Korean J Community Nutr. 2024 Dec;29(6):445-454
https://doi.org/10.5720/kjcn.2024.00269
eISSN 2951-3146

KJCN
Korean Journal of Community Nutrition

Review

# Research trends relating to body weight control: a systematic review and keyword network analysis of Korea Citation Index Journals (2004–2023)

**Yunkyoung Oh**[1], **Eunsil Her**[2,†]

[1]Professor, Department of Cosmetology, Changshin University, Changwon, Korea
[2]Professor, Department of Food and Nutrition, Changshin University, Changwon, Korea

**Received:** November 18, 2024
**Revised:** December 6, 2024
**Accepted:** December 25, 2024

**†Corresponding author:**
**Eunsil Her**
Department of Food and Nutrition, Changshin University, 262 Paryong-ro, Masanhoewon-gu, Changwon 51352, Korea
Tel: +82-55-250-1203
Fax: +82-55-250-1201
Email: heres@cs.ac.kr

**Objectives:** Obesity rates are rapidly rising in Korea. Weight control is highly involved in obesity treatment. This study aimed to explore research trends related to weight control through keyword network analysis. By focusing on journals indexed in the Korea Citation Index (KCI), this study highlights trends specific to Korea, offering insights that reflect the country's unique cultural and policy contexts in weight control research.
**Methods:** This study collected keywords from weight control-related papers published in the KCI journal over the past 20 years. Keywords were cleaned through Textom (2024), and the relationships between key research issue frequency analysis, structural characteristics, and keywords were identified using Textom, UCINET6, and NetDraw.
**Results:** Over the past 20 years, 40 to 50 studies related to weight control have been conducted each year. *The Korean Journal of Community Nutrition* had the largest number of published articles. Keyword frequency analysis showed that 'obesity' had the highest frequency. And the analysis of degree centrality and betweenness centrality, the keyword 'obesity' ranked the highest. CONCOR analysis identified four clusters: preventive health care, health management, physical health, and personal development.
**Conclusion:** The results of this study showed that weight control research reflecting the characteristics of the times has been steadily progressing in relation to the rapidly increasing obesity in Korea, and when developing policies or setting research directions related to weight loss in the future, research should be conducted in a prospective manner by subdividing it according to groups and interests.

**Keywords:** big data; journal article; body weight

## INTRODUCTION

Economic development has led to changes in dietary and lifestyle habits, increasing overweight and obese populations. Currently, obesity increases the risk of various metabolic diseases [1], increases the prevalence of chronic diseases [2], reduces the quality of life and has negative mental and psychological effects [3]. The World Health Organization has classified obesity as a disease that requires long-term treatment in 1996 [4]. The higher the body mass index and waist circumference, the higher the annual medical costs and the shorter the life expectancy compared to those of a normal weight [5].

As the risk of obesity becomes more recognized, interest in weight control is also increasing. The prevalence of obesity among Korean adults increased from 30.9% in 2013 to 37.2% in 2022, and in particular, the prevalence of obesity in men (37.7% in 2013 → 47.7% in 2022) increased faster compared to women (25.1% in 2013 → 25.7%). The rate of attempting weight loss was higher in women, with 61.9% for men and 71.8% for women in 2022 [6].

Maintaining a stable weight is about maintaining a balance between energy intake and energy expenditure [7]. Weight control is effective by creating a so-called negative energy balance by reducing energy intake and increasing energy expenditure. But indiscriminate dieting is popular due to expectations of weight control, the influence of mass media, and social and cultural obsession with thinness, which can lead to not only nutritional deficiencies but also mental problems, such as anorexia and bulimia [8, 9].

Regarding weight control, academic interest, and various studies are continuing in terms of diet, nutrition, exercise, and medicine. In particular, the number of papers in the field of food science and nutrition research related to weight control is increasing, expanding the scope of research to include diet therapy, nutrient intake related to weight control, and dietary behavior.

