

The Relationship between Healthy Lifestyle Beliefs and Sub-health Status among College Students

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Abstract: Objective: To explore the relationship between healthy lifestyle beliefs and sub-health status among college students. **Methods:** A questionnaire survey was conducted among 1,091 college students in Zhuhai, Guangdong Province. Data were collected using the Healthy Lifestyle Beliefs Scale and the Sub-health Rating Scale, and descriptive statistics, Spearman correlation analysis, and linear regression analysis were used to examine the relationships between variables. **Results:** The median score for healthy lifestyle beliefs was 64 (48, 72), and the median total sub-health score was 108 (101, 118). Healthy lifestyle beliefs were significantly positively correlated with the total sub-health score ($r=0.169$, $p<0.001$), and were also significantly correlated with the physiological, psychological, and social sub-health dimensions. Regression analysis showed that healthy lifestyle beliefs significantly and positively predicted the total sub-health score ($\beta=0.247$, $t=8.419$, $p<0.001$). **Conclusion:** More positive healthy lifestyle beliefs are associated with better health status and a lower level of sub-health among college students. Universities should pay attention to health cognition and health belief education, and guide students to develop positive health values and awareness of self-health management.

Keywords: Healthy Lifestyle Beliefs; Sub-health Status; Health Promotion; Health Education

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1. Introduction

The university stage is an important period during which individuals move from adolescence to early adulthood. Compared with secondary school, college students experience marked changes in learning styles, daily rhythms, interpersonal relationships, and self-management. After entering university, students need to arrange sleep, diet, physical activity, study, and interpersonal communication more independently, while also facing pressures related to academic competition, career planning, and social adaptation. Previous studies have suggested that university life is a key period for the formation and consolidation of health-related behaviors, and that health perception, health behaviors, and risk behaviors are influenced by the university environment^[1,2]. If individuals lack stable health cognition and healthy behaviors, long-term fatigue, insufficient sleep, mood fluctuations, reduced attention, and social adaptation difficulties may gradually accumulate and manifest as sub-health. Sub-health is not a definite disease, but a transitional state between health and disease, usually reflected in physiological, psychological, and social functioning below an ideal level. For college students, sub-health is often hidden and cumulative; if it is not identified and addressed in time, it may further affect academic efficiency, quality of life, and future health development.

In recent years, the role of healthy lifestyles in health promotion among young people has received increasing attention. Arafa et al. noted that lifestyle behaviors in childhood and adolescence are jointly shaped by family, school, sociocultural, and environmental factors, and may have long-term effects on chronic disease risk, mental health, and quality of life ^[3]. Bourke et al. further suggested that healthier lifestyle behavior patterns during adolescence are associated with better mental health and wellbeing in emerging adulthood ^[4]. Peuters et al. indicated that physical activity, reduced sedentary behavior, adequate sleep, and healthy diet may have protective effects on adolescent and youth mental health ^[5]. Alothman et al. also emphasized that identifying and improving lifestyle behaviors among university students can help reduce multiple health risks and promote long-term health ^[6]. Therefore, the health status of college students depends not only on whether they already have a disease, but also on their understanding of health, behavioral choices, and self-management ability.

Healthy lifestyle beliefs are an important psychological variable for understanding the formation of health behaviors. They mainly refer to an individual's cognitive tendency to believe that they can adopt and maintain a healthy lifestyle, including beliefs about healthy eating, active exercise, emotion regulation, stress management, and persistence in health-promoting behaviors. Melnyk, Kelly, and Tan examined the psychometric properties of the Healthy Lifestyle Beliefs Scale and suggested that it can be used to assess adolescents' beliefs about their ability to maintain a healthy lifestyle ^[7]. Compared with health knowledge alone, healthy lifestyle beliefs place greater emphasis on whether individuals believe that they can do it and that it is worth doing. Such beliefs are action oriented and can influence whether individuals are willing to choose healthy behaviors and whether they can persist when encountering pressure and barriers.

