Advances in Food Science and Human Nutrition (2025)
Clausius Scientific Press, Canada

DOI: 10.23977/afshn.2025.070104
ISSN 2616-258X Vol. 7 Num. 1

The Development Trend and Hot Frontiers of Student Nutrition Research at Home and Abroad Since the New Century

Chenfei Wang[1,a,*]

[1]*School of Economics and Management, Shandong Agricultural University, Tai'an, Shandong, China*
[a]*wcf5862@163.com*
[*]*Corresponding author*

Keywords: Healthy China; Student nutrition; Visual analysis; Cite Space

Abstract: The nutritional and health status of students is related to the national physical fitness and population quality, economic development and social stability, and more importantly, the implementation of the Healthy China strategy. This article uses Cite Space software to visually analyze literature on student nutrition in CNKI and WOS databases since the 21st century, to grasp the development process, research hots-pots, and cutting-edge dynamics of student nutrition research, and provide references for future research. Research has found that fruitful results have been achieved in student nutrition research both domestically and internationally. In China, research mainly focuses on topics such as student nutrition status and nutrition education, while abroad places more emphasis on empirical research, mainly exploring topics such as nutrition intake, energy consumption, and medical nursing education. Compared to China, foreign countries attach more importance to this field, with closer cooperation and exchanges between research institutions, and more prominent strength of higher education institutions.

1. Introduction

In 1992, the Food and Agriculture Organization of the United Nations and the World Health Organization jointly stated in the World Declaration on Nutrition that maintaining good nutritional status is the key to the development of human society, and whether one has good nutritional and health status is one of the important indicators for evaluating whether a person can achieve comprehensive development. Research has shown that the nutritional status during childhood and adolescence plays an important role in their lifelong development. To this end, governments around the world have enacted relevant laws and regulations to continuously improve students' nutritional and health status, enhance their physical fitness, and increase their human capital. However, improving student nutrition is not something that can be achieved overnight, but requires continuous optimization and improvement. In order to better understand the latest research trends in the field of student nutrition, this article uses Cite Space software and scientific bibliometric

methods to summarize and sort out the research trends in the field of student nutrition since the 21st century, explore the hots-pots and frontiers of student nutrition research, and provide useful references and suggestions for the further development of student nutrition research and nutrition education in the future.

2. Research Content and Steps

2.1. Data Sources and Research Methods

The literature collection data is sourced from the China National Knowledge Infrastructure (CNKI) academic journal database and the Web of Science (WOS) core collection. To ensure the comprehensiveness and authority of the literature collection, this study used advanced retrieval to collect data. Among them, the CNKI database uses "student nutrition" as the search topic, and the source categories are limited to CSSCI and Peking University Core; The WOS database uses "student nutrition" as the search topic, and the citation index is limited to SCI and SSCI. The literature collection period is set from 2000 to 2023, and the data deadline is August 9, 2023. After screening invalid data such as catalogs, conferences, and notifications, a total of 959 valid Chinese literature and 6021 valid foreign literature were obtained, forming the sample data required for this study.

This article uses Cite Space 6.2.R4 software to visualize and analyze 959 Chinese literature and 6021 foreign literature using methods such as keyword co-occurrence, clustering, and mutation rate detection. The aim is to explore the evolutionary trends and hot frontiers of student nutrition research both domestically and internationally, in order to grasp the future development trends of student nutrition research.