Recently, with the development of big data processing technology, it has become possible to efficiently analyze data and add new interpretations to existing data [10], and methods for examining research trends have become more diverse using network analysis. In the existing research trend analysis study, the researcher sets the analysis criteria and categorizes them. I have organized the research materials. This method has the advantage of being able to organize them systematically according to the researcher's intention, but it has the disadvantage of having concerns about the researcher's values interfering, which may hinder validity or generalization [11]. Additionally, while previous studies examining research trends have been performed using only surface-level analyses, such as the number of papers, research methods and subjects, and research topic classification through content analysis, network analysis has the advantage of focusing on relational characteristics formed by keywords, co-authors, and references of papers [12], allowing for more visual derivations and confirmations of analysis results. When analyzing research trends in network analysis, the text used is mainly extracted from the title, table of contents, abstract, author keywords (subject terms), and the main text [13]. Among these, keywords are not only important elements that characterize the content of the paper but are also used as index terms for information retrieval, making them suitable for analyzing research trends. Also, while existing cluster analysis mainly focuses on the characteristics of individual objects, CONCOR analysis repeatedly calculates correlations to derive structural equivalence, making it easier to understand relationships between keywords and providing insight [14].

Analyzing research trends is an important indicator for examining the academic development of the field, allowing for a comprehensive understanding of research results and suggesting developmental directions for future research. Until now, research trends on obesity related to exercise [15], research trends on obesity in children and adolescents [16], research on diet awareness using big data analysis [17], and a semantic network analysis of research trends on adolescent dietary life [18] have been actively conducted. However, there is currently no data on research trends related to weight control.

This study focuses on Korea Citation Index (KCI) journals to capture domestic research trends in weight control. The KCI database provides a comprehensive repository of academic work conducted within Korea, enabling an analysis tailored to the unique societal and cultural contexts of the country. Therefore, this study first examines the frequency of keyword appearance in studies published on the topic of weight control over the past 20 years to identify key research topics related to weight control research. In particular, by dividing the research period into 10-year units, we aim to derive differences in issues and research trends by era. We also examine the network patterns between these major keywords and the ranking of keywords with dominant central or mediating roles among keywords. These analysis results will allow us to more intuitively understand the relationships between keywords, and we will be able to develop new research topics on weight control in the future by combining keywords with strong centrality


https://doi.org/10.5720/kjcn.2024.00269

and mediating properties. Finally, we will cluster similar keywords through CONCOR analysis based on keyword correlations to easily understand the types of weight control research over the past 20 years and derive implications for research scope, research policy, and the possibility of convergence research. The research questions (RQ) of this study are as follows:

RQ1: What are the core research topics and the trends of research by period as seen from the keyword appearance frequency of "weight control"-related research published in KCI journals from 2004 to 2023 (divided by 10 years)?

RQ2: What are the structural characteristics and relationships between keywords as examined by network analysis (network properties, centrality, CONCOR) centered on keywords with high frequency of appearance in RQ1?

## METHODS

### Ethics statement

This study was a review article analyzing keywords of already published researches and was not a study on human subjects, so it was not subject to Institutional Review Board.

### 1. Study design

This was a systematic review. It was described according to the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) statement (https://www.prisma-statement.org/).

### 2. Data collection and cleaning

The data collection and cleaning process in presented in Fig. 1. Data were collected from the KCI (www.kci.go.kr) database on April 22, 2024, from articles conducted over the past 20 years with the keywords 'weight control OR weight management' (search period: January 1, 2004–December 31, 2023). A total of 1,336 articles were collected in the first round, and 1,147 were selected for the final analysis, excluding studies with off-topic studies and missing keywords or abstracts.

Data cleaning involved two phases. First, keywords were extracted from the collected 1,147 articles. A total of 2,063 keywords were extracted, including duplicates. Data were refined to ensure the accuracy of keyword network analysis and to interpret the results clearly. The collected keywords were analyzed using text mining with Textom (2024) and the Espresso K method, which account for compound nouns and proper nouns. 'Weight control' or 'Weight management', which were used as search terms, were judged to be difficult to give meaning to the structural properties and centrality analysis, so they were removed. Similar concepts (e.g., 'Food behavior', 'Eating behavior', 'Dietary behavior' → 'Dietary behavior') were unified into one keyword. 'Dietary behavior' and 'Nutrition education' were unified by removing spaces. This process was reviewed by three food science and nutrition experts.

