



Research Article

Shifting social perceptions of dietitians in Korea after the legislation of nutrition teachers: a keyword network analysis of unstructured data

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Objectives: In Korea, dietitian licenses began to be issued in 1964, and they have been working to prevent diseases and promote people's health in various fields according to the times. This study was conducted to compare differences in social perception of dietitian over time by collecting online unstructured data and analyzing the frequency and network structure of nutritionist-related keywords after the deployment of nutrition teachers began.

Methods: Using 'dietitian' as a keyword, we collected data from NAVER's web, blogs, and news provided by Textom (2024, The IMC) and refined the data. We investigated the frequency ranking of keywords related to dietitians for each period, revealed the network structure using UCINET6 (Freeman) and Netdraw, and clustered similar concepts among keywords through CONCOR (CONvergence of iterated CORrelations) analysis to cluster-related concepts.

Results: Frequency analysis revealed that during the first period, keywords such as 'School' and 'Education' reflecting the institutionalization of nutrition teachers, were highly ranked. However, by the second period, these terms had dropped out of the top 10. Meanwhile, keywords related to healthcare, such as 'Hospital', consistently remained among the most prominent. In the second period, the rankings of the 'License' and 'University transfer' keywords increased significantly. Centrality analysis showed stronger connectivity between dietitians and keywords such as 'Food', 'School', 'Examination', and 'Nutrition' in the second period compared to the first. CONCOR analysis further demonstrated that the 'Major education' cluster of the first period was differentiated into the 'Major education and qualification' and 'Professional competency certification process' clusters of the second period. In addition, the 'Health and welfare' cluster of the first period was divided into the 'Health and welfare regional service' clusters of the second period.

Conclusion: The results of this study will be used as basic data for identifying social perception and trends in the dietitian profession, further providing a scope for their improvement.

Keywords: dietitian; social perception; big data

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INTRODUCTION

Dietitians are healthcare professionals specializing in meal management and nutritional services to prevent diseases and promote overall health. They are officially recognized as healthcare personnel under the 「Act on Providing Assistance

with Health Professionals」[1]. In Korea, dietitian licenses have been issued since 1964, and as of 2020, approximately 42,000 dietitians are active. More than 78% are employed in foodservice facilities, including industry, schools, hospitals, social welfare facilities, infant care facilities, kindergartens, older adult care facilities, and the military. Additionally, they are active in education, research, the foodservice industry, public officials, and public health centers [2].

With the revision of the 「Elementary and Secondary Education Act」 in 2003, a nutrition teacher system was introduced in schools in 2007 [3], and the scope is expanding as nutrition teachers are assigned to kindergartens from 2021 [4]. Its scope continues to expand, with nutrition teachers assigned to kindergartens starting in 2021. Meanwhile, clinical dietitians are professionals with national licenses who play a major role in improving the quality of clinical nutrition services provided in hospitals and supporting disease prevention and treatment. Since the enactment of the 「National Nutrition Management Act」 in 2012 [5], the number of clinical dietitians has steadily increased.

With growing concerns over food poisoning at children's foodservice facilities and the poor quality of meals for children, the Center for Children's Foodservice Management was established in 2011 under the 「Special Act on Safety Management of Children's Dietary Life」 [6]. In 2022, its scope was expanded under the 「Act on Foodservice Safety Support for Social Welfare Facilities for the Elderly and the Disabled」, it was expanded to the Center for Children's and Social Welfare Foodservice Management [7]. As of 2024, approximately 2,500 dietitians are working across 236 centers nationwide [8]. In this way, both the scope and value of the dietitian profession are expanding, and in the Ministry of Employment and Labor's mid- to long-term human resource supply and demand forecasts, an additional 370,000 health and social welfare workers are expected to be hired over the next 5 years (2025–2030) [9]. Accordingly, the demand for dietitians is also expected to increase. Therefore, there is a need to evaluate social perception among dietitians.

Most previous studies on social perception have relied on surveys conducted with sample groups [10, 11]. However, these methods have limitations, as they may

not accurately reflect the general characteristics of the population, potentially leading to errors or researcher bias [12]. In contrast, the emerging field of big data analysis offers a more effective approach to understanding societal perceptions and trends by utilizing large datasets and can suggest meaningful opinions in analyzing the changing trends over time for a specific topic [13, 14]. Furthermore, by examining relationships between keywords, data can be visualized, and patterns can be derived, allowing for a clear understanding of the structural characteristics [15]. Today, social networking services are widely used, enabling people to communicate and exchange information and content. Additionally, news articles and online communities provided on internet portal sites reflect the thoughts and opinions of the conveyors of information, making it possible to understand the public perceptions through these sources [16]. Recently, studies utilizing big data have been conducted in the field of food and nutrition, such as analyzing the diet status at a specific point in time based on social media big data [17] or comparing the perception of diet before and after COVID-19 [18].

Studies on social perception of specific occupations are being conducted using social big data, and these studies have shown that changes in social issues or policies have an impact on changes in social perception of specific occupations [19, 20]. Occupational prestige can be defined as the evaluation of a specific occupation shared by members of society, and is useful for examining social changes and changes in perception. A first big issue for dietitians since 2000 was that dietitians who previously worked as school food sanitation officers could legally be assigned to schools as nutrition teachers. Secondary school teachers ranked 6th in occupational prestige in 2009 [21]. By comparing the three years from 2007 (2007–2009), when the nutrition teacher who had