2.2. Statistical Analysis of Domestic and Foreign Literature on Student Nutrition Research

2.2.1. Analysis of Publication Volume

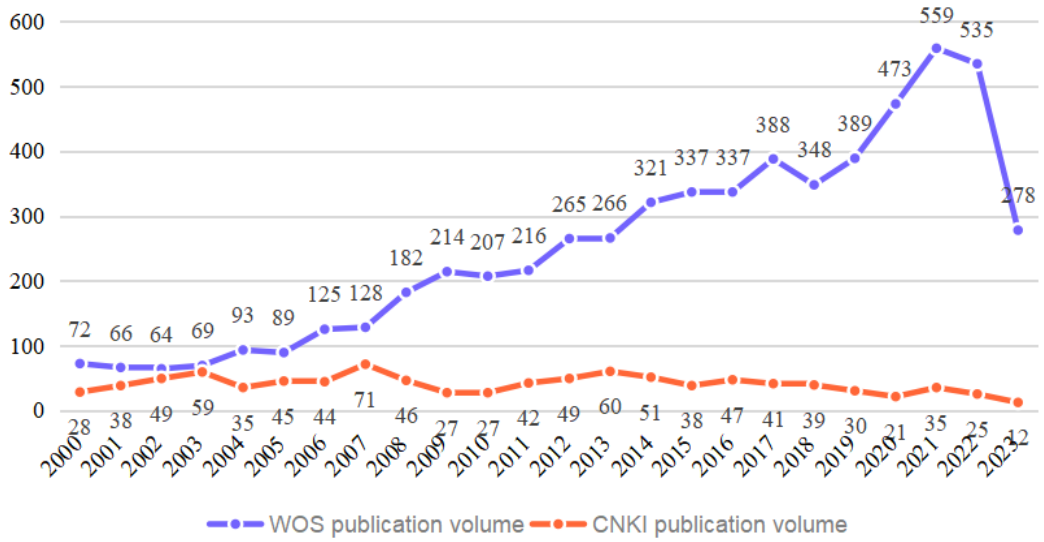

Figure 1. Trend Chart of Publication Volume in the Field of Student Nutrition

The trend of changes in the number of publications in the field of student nutrition at home and abroad from 2000 to 2023 is shown in Figure 1. It can be seen that since the new century, the number of publications on Chinese literature on student nutrition in China has remained relatively

stable, showing an overall fluctuating downward trend, especially in the past decade where the downward trend has been significant. On the contrary, the overall publication volume of nutrition related literature for foreign students has shown a steady upward trend, reaching its highest peak of 559 articles in 2021. In 2022, there was a slight decline, but the annual publication volume remains at a high level. After horizontal comparison between domestic and foreign research, it can be found that high-quality research on student nutrition in China is continuously decreasing, which is inconsistent with the steady increase in foreign research and the increasing emphasis on student nutrition policies in the country. Therefore, research on student nutrition in China urgently needs to be further emphasized and strengthened.

2.2.2. Research Institution Analysis

Table 1. Number of Publications by Domestic and Foreign Research Institutions in the Field of Student Nutrition (Top 10)

Serial Number	CNKI Research Institute	Frequency	WOS Research Institution	Frequency
1	Institute of Nutrition and Health, Chinese Center for Disease Control and Prevention	41	University Of California	188
2	Institute of Nutrition and Food Safety, Chinese Center for Disease Control and Prevention	24	Harvard University	137
3	Peking University Institute of Child and Adolescent Health	15	University of Minnesota	130
4	Beijing Center for Disease Control and Prevention	12	University of Texas	129
5	Key Laboratory of Trace Elements and Nutrition, National Health Commission	10	University of Minnesota–Twin Cities	121
6	School of Public Health, Hainan Medical University	9	University of North Carolina	115
7	School of Public Health, Peking University	7	University of Illinois	107
8	Dongcheng District Primary and Secondary School Health Care Center, Beijing	7	Florida State	82
9	Changping District Center for Disease Control and Prevention, Beijing	5	Pennsylvania Federal Higher Education System	78
10	School of Public Health, Baotou Medical University	5	Ohio	69

This article conducted a statistical analysis of the publication volume of research institutions, and the analysis results are shown in Table 1. Research has found that the research institutions with a large number of publications in the field of student nutrition in China are mainly concentrated in Beijing, and are mostly research institutes. The research strength of higher education institutions is relatively weak. The top ten institutions in the field of foreign student nutrition research are all located in the United States and are all higher education institutions, indicating that the United States attaches great importance to student nutrition issues and has always been at the forefront of student nutrition research, making significant contributions to the study of student nutrition issues. The network density of the CNKI institutional cooperation graph is only 0.0032, indicating that the

vast majority of domestic research institutions independently conduct student nutrition research, and there is a lack of scattered institutional cooperation relationships and communication; The network density of the WOS collaboration graph is 0.0349, which is much higher than that of CNKI, reflecting the closer communication and cooperation among institutions in student nutrition research, especially in the United States.

