
2. National Health Commission of the PRC. (2021). China Health Statistics Yearbook 2020. Retrieved Nov. 23, 2023, from <http://www.nhc.gov.cn/mohwsbwstjxxzx/tjtjn/202112/dcd39654d66c4e6abf4d7b1389becd01.shtml>
3. Pan, X., Wang, L. & Pan, A. (2021). Epidemiology and determinants of obesity in China. *The lancet. Diabetes endocrinology*, 9(6):373-392.
4. Liu, G. (2021). Healthy China and Economic growth in the post-pandemic era. Retrieved October 29, 2023, from Peking University, Institute for Global Health and Development Web site: <https://www.ghd.pku.edu.cn/rcdw/jsxl/L/lglgyjgd/c637a5d879194d2dac375929c6ec3a41.htm>.
5. Gorina, M., Limonero, J. T., & Alvarez, M. (2018). Effectiveness of primary healthcare educational interventions undertaken by nurses to improve

- chronic disease management in patients with diabetes mellitus, hypertension and hypercholesterolemia: A systematic review. *International journal of nursing studies*, 86, 139-150.
6. Liu, H., Mu, Y. & Feng, Z. (2015). Implications of American Managed Care on the Community-based Health Management in China. *Medicine and Philosophy*, 36(9):74-77.
7. Lv, S. (2016). Review of progress of scientific research on health education and health promotion in China. *Chinese Journal of Health Education*, 32(12):1119-1122.
8. Schwarzer R, Luszczynska A. (2008). How to overcome health-compromising behaviors: The health action process approach. *European Psychologist*, 13(2): 141-151.
9. Ajzen, I., & Fishbein, M. (1977). Attitude-behavior relations: A theoretical analysis and review of empirical research. *Psychological bulletin*, 84(5), 888.
10. Sheeran, P. (2002). Intention—behavior relations: a conceptual and empirical review. *European review of social psychology*, 12(1), 1-36.
11. Bierbauer, W., Inauen, J., Schaefer, S., Kleemeyer, M. M., Lüscher, J., König, C., ... & Scholz, U. (2017). Health behavior change in older adults: Testing the health action process approach at the inter- and intraindividual level. *Applied Psychology: Health and Well-Being*, 9(3), 324-348.
12. Buawangpong, N., Sirikul, W., Anukhro, C., Seesen, M., La-Up, A., & Sivoj, P. (2022). Health information sources influencing health literacy in different social contexts across age groups in northern Thailand citizens. *International Journal of Environmental Research and Public Health*, 19(10), 6051.
13. Li, X., & Liu, Q. (2020). Social media use, eHealth literacy, disease knowledge, and preventive behaviors in the COVID-19 pandemic: Cross-sectional study on Chinese netizens. *Journal of medical Internet research*, 22(10), e19684.
14. Kontos, E., Blake, K. D., Chou, W. Y. S., & Prestin, A. (2014). Predictors of eHealth usage: insights on the digital divide from the Health Information National Trends Survey 2012. *Journal of medical Internet research*, 16(7), e172.
15. Tennant, B., Stelfox, M., Dodd, V., Chaney, B., Chaney, D., Paige, S., & Alber, J. (2015). eHealth literacy and Web 2.0 health information seeking behaviors among baby boomers and older adults. *Journal of medical Internet research*, 17(3), e70.
16. Branquinho, C., Paiva, T., Guedes, F., Gaspar, T., Tomé, G., & Gaspar de Matos, M. (2022). Health risk behaviors before and during COVID-19 and gender differences. *Journal of Community Psychology*, 50(2), 1102-1110.
17. Cai, H. (2020). Sex difference and smoking predisposition in patients with COVID-19. *The Lancet Respiratory Medicine*, 8(4), e20.
18. Satre, D. D., Hirschtritt, M. E., Silverberg, M. J., & Sterling, S. A. (2020). Addressing problems with alcohol and other substances among older adults during the COVID-19 pandemic. *The American Journal of Geriatric Psychiatry*, 28(7), 780-783.
19. Weerakoon, S. M., Jetelina, K. K., & Knell, G. (2020). Longer time spent at home during COVID-19 pandemic is associated with binge drinking among US adults. *The American Journal of Drug and Alcohol Abuse*, 47, 98-106.
20. Liu, N., Zhang, F., Wei, C., Jia, Y., Shang, Z., Sun, L., Wu, L., Sun, Z., Zhou, Y., Wang, Y., & Liu, W. (2020). Prevalence and predictors of PTSD during COVID-19 outbreak in China hardest-hit areas: Gender differences matter. *Psychiatry Research*, 287, 112921.
21. Sinha, M., Pande, B., & Sinha, R. (2020). Impact of COVID-19 lockdown on sleep-wake schedule and associated lifestyle related behavior: A national survey. *Journal of Public Health Research*, 9(3), 239-245.
22. Zajacova, A., & Lawrence, E. M. (2018). The relationship between education and health: reducing disparities through a contextual approach. *Annual review of public health*, 39, 273-289.
23. Johnson-Lawrence, V., Zajacova, A., & Sneed, R. (2017). Education, race/ethnicity, and multimorbidity among adults aged 30-64 in the National Health Interview Survey. *SSM-population health*, 3, 366-372.
24. Manning, W. G., Newhouse, J. P., Duan, N., Keeler, E. B., & Leibowitz, A. (1987). Health insurance and the demand for medical care: evidence from a randomized experiment. *The American economic review*, 251-277.
25. Yu, D. (2015). Does Basic Medical Insurance for Urban Residents Raise Medical Service Utilization?—An Empirical Evaluation of System Running Effect. *Journal of Finance and Economics*. 30(5):117-128
26. Shen, M., He, W., & Li, L. (2020). Incentives to use primary care and their impact on healthcare utilization: evidence using a public health insurance dataset in China. *Social Science & Medicine*, 255, 112981.
27. Glanz, K., Rimer, B. K., & Viswanath, K. (Eds.). (2015). *Health behavior: Theory, research, and practice*. John Wiley & Sons.
28. Fielding, J. E. (2022). *Health program planning, implementation, and evaluation: creating behavioral, environmental, and policy change*. JHU Press.
29. Koelen, M. A., & Van den Ban, A. W. (2004). *Health education and health promotion*. Wageningen Academic Publishers.
30. Green, L. W., & Kreuter, M. W. (1990). *Health*

promotion as a public health strategy for the 1990s. *Annual review of public health*, 11(1), 319-334.

31. Winkleby, M. A. (1994). The future of community-based cardiovascular disease intervention studies. *American Journal of Public Health*, 84(9), 1369-1372.
32. Glanz, K., & Bishop, D. B. (2010). The role of behavioral science theory in development and implementation of public health interventions. *Annual review of public health*, 31, 399-418.
33. Wang, Y., Sun, X., & Yang, Y. (2019). *China Blue Paper on Obesity Prevention and Control*. Peking University Medical Press