Existing studies have shown that healthy lifestyle beliefs are related to a range of health outcomes. Akdeniz Kudubes et al. found in a sample of Turkish adolescents that healthy lifestyle beliefs predicted attitudes toward nutrition, exercise, physical activity, and weight-related self-efficacy ^[8]. Chan, Melnyk, and Chen also found in Taiwanese adolescents that positive healthy lifestyle beliefs had a significant positive effect on healthy lifestyle behaviors ^[9]. Nunes et al. further suggested that healthy lifestyle beliefs are an important predictor of lifestyle behaviors, and that assessing these beliefs can help guide health behavior interventions ^[10]. Earlier work also linked healthy lifestyle cognitive beliefs with healthy lifestyle choices, social support, and healthy behaviors among adolescents ^[11]. In addition, Çol et al. showed that health promotion training could improve university students' health perceptions and healthy lifestyle behaviors and reduce some risky behaviors ^[1]. Thus, healthy lifestyle beliefs are not abstract attitudes, but an important psychological basis linking health cognition, behavioral choice, and health outcomes.

Healthy lifestyle beliefs are especially important among college students. College students usually have some health knowledge, but knowledge does not necessarily translate into action. Some students understand the importance of regular routines, balanced diet, and emotion management, yet still stay up late, remain sedentary, eat irregularly, or neglect psychological stress. One important reason for this phenomenon is that individuals may lack the beliefs and self-efficacy needed to transform health knowledge into stable action. Horaist et al.'s study of first-year college students also suggested that the early university stage is an important period for the formation of health behaviors, and that diet, exercise, sleep, and stress-management habits influence later health development ^[2]. If college students believe that they can make healthy choices and that these choices can improve their condition, they may be more likely to actively adjust their lifestyle. Conversely, if they believe that healthy behaviors are difficult to maintain, have limited effects, or conflict with real-life pressure, they may be more likely to fall into unhealthy behavioral patterns.

Sub-health is a suitable perspective for evaluating the health of college students. Compared with disease diagnosis, sub-health emphasizes non-disease-related health depletion in daily life, such as physical fatigue, decreased sleep quality, emotional instability, reduced attention, fewer social activities, and weakened social adaptation. The Sub-health Rating Scale divides individual health into physiological, psychological, and social dimensions, allowing a relatively comprehensive assessment of college students' overall health in study and life ^[12]. Healthy lifestyle beliefs may be related to all these dimensions. Positive health beliefs may help individuals arrange daily life more reasonably, strengthen emotion-regulation awareness, increase initiative in coping with difficulties, and improve overall health through sustained healthy behaviors.

However, existing research has focused more on the associations between healthy lifestyle beliefs and dietary attitudes,

exercise attitudes, healthy lifestyle behaviors, or mental health, while studies directly examining their relationship with sub-health status among college students remain relatively limited. In fact, sub-health is not determined by a single behavior alone, but is also related to individuals' understanding, evaluation, and action beliefs regarding health. College students with stronger healthy lifestyle beliefs may pay more attention to their physical and psychological signals and may be more willing to adopt healthy behaviors to cope with fatigue, stress, and life imbalance, thereby showing better health status. In contrast, individuals who lack healthy lifestyle beliefs may find it difficult to form sustained actions even when they know the importance of healthy behaviors, which may increase the risk of sub-health.

Based on this background, the present study analyzes the original survey data and focuses only on the two core variables of healthy lifestyle beliefs and sub-health status among college students. This study aims to answer two questions: first, whether healthy lifestyle beliefs are significantly associated with sub-health status among college students; second, whether healthy lifestyle beliefs can significantly predict college students' sub-health status. Through this analysis, this study seeks to clarify the role of healthy lifestyle beliefs in sub-health prevention and health promotion among college students, and to provide a reference for health education, lifestyle guidance, and early intervention for sub-health in universities.

2. Methods

2.1 Participants

This study used a questionnaire survey to collect data from college students in Zhuhai, Guangdong Province. A total of 1,176 questionnaires were distributed in the original survey, and 1,091 valid questionnaires were finally obtained, with an effective response rate of 92.77%. Among the participants, 486 were male, accounting for 44.55%, and 605 were female, accounting for 55.45%. In terms of grade distribution, first-year students accounted for the largest proportion (39.96%), followed by second- and third-year students. Based on the original survey data, the present study conducted a secondary analysis and retained only two core variables, healthy lifestyle beliefs and sub-health status, without including other variables such as regular exercise or social support.