### 3. Statistical analysis

The data collected through KCI was refined and frequency analyzed using the TEXTOM (2024) program, and network analysis, including centrality analysis, was

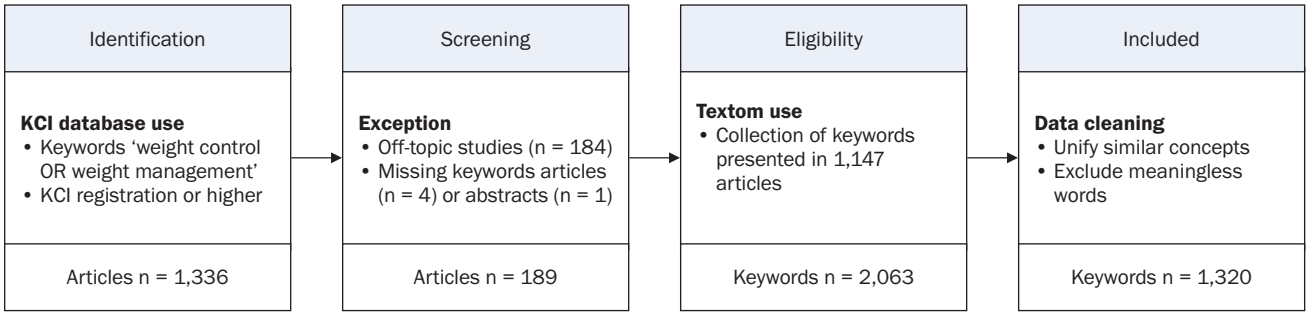


**Fig. 1.** Flow chart of data collection and cleaning process.
KCI, Korea Citation Index.

conducted using UCINET6. Frequency analysis was conducted on keywords related to weight control based on the refined data, and a 50 × 50 1-mode matrix data set was created. The specific procedure for keyword network analysis performed are as follows. First, the number of nodes, density, average connection distance, average connection strength, number of components, diameter, and network concentration were examined to identify structural properties among weight control-related keywords. Second, a single-sample mean difference test using the bootstrap method was conducted to statistically test the structural characteristics of the keyword network, such as density and centrality. Third, degree and betweenness centrality were analyzed to examine the centrality of keywords within the keyword network. Fourth, CONCOR analysis was conducted to identify the network structure of subgroups.

## RESULTS

### 1. Trends in academic journal articles

Over the past 20 years, 40 to 50 academic journal articles on weight control have been published each year. The top 20 rankings of journals with the most publications related to weight control over the past 20 years are presented in Table 1. *The Korean Journal of Community Nutrition* (168 articles) had the largest number of published articles, followed by *The Journal of the Korean Society of Food Science and Nutrition, The Journal of Korea Academia-Industrial Cooperation Society, The Journal of Life Science, The Journal of Nutrition and Health*, and *The Korean Journal of Physical Education*. In the top 20, food and nutrition-related journals (Rank 1, 2, 5-1, 7, 13-1) accounted for the most with five; there were four physical activity-related journals (Rank 5-2, 17-1, 19-1, 19-2) and four medical and health-related journals (Rank 8, 9, 10, 11).

### 2. Keyword frequency analysis

The frequency analysis results for the extracted keywords showed that 'Obesity' was the most frequent keyword with 255 occurrences, which was more than twice as frequent as the second-ranked keyword 'Body mass index' (BMI), which was noted 102 times. This was followed by 'Exercise', 'Health', 'Diabetes mellitus', 'Body image', 'Dietary behavior', 'Dietary habit', 'Nutrient intake', 'Stress', and 'Body composition' (Table 2). Words related to factors affecting weight, such as 'Exercise', 'Dietary behavior', 'Stress', and 'Lifestyle'; words related to health indicators, such as 'Diabetes mellitus', 'Body composition', 'Hypertension', 'Metabolic syndrome', 'Blood lipid', and 'Leptin'; and words related to research subjects, such as 'Child', 'Infant', and 'College student', ranked in the top 50.