2.3. Analysis of Hots-pots and Frontiers in Student Nutrition Research at Home and Abroad

2.3.1. Keyword Co-occurrence Analysis

In order to better grasp the similarities and differences in student nutrition research at home and abroad, this study compared and analyzed the top 20 keywords in the field of student nutrition ranked by frequency on CNKI and WOS, as shown in Table 2.

Table 2. Main Keywords in the Field of Student Nutrition at Home and Abroad (Top 20)

Serial Number	CNKI keywords	frequency	WOS keywords	frequency
1	student	550	children	1196
2	nutritional status	405	physical activity	1075
3	obesity	106	nutrition	1024
4	malnutrition	91	obesity	950
5	nutritional disorders	80	health	742
6	rural population	68	adolescents	732
7	attitude	63	consumption	607
8	nutrition	58	prevalence	582
9	dietary survey	51	overweight	561
10	diabetes	50	students	553
11	student nutrition	47	body mass index	448
12	overweight	47	education	402
13	health education	42	fruit	357
14	practice	42	behaviors	351
15	eating habits	40	risk	343
16	knowledge	38	impact	327
17	Primary and secondary school students	37	college students	322
18	meals	37	nutrition education	320
19	ethnic minority	35	knowledge	301
20	nutrition policy	33	food	299

The similarities between domestic and foreign student nutrition research are mainly manifested in the following three aspects. Firstly, both domestically and internationally, research on the nutritional status of children is highly valued, with common keywords including “primary and secondary school students” and “children”. Both domestic and foreign studies have shown that nutrition is crucial for the growth and development of children, and the nutritional and health status during childhood significantly affects their physical fitness and income in adulthood[1]. Secondly, the problem of overweight and obesity among students both domestically and internationally is particularly prominent, with common keywords including “obesity”. In the past 20 years, whether in developed countries such as the United States and Germany, or in developing countries such as China and India, the incidence of overweight and obesity among students has gradually increased, attracting widespread attention from society[2]. Thirdly, both domestic and foreign research focuses on student nutrition education, with common keywords including “health education” “dietary habits” “education” “behaviors” etc. Whether it is the imparting of nutrition and health knowledge

or the cultivation of daily behavioral habits, both domestically and internationally attach great importance to the education and practice of student nutrition.

Due to differences in reality, there are also significant differences in student nutrition research both domestically and internationally. From the current situation of nutrition research among domestic students, due to the significant regional disparities in China, while malnutrition is a serious problem, overweight and obesity are also particularly prominent, facing the dual burden of nutrition. High frequency keywords include “malnutrition” and “nutritional disorders”. In addition, based on the specific realities of the socialist system and the dual economic structure, domestic scholars pay more attention to vocabulary such as “rural population” and “ethnic minorities” when exploring student nutrition, which has given rise to research on student nutrition issues with Chinese characteristics[3]. From the current situation of nutrition research on foreign students, foreign scholars not only focus on students’ nutritional intake, but also conduct more research on students’ physical activities. The dual approach of “diet+exercise” can improve students’ health status, with keywords such as “physical activity”. Moreover, research on students’ nutritional status abroad is not limited to individual health conditions, but also pays special attention to public health issues, with keywords such as “valence” and “risk”.

2.3.2. Keyword Clustering Analysis

To make the theme more clear and the clustering content more prominent, this study summarizes and generalizes multiple clustering themes. As shown in Table 3, it was found that the research hots-pots in the field of student nutrition at CNKI focus on two major aspects: student nutrition status (#0 obesity, #1 student nutrition, #3 student nutrition status) and student nutrition education (#2 practice, #4 student health services).

Firstly, research on the nutritional status of students. At present, the most severe problem facing Chinese students' nutrition is the dual burden of nutrition, which means that malnutrition and overweight and obesity coexist. On the one hand, due to the significant regional and wealth disparities in China, many impoverished areas have poor living conditions, severe nutritional deficiencies, and high rates of malnutrition[4]. On the other hand, since the 21st century, the living standard of our people has improved rapidly, the intake of high-fat and high-calorie food has increased rapidly, people’s diet concept and diet structure have undergone tremendous changes, the problem of nutrition surplus and food waste has become increasingly prominent, and overweight and obesity have become increasingly serious social problems. With the implementation of the 2011 Rural Compulsory Education Student Nutrition Improvement Plan, “Rural Compulsory Education” has become a new research hots-pot. Existing research indicates that nutrition improvement programs not only enhance students’ physical fitness, but also play a positive role in improving human capital, promoting educational equity, and accelerating the realization of common prosperity.