2.2 Measures

2.2.1 Healthy Lifestyle Beliefs Scale

Healthy lifestyle beliefs were measured using the Healthy Lifestyle Beliefs Scale, which was psychometrically evaluated by Melnyk, Kelly, and Tan (2021)^[7]. The scale is used to assess individuals' beliefs about their ability to maintain a healthy lifestyle. It contains 16 items and includes two dimensions: engagement in healthy lifestyle behaviors and emotion regulation. The scale uses a 5-point Likert scoring method, ranging from 1 (strongly disagree) to 5 (strongly agree), with total scores ranging from 16 to 80. Higher scores indicate stronger beliefs that one can choose and maintain a healthy lifestyle. In this study, the Cronbach's α coefficient of the scale was 0.982, indicating good internal consistency.

2.2.2 Sub-health Rating Scale

Sub-health status was measured using the Sub-health Rating Scale developed by Xu et al. (2011)^[12]. This scale evaluates individual health status from physiological, psychological, and social dimensions, and can reflect non-disease-related health depletion in college students' daily lives. The total score ranges from 35 to 175, with higher scores indicating better health status and a lower level of sub-health. In this study, the Cronbach's α coefficient of the Sub-health Rating Scale was 0.883, indicating good reliability.

2.3 Data Analysis

SPSS 26.0 was used for data analysis. First, descriptive statistics were conducted for participants' basic information and the main variables. Second, Spearman correlation analysis was used to examine the correlations between healthy lifestyle beliefs and the total sub-health score as well as its dimensions. Finally, linear regression analysis was used to examine the predictive effect of healthy lifestyle beliefs on sub-health status. The significance level was set at $p < 0.05$.

3. Results

3.1 Descriptive Statistics for Healthy Lifestyle Beliefs and Sub-Health Status

The descriptive statistics showed that the median total score of healthy lifestyle beliefs was 64 (48, 72). The median score

of the lifestyle dimension was 36 (27, 40), and the median score of the emotion regulation dimension was 28 (21, 32). This indicates that most college students had healthy lifestyle beliefs at or above the medium level, although some students still had relatively low scores. The median total sub-health score was 108 (101, 118). The median scores for the physiological, psychological, and social sub-health dimensions were 45 (42, 49), 36 (34, 41), and 27 (22, 32), respectively. Because higher scores on the Sub-health Rating Scale indicate better health status, these results suggest that the overall health status of the sample was at a medium level and that a certain risk of sub-health still existed.

Table1: Descriptive statistics of healthy lifestyle beliefs and sub-health status

Variables	P25	P50	P75
Healthy lifestyle beliefs	48.0	64.0	72.0
Lifestyle dimension	27.0	36.0	40.0
Emotion regulation dimension	21.0	28.0	32.0
Total sub-health score	101.0	108.0	118.0
Physiological sub-health	42.0	45.0	49.0
Psychological sub-health	34.0	36.0	41.0
Social sub-health	22.0	27.0	32.0

Note: P25, P50, and P75 indicate the 25th, 50th, and 75th percentiles, respectively. Higher scores on the Sub-health Rating Scale indicate better health status.

3.2 Correlation Analysis between Healthy Lifestyle Beliefs and Sub-Health Status

Spearman correlation analysis showed that healthy lifestyle beliefs were significantly positively correlated with the total sub-health score ($r=0.169$, $p<0.001$). In terms of dimensions, healthy lifestyle beliefs were significantly positively correlated with physiological sub-health ($r=0.090$, $p<0.01$), psychological sub-health ($r=0.063$, $p<0.05$), and social sub-health ($r=0.252$, $p<0.001$). Because higher scores on the Sub-health Rating Scale indicate better health status, these findings can be interpreted as follows: the more positive college students' healthy lifestyle beliefs are, the better their overall health status and the lower their level of sub-health.