Relatively recent research trends were compared with previous research trends in Table 3 by dividing the last 20 years into 10-year periods, the first period (2004–2013) and the second period (2014–2023). As a result of examining the top 10 keywords according to the survey period, in the first period, 'Obesity' (134 times) appeared the most, followed by 'BMI', 'Exercise', 'Nutrient intake', 'Body image', 'Dietary behavior', 'Child',

**Table 1.** Number of published articles by journal

| Rank | Journal name | Number | Rank | Journal name | Number |
|---|---|---|---|---|---|
| 1 | *The Korean Journal of Community Nutrition* | 168 | 11 | *Korean Journal of Family Medicine* | 20 |
| 2 | *Journal of the Korean Society of Food Science and Nutrition* | 70 | 12 | *The Korean Journal of Sport* | 19 |
| 3 | *Journal of Korea Academia-Industrial Cooperation Society* | 52 | 13-1 | *Journal of the East Asian Society of Dietary Life* | 18 |
| 4 | *Journal of Life Science* | 34 | 13-2 | *Journal of Wellness* | 18 |
| 5-1 | *Journal of Nutrition and Health* | 32 | 13-3 | *The Journal of the Korea Contents Association* | 18 |
| 5-2 | *The Korean Journal of Physical Education* | 32 | 16 | *Journal of Digital Convergence* | 16 |
| 7 | *The Korean Journal of Food and Nutrition* | 31 | 17-1 | *Exercise Science* | 15 |
| 8 | *Journal of Obesity & Metabolic Syndrome* | 28 | 17-2 | *Korean Journal of Health Psychology* | 15 |
| 9 | *Clinical and Experimental Pediatrics* | 25 | 19-1 | *Korean Journal of Sport Science* | 14 |
| 10 | *Korean Journal of Health Promotion* | 21 | 19-2 | *The Korean Society of Sports Science* | 14 |


https://doi.org/10.5720/kjcn.2024.00269

**Table 2.** Frequency analysis related to weight control keyword

| Rank | Keyword | Frequency | Rank | Keyword | Frequency | Rank | Keyword | Frequency | Rank | Keyword | Frequency |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Obesity | 255 | 14-1 | Weight loss | 42 | 27-1 | Female | 23 | 35-6 | Cholesterol | 19 |
| 2 | BMI | 102 | 14-2 | Nutrition education | 42 | 27-2 | Self-esteem | 23 | 35-7 | Risk factor | 19 |
| 3 | Exercise | 100 | 16 | Diet | 37 | 27-3 | Blood lipid | 23 | 42-1 | Dance | 18 |
| 4 | Health | 73 | 17 | Infant | 34 | 30 | Self-efficacy | 22 | 42-2 | Age | 18 |
| 5 | Diabetes mellitus | 59 | 18 | Hypertension | 31 | 31-1 | College student | 21 | 44 | Body fat | 17 |
| 6 | Body image | 58 | 19 | Nutrition knowledge | 30 | 31-2 | Dietary attitude | 21 | 45-1 | Insulin | 16 |
| 7 | Dietary behavior | 56 | 20 | Depression | 28 | 31-3 | Physical activity | 21 | 45-2 | Antioxidant | 16 |
| 8-1 | Dietary habit | 51 | 21-1 | Health behavior | 26 | 34 | Leptin | 20 | 47 | Satisfaction | 15 |
| 8-2 | Nutrient intake | 51 | 21-2 | Physical fitness | 26 | 35-1 | Weight control behavior | 19 | 48-1 | Eating disorder | 14 |
| 10-1 | Stress | 50 | 23-1 | Metabolic syndrome | 25 | 35-2 | Appearance | 19 | 48-2 | High school student | 14 |
| 10-2 | Body composition | 50 | 23-2 | Body shape | 25 | 35-3 | Management behavior | 19 | 48-3 | Perception | 14 |
| 12 | Child | 48 | 25-1 | Lifestyle | 24 | 35-4 | Blood pressure | 19 | | | |
| 13 | Weight | 47 | 25-2 | Muscle | 24 | 35-5 | Training | 19 | | | |

BMI, body mass index.