Secondly, research on student nutrition education. For a long time, schools and families have overly focused on students' academic performance, with insufficient emphasis on nutrition and health education, and students generally lack access to nutrition knowledge. Overall, the overall mastery of nutrition knowledge among Chinese students is poor, with a relative lack of nutrition knowledge. However, their attitudes towards nutrition are generally positive and optimistic. In recent years, the attention of the country and society to nutrition and health has been continuously increasing, and parents and students have also begun to pay more and more attention to nutrition and health issues[5]. Parents and students hope that schools can carry out education courses related to nutrition and health to enhance their authority in acquiring nutrition knowledge and broaden their channels for obtaining nutrition knowledge.

Table 3. CNKI Student Nutrition Keyword Clustering

number	Cluster name	Silhouette value	LLR label words
0	obesity	0.795	Obesity (145.23); Nutritional disorders (114.26); Nutritional status (97.91); Malnutrition (71.95); Attitude (64.57)
#1	Student nutrition	0.929	Student nutrition (52.47); Student (41.44); Nutritional status (27.29); Rural compulsory education (20.4); Obesity (16.64)
#2	practice	0.794	Practice (93.67); Attitude (80.29); Health knowledge (67.11); Obesity (54.4); Nutritional disorders (46.44)
#3	Student nutritional status	0.938	Student nutritional status (59.58); Defective rate (32.78); Obesity rate (32.78); Student (20.26); Nutritional status (13.35)
#4	student health services	0.777	Student healthcare services (57.7); Nutrition (50.61); Nutritional status (28.61); Health education (28.07); Food Processing and Processing (25.19)

As shown in Table 4, the research hots-pots in the field of nutrition for WOS students focus on three major aspects: nutrition education (#0 nutrition education, #1 college students), energy expenditure (#2 physical activity), and nutrient intake (#3 obesity, #4 parental nutrition).

Table 4. WOS Student Nutrition Keyword Clustering

number	Cluster name	Silhouette value	LLR label words
#0	nutrition education	0.728	nutrition education (121.34); body mass index (58.93); education (58.88); program (43.24); medical education (39.84)
#1	college students	0.626	college students (104.81); university students (81.51); young adults (51.96); dietary intake (41.32); overweight (32.65)
#2	physical activity	0.636	physical activity (56.65); nutrition education (36.89); public health (33.9); risk factors (33.54); metabolic syndrome (29.48)
#3	obesity	0.688	obesity (69.46); body mass index (66.03); overweight (38.4); childhood obesity (33.55); united states (19.39)
#4	parenteral nutrition	0.794	parenteral nutrition (27.09); enteral nutrition (27.09); intelligence (18.04); head (18.04); height (18.04)

Firstly, research on nutrition education. Previous studies have shown that experiential cooking courses have a positive impact on food preferences, attitudes, and behaviors of school aged children[6]. Lectures on nutrition and health knowledge for students can significantly improve their dietary structure, increase their physical activities, and enable them to acquire more nutrition knowledge. In addition, foreign research also pays more attention to nutrition education for college students, especially in the field of medicine. There is relatively more research on nutrition education for medical students, and the gap between the nutrition education provided for medical students and the nutritional abilities required for effective nutrition care is a global issue[7].

Secondly, research on energy consumption. Appropriate physical activities are crucial for the health status of students. Less physical activity and malnutrition are important reasons for adolescent obesity, and the incidence rate of metabolic syndrome in obese students is far higher

than that in normal weight students. Therefore, the amount of physical activity will indirectly affect the incidence rate of metabolic syndrome and seriously affect the health of students.

Thirdly, research on nutrient intake. Foreign students also face serious issues of overweight and obesity, which have become a public health problem that troubles countries around the world[8]. Foreign scholars have found that the intake of sugary drinks, the frequency of breakfast intake, and the diversity of dietary structure all significantly affect the incidence of obesity in students. At the same time, foreign scholars are committed to researching the improvement of students' nutritional status, attempting to make students' nutritional intake more scientific through appropriate human intervention[9].