Table2: Correlation analysis between healthy lifestyle beliefs and sub-health status

Variables	Healthy lifestyle beliefs	Significance
Physiological sub-health	0.090	$p<0.01$
Psychological sub-health	0.063	$p<0.05$
Social sub-health	0.252	$p<0.001$
Total sub-health score	0.169	$p<0.001$

Note: The correlation coefficients are Spearman correlation coefficients. Higher sub-health scores indicate better health status.

3.3 Predictive Effect of Healthy Lifestyle Beliefs on Sub-Health Status

To further examine the predictive effect of healthy lifestyle beliefs on college students' sub-health status, healthy lifestyle beliefs were used as the predictor variable, and the total sub-health score and its physiological, psychological, and social dimensions were used as outcome variables in regression analyses. The results showed that healthy lifestyle beliefs significantly and positively predicted the total sub-health score ($\beta=0.247$, $t=8.419$, $p<0.001$), with a model explanatory rate of $R^2=0.061$. In other words, higher levels of healthy lifestyle beliefs were associated with better overall health status among college students. Further analysis showed that healthy lifestyle beliefs had significant positive predictive effects on physiological sub-health, psychological sub-health, and social sub-health, with a relatively stronger predictive effect on social sub-health ($\beta=0.235$, $t=7.961$, $p<0.001$).

Table3: Regression analysis of healthy lifestyle beliefs predicting sub-health status

Dependent variable	Predictor variable	R^2	F	β	t
Total sub-health score	Healthy lifestyle beliefs	0.061	70.884	0.247	8.419***
Physiological sub-health	Healthy lifestyle beliefs	0.039	44.733	0.199	6.688***
Psychological sub-health	Healthy lifestyle beliefs	0.019	20.574	0.136	4.536***
Social sub-health	Healthy lifestyle beliefs	0.055	63.378	0.235	7.961***

Note: *** $p < 0.001$. Higher sub-health scores indicate better health status.

4. Discussion

4.1 Healthy Lifestyle Beliefs among College Students Were above the Medium Level

This study found that the median score of healthy lifestyle beliefs among college students was 64 (48, 72), which was generally above the midpoint of the scale. This indicates that most college students held certain positive beliefs about healthy lifestyles. In other words, many students believed that healthy eating, moderate exercise, emotion regulation, and active coping with stress were beneficial to their health, and they subjectively recognized the value of maintaining a healthy lifestyle.

This result may be related to the continuous strengthening of health education in universities. In recent years, college students have been exposed to abundant health information through courses, online platforms, campus publicity, and social media, and they have gained a certain understanding of the importance of exercise, diet, sleep, and psychological adjustment. At the same time, the promotion of Healthy China initiatives, school physical education reform, and mental health education has made college students more familiar with the concept of a healthy lifestyle.

However, healthy lifestyle beliefs above the medium level do not mean that all college students can consistently practice healthy behaviors. University life provides greater autonomy in time management, but it is also more vulnerable to late sleeping, sedentary behavior, takeaway food, electronic device use, and academic pressure. Some students may know that a healthy lifestyle is important, but still find it difficult to persist because of insufficient self-management, real-life pressure, or environmental limitations. Therefore, university health promotion should not only disseminate health knowledge, but also help students form practical, sustainable health beliefs and action plans.

4.2 Healthy Lifestyle Beliefs Were Significantly Associated with Sub-Health Status

The correlation analysis showed that healthy lifestyle beliefs were significantly positively correlated with the total sub-health score. Since higher scores on the Sub-health Rating Scale indicate better health status, this result suggests that more positive healthy lifestyle beliefs are associated with a lower level of sub-health among college students. This finding indicates that healthy lifestyle beliefs are not only cognitive health attitudes, but are also related to individuals' actual health status.

Theoretically, healthy lifestyle beliefs may improve sub-health status by influencing health behaviors. Students with stronger health beliefs may be more likely to actively attend to their routines, diet, exercise, and emotional state, and may be more likely to adopt positive coping strategies when fatigue or stress occurs. Conversely, if individuals believe that healthy behaviors are difficult to maintain, have limited effects, or conflict with real life, their motivation for health behaviors may decline, increasing the likelihood of physical fatigue, psychological stress, and social adaptation problems.