**Table 3.** Frequency of keywords related to weight control by research period

| 1st period (2004–2013) | | | | | | 2nd period (2014–2023) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Rank | Keyword | Frequency | Rank | Keyword | Frequency | Rank | Keyword | Frequency | Rank | Keyword | Frequency |
| 1 | Obesity | 134 | 11 | Health | 27 | 1 | Obesity | 121 | 11-1 | Infant | 18 |
| 2 | BMI | 72 | 12 | Weight | 26 | 2 | Exercise | 52 | 11-2 | Weight loss | 18 |
| 3 | Exercise | 48 | 13-1 | Weight loss | 24 | 3 | Health | 46 | 11-3 | Muscle | 18 |
| 4 | Nutrient intake | 42 | 13-2 | Body composition | 24 | 4 | BMI | 44 | 14-1 | Body image | 17 |
| 5 | Body image | 41 | 15 | Nutrition knowledge | 23 | 5-1 | Stress | 34 | 14-2 | Dietary behavior | 17 |
| 6 | Dietary behavior | 39 | 16 | Blood lipid | 21 | 5-2 | Body composition | 26 | 16-1 | Appearance | 14 |
| 7-1 | Child | 38 | 17 | Hypertension | 18 | 7-1 | Weight | 21 | 16-2 | Female | 14 |
| 7-2 | Diabetes mellitus | 38 | 18-1 | Diet | 16 | 7-2 | Diabetes mellitus | 21 | 18-1 | Weight control behavior | 13 |
| 7-3 | Dietary habit | 38 | 18-2 | Stress | 16 | 7-3 | Diet | 21 | 18-2 | Hypertension | 13 |
| 10 | Nutrition education | 30 | 18-3 | Infant | 16 | 10 | Depression | 18 | 18-3 | Dietary habit | 13 |

BMI, body mass index.

'Diabetes mellitus', 'Dietary habit', 'Nutrition education' in order. In the second period, 'Obesity' had the highest frequency, followed by 'Exercise', 'Health', 'BMI', 'Stress', 'Body composition', 'Weight', 'Diabetes mellitus', 'Diet', and 'Depression'.