3. Conclusions

This article uses Cite Space software to visualize the literature related to student nutrition research in CNKI and WOS from 2000 to 2023, exploring the research hots-pots and frontiers in the field of student nutrition. Based on clarifying the overall development of student nutrition research, the following conclusions are drawn:

Firstly, scholars both domestically and internationally have achieved fruitful results in the field of student nutrition. From the perspective of publication volume, research on student nutrition in foreign countries has shown a steady increase overall, while the number of high-quality papers on student nutrition research in China is relatively small, and the downward trend in publication volume has been evident in recent years. From the perspective of institutional cooperation, a research network in the field of nutrition for foreign students has been formed, with the United States as the core and higher education institutions as the main force. There is a strong sense of teamwork and close communication and cooperation between institutions. Compared to this, the cooperation network of domestic institutions is relatively low, and the vast majority of scientific research institutions conduct research independently. The cooperation relationships between institutions are scattered and communication is limited, and the research strength of higher education institutions is relatively weak.

Secondly, there are both similarities and unique characteristics in the hot topics of student nutrition research both domestically and internationally. The similarities are mainly reflected in the fact that both domestic and foreign research attaches great importance to the study of nutritional status during childhood, the issue of overweight and obesity in students, and the study of nutrition education for students. The differences mainly reflect the differences in themes, content, and methods between domestic and foreign research. Foreign research focuses on empirical analysis and intervention experiments, paying attention to students' nutritional health status, nutritional diseases, and physical exercise; Domestic research places more emphasis on policy analysis and investigation, focusing on nutrition education and improvement.

References

[1] Hersch Derek, Perdue Laura, Ambroz Teresa & Boucher Jackie L. (2014). The impact of cooking classes on food-related preferences, attitudes, and behaviors of school-aged children: a systematic review of the evidence. Preventing chronic disease, 11, 193.

[2] Cardenas Diana, Díaz Gustavo, Cadavid Jessika, Lipovestky Fernando, Canicoba Marisa, Sánchez Paola, & Arenas Humberto. (2021). Nutrition in medical education in Latin America: Results of a cross-sectional survey. Journal of parenteral and enteral nutrition, 46(1), 229-237.

[3] Bredhauer Jacqueline, Cone Sam, Brown Lucy, Moseley Genevieve, Wilson Alyce, Perlstein Robyn & Ball Lauren. (2022). Hungry for more: Australian medical students' competence, attitudes and preferences towards nutrition education. BMC Medical Education, 22(1), 692-693.

[4] Zapata Lauren B, Bryant Carol A, McDermott Robert J & Hefelfinger Jennie A. (2008). Dietary and physical activity behaviors of middle school youth: the youth physical activity and nutrition survey. The Journal of school health,

78(1), 9-18.
[5] Hearst Mary O, Wang Qi, Grannon Katherine, Davey Cynthia S & Nanney Marilyn S. (2017). It Takes a Village: Promoting Parent and Family Education on Healthy Lifestyles for Minnesota Secondary Students. The Journal of school health, 87(1), 55-61.
[6] Mushtaq Muhammad Umair, Gull Sibgha, Mushtaq Komal, Shahid Ubeera, Shad Mushtaq Ahmad & Akram Javed. (2011). Dietary behaviors, physical activity and sedentary lifestyle associated with overweight and obesity, and their socio-demographic correlates, among Pakistani primary school children. The international journal of behavioral nutrition and physical activity, 8(1), 130.
[7] So H K, Nelson E A S, Li Albert M, Guldan G S, Yin J, Ng P C & Sung R Y T. (2011). Breakfast frequency inversely associated with BMI and body fatness in Hong Kong Chinese children aged 9-18 years. The British journal of nutrition, 106(5), 742-51.
[8] Rolls Barbara J, Ello-Martin Julia A & Tohill Beth Carlton. (2004). What can intervention studies tell us about the relationship between fruit and vegetable consumption and weight management?. Nutrition reviews, 62(1), 1-17.
[9] Ayande Ruthfirst E A, Agordoh Percival D, Salino Vanessa J, Webster Ariyan Clarisa, Collier Lindsay, Asante Matilda & Carbone Elena T. (2023). Knowledge, attitudes, and practices of registered dietitians and nutritionists regarding enteral and parenteral nutrition support in Ghana: a needs assessment study. Frontiers in nutrition, 10, 23-26.