In this study, the association between healthy lifestyle beliefs and social sub-health was relatively stronger. This may be because healthy lifestyle beliefs involve not only physical behaviors but also beliefs about emotion regulation, goal achievement, and family support. Students with stronger healthy lifestyle beliefs generally believe that they can deal with life problems, and they may be more likely to maintain positive interpersonal interactions and social adaptation. Therefore, healthy lifestyle beliefs may have a relatively clear connection with social functioning and social adaptation.

4.3 Healthy Lifestyle Beliefs Significantly Predicted Sub-Health Status

The regression analysis showed that healthy lifestyle beliefs significantly and positively predicted the total sub-health score, suggesting that healthy lifestyle beliefs are an important psychological factor closely related to sub-health status among

college students. Although a cross-sectional study cannot directly prove causality, existing evidence suggests that positive healthy lifestyle beliefs may have health-protective significance. The more positive one's health beliefs are, the more likely the individual is to form intentions for health behavior, thereby improving physiological, psychological, and social status through lifestyle adjustment.

From the physiological dimension, positive healthy lifestyle beliefs may encourage students to pay greater attention to regular routines, dietary choices, and physical activity, thereby reducing fatigue, poor sleep, and physical discomfort. From the psychological dimension, the emotion-regulation component of healthy lifestyle beliefs may help individuals believe that they can manage stress, solve problems, and maintain a positive state, which may reduce emotional fluctuation and psychological sub-health risk. From the social dimension, students who believe that they can maintain a healthy lifestyle may also be more willing to participate in health activities, obtain support from others, and maintain better interpersonal adaptation.

It should be noted that the explanatory power of healthy lifestyle beliefs for the total sub-health score was not high in this study, suggesting that sub-health status is influenced by multiple factors. Sleep quality, physical activity level, dietary structure, academic pressure, interpersonal relationships, economic status, and electronic device use may all affect college students' health status. Therefore, although healthy lifestyle beliefs are an important variable, they should not be regarded as the only explanation for sub-health. A more reasonable interpretation is that healthy lifestyle beliefs are a psychological foundation that can be improved through education and intervention in the prevention of sub-health among college students.

4.4 Implications for Health Promotion in Universities

First, universities should strengthen education on healthy lifestyle beliefs. Traditional health education often focuses on the dissemination of knowledge, but knowledge alone does not necessarily translate into behavior. Universities should help students build positive beliefs such as I can do it and health behavior is worth maintaining, so that students can recognize that a healthy lifestyle is closely related to learning efficiency, emotional stability, and future development.

Second, the cultivation of health beliefs should be combined with specific behavioral training. Universities can guide students to develop practical plans for routines, diet, exercise, and emotion regulation through themed courses, group counseling, and health-management activities. For example, students can begin with stabilizing sleep schedules, reducing sedentary time, increasing walking, eating breakfast regularly, and recording emotions, so that health beliefs are strengthened through specific actions.

5. Limitations and Future Directions

This study was based on cross-sectional questionnaire data and can demonstrate significant correlations and predictive relationships between healthy lifestyle beliefs and sub-health status among college students, but it still has certain limitations. First, the study mainly used self-report scales to collect data, which may be affected by social desirability and subjective evaluation bias. Future research may combine objective health indicators, sleep records, physical activity records, and dietary behavior data to improve measurement accuracy. Second, this study analyzed only the two variables of healthy lifestyle beliefs and sub-health status, and did not include factors such as sleep, exercise, diet, social support, and psychological stress. Future research may build a more comprehensive model while retaining the core role of healthy lifestyle beliefs, so as to more fully explain the formation mechanism of sub-health status among college students.

6. Conclusion

This study analyzed the relationship between healthy lifestyle beliefs and sub-health status among college students. The results showed that college students' healthy lifestyle beliefs were generally above the medium level; healthy lifestyle beliefs were significantly positively correlated with the total sub-health score and its physiological, psychological, and social dimensions; and healthy lifestyle beliefs significantly and positively predicted the total sub-health score and each dimension. Because higher scores on the Sub-health Rating Scale indicate better health status, more positive healthy lifestyle beliefs can be considered to be associated with better health status and a lower level of sub-health among college students.

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Conflict of Interests

The authors declare that there is no conflict of interest regarding the publication of this paper.

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