### 3. The structural form of the network

The network structure was analyzed focusing on the

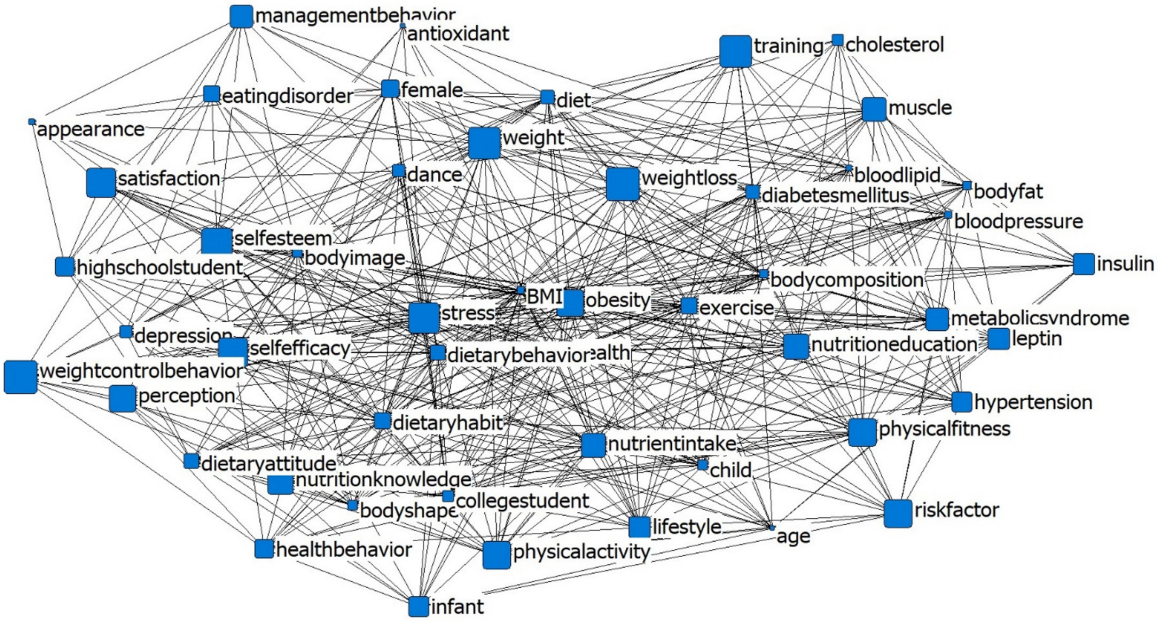


**Fig. 2.** The overall network of weight control keywords.
BMI, body mass index.

top 50 keywords by frequency, and visualized using NetDraw as shown in Fig. 2. The number of nodes was 50, density was 0.433, average connection strength was 21.240, average connection distance was 1.567, component was 1, diameter was 3, and network centrality was 54.8%. This shows that each keyword is associated with an average of 1.56 other keywords, and all keywords are connected with a maximum of three keywords. Using the bootstrap method to test the statistical significance of the entire network for weight control keywords revealed that the average of the sampling distribution was 1.1975, the standard error was 0.1983, and Z = 5.9765. The probability that the test statistic was observed to be higher than the absolute value of the Z-score was 0.0002, indicating that the relationships between data within the network were statistically significant at the 5% level.

### 4. Degree centrality and betweenness centrality analysis

Centrality analysis was conducted to examine the influence of major keywords on the network (Table 4). Degree centrality refers to the extent to which a keyword is directly connected to other keywords. A higher value indicates that the keyword has many connections and plays a central role in the overall network structure. As a result, 'Obesity' (0.959) > 'BMI' (0.898) > 'Health' (0.776) > 'Exercise' (0.714) = 'Stress' (0.714). Betweenness centrality is an indicator that measures how much a node acts as a mediator or intermediary in the network relationships between other nodes. The top 5 keywords with high rankings were 'Obesity' (0.075) > 'BMI' (0.059) > 'Health' (0.050) > 'Stress' (0.035) > 'Exercise' (0.027). There were some changes in the frequency rankings, but most of them were the same keywords as the degree centrality.

### 5. CONCOR analysis related to weight control

CONCOR analysis was performed to cluster studies with similar keywords related to weight control and identify their characteristics (Table 5). Cluster 1 includes keywords such as 'Weight control behavior', 'Satisfaction', 'Stress', 'Self-efficacy', 'Nutrition knowledge', and is named the 'Preventive healthcare' cluster. Cluster 2 includes keywords such as 'Weight loss', 'Weight', 'Risk factor', 'Lifestyle', and 'Health', and is named the 'Health management' cluster. Cluster 3 includes 'Training', 'Physical fitness', 'Obesity', and 'Metabolic syndrome', and is named the 'Physical health' cluster. Cluster 4 includes keywords such as 'Self-esteem', 'Management


https://doi.org/10.5720/kjcn.2024.00269

**Table 4.** Centrality for keywords related to weight control

| Degree centrality | | | | | | Betweenness centrality | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Rank | Keyword | Centrality | Rank | Keyword | Centrality | Rank | Keyword | Centrality | Rank | Keyword | Centrality |
| 1 | Obesity | 0.959 | 11 | Diabetes mellitus | 0.551 | 1 | Obesity | 0.075 | 11 | Self-esteem | 0.017 |
| 2 | BMI | 0.898 | 12 | Nutrient intake | 0.531 | 2 | BMI | 0.059 | 12 | Nutrient intake | 0.015 |
| 3 | Health | 0.776 | 13 | Self-esteem | 0.531 | 3 | Health | 0.050 | 13 | Weight loss | 0.014 |
| 4 | Stress | 0.714 | 14 | Weight loss | 0.510 | 4 | Stress | 0.035 | 14 | Diet | 0.014 |
| 5 | Exercise | 0.714 | 15 | Nutrition education | 0.510 | 5 | Exercise | 0.027 | 15 | Dietary habit | 0.012 |
| 6 | Dietary behavior | 0.633 | 16 | Diet | 0.510 | 6 | Weight | 0.026 | 16 | Female | 0.011 |
| 7 | Body image | 0.592 | 17 | Child | 0.490 | 7 | Dietary behavior | 0.023 | 17 | Nutrition education | 0.011 |
| 8 | Body composition | 0.571 | 18 | College student | 0.490 | 8 | Diabetes mellitus | 0.021 | 18 | Child | 0.011 |
| 9 | Dietary habit | 0.571 | 19 | Physical fitness | 0.469 | 9 | Body image | 0.018 | 19 | College student | 0.010 |
| 10 | Weight | 0.959 | 20 | Body shape | 0.469 | 10 | Body composition | 0.018 | 20 | Physical fitness | 0.009 |

BMI, body mass index.

**Table 5.** CONCOR analysis of keywords related to weight control

| Clusters | Keywords | Number |
|---|---|---|
| Preventive healthcare | Weight control behavior, Satisfaction, Stress, Self-efficacy, Nutrition knowledge, Perception, Physical activity, Nutrient intake, Infant, Health behavior, High school student, Dance, Dietary behavior, Dietary attitude, Dietary habit, Body shape, College student, BMI, Depression | 19 |
| Health management | Weight loss, Weight, Risk factor, Lifestyle, Health, Hypertension, Nutrition education, Diet, Diabetes mellitus, Exercise, Cholesterol, Child, Body fat, Blood lipid, Antioxidant, Age | 17 |
| Physical health | Training, Physical fitness, Obesity, Metabolic syndrome, Muscle, Leptin, Insulin, Blood pressure, Body composition | 9 |
| Personal development | Self-esteem, Management behavior, Female, Eating disorder, Appearance | 5 |

BMI, body mass index.

behavior', and 'Female', and is named the 'Personal development' cluster.

## DISCUSSION

Body weight is determined by energy intake and energy expenditure, and weight control requires changes in diet, physical activity, and behavior [19]. Analysis of journal article publication trends showed that research on weight control is being conducted in various aspects, such as fields of food science and nutrition, exercise, medicine, and health. In particular, food science and nutrition-related journals ranked highest in the number of published articles, as diet plays an important role in major strategies for weight management. The fact that the '*The Korean Journal of Community Nutrition*' ranked first shows that community-centered nutrition research plays an important role in weight control. This finding reflects the emphasis on nutrition research in Korea but should be interpreted with caution as the contribution of specific studies to weight control strategies requires further validation. The inclusion of four journals related to physical activity in the top 20 shows a high awareness that diet and physical activity are necessary for effective weight management. The high rank of medical and health-related journals also reflects the medical community's strong interest in understanding and solving weight-related problems. The analysis of publication

trends by year suggests that weight control continues to be an important research topic due to the need for effective intervention methods against the continuous increase in obesity rates in Korea [20].

Keyword frequency analysis results showed that research on the relationship between weight control and the prevention or treatment of major chronic diseases such as 'Obesity', 'Diabetes mellitus', 'Hypertension', and 'Metabolic syndrome', which are on the rise in Korea [20], is actively underway. There are many ways to determine weight status [21], and as a result of this study, BMI, which uses height and weight and is known to have a high correlation with body fat, was widely used in studies. Also, the necessity of 'Exercise', 'Dietary behavior', 'Dietary habit', and 'Nutrient intake' in practicing weight control was recognized, and research on these was actively conducted. The original meaning of weight control includes both gaining and losing weight through intentional efforts [22], but the results of this study showed that 'Weight loss' was the main concern. Additionally, this result shows a difference from the results of 'Exercise', 'Health', 'Menu', and 'Effect', which were obtained by collecting data using diet search terms on 'Naver' in one year (2015) [23]. This difference appears to be due to differences in analysis data. The prevalence of obesity among children and adolescents in Korea was 16.2% in the 8th National Health and Nutrition Examination Survey (2019–2021), which was significantly lower than the adult obesity rate (37.2% in 2022) [5]. Nevertheless, the fact that this study focused on the early years of life, such as 'Children' and 'Infants', reflects the need for early treatment due to the long-term negative effects of childhood obesity [24]. Therefore, it is necessary to actively utilize the research results in health and nutrition education in kindergartens and elementary schools as a policy. Meanwhile, research on adults with high obesity rates, especially those aged 40–49 and men, was insufficient, , so actual research on these subjects is needed.

A comparison of research trends over the past 20 years in two 10-year periods revealed a change in research focus, although 'Obesity', 'BMI', and 'Exercise' remained important research topics in both periods. The top keywords in the first period were 'Nutrient intake', 'Dietary behavior', and 'Dietary habit', which suggests that research on nutritional management related to weight control was actively conducted. However, in the second period, mental health factors such as 'Stress' and 'Depression' emerged as top keywords, which is thought to reflect the perception that obesity is a chronic disease that is difficult to manage without holistic treatment [25]. This suggests that mental health factors are increasingly being recognized as critical variables in obesity management within domestic studies. Therefore, when conducting research related to weight control in the future, integrated research on the holistic aspect needs to be actively conducted, and a holistic integrated treatment approach should also be attempted when establishing health policies related to obesity treatment.

In both centrality analyses, 'Obesity', 'BMI', 'Health', 'Exercise', and 'Stress' were the top five keywords. These keywords were also major keywords in frequency analysis. In particular, 'Obesity' ranked highest in both centrality indices, which means that 'Obesity' is closely connected to other keywords in the network and plays an important intermediary role between them. These results suggest that a deep understanding of obesity-related factors is needed for future weight control-related research and policy establishment.

Preventive health care (Cluster 1) in the CONCOR analysis includes psychological factors such as stress, self-efficacy, and depression, which suggests that research and policies on mental health management, especially for students, are needed in preventive health care. For effective health management in Cluster 2, multidisciplinary research on nutrition education, diet, exercise, and clinical trials should be conducted. Physical health (Cluster 3) refers to the fact that physical activity, such as strength training, plays an important role in the management of obesity and metabolic syndrome. Personal development (Cluster 4) refers to the aspect where an individual's psychological and emotional growth leads to management behavior and is linked to weight management. These results clarify the direction of research related to weight management according to target or interest, thereby enabling a more systematic and specific approach when establishing weight management strategies in Korea.

### Limitations

This study had some limitations. First, since only the


https://doi.org/10.5720/kjcn.2024.00269

keywords of KCI-listed journal papers were analyzed, unpublished papers or papers different from the search terms may have been omitted. Second, there is a possibility that the researcher's subjectivity may have intervened in decision-making during the data cleaning process. Third, the analysis was limited to keywords, which may not fully capture the depth and context of each study. Fourth, the focus on KCI journals excludes international perspectives, potentially limiting the generalizability of the findings.

### Conclusion

This study is significant in identifying the change process and structural relationships of research over the past 20 years through keyword network analysis related to weight control. The results of this study showed that weight control research reflecting the characteristics of the times has been steadily progressing in relation to the rapidly increasing obesity, and suggested that weight control research should be actively conducted in the future from an overall perspective related to weight loss in Korea. The results of the CONCOR analysis are expected to be helpful in segmenting groups when developing policies or setting research directions related to weight control. However, concrete evidence and examples of how these findings can be implemented into policies are still required.

## CONFLICT OF INTEREST

There are no financial or other issues that might lead to conflict of interest.

## FUNDING

This study was supported by the Changshin University Research Fund (Grant No. 2024-023).

## DATA AVAILABILITY

The data that support the findings of this study are openly available in "KCI" at https://www.kci.go.kr.

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https://doi.org/10.5720/kjcn.2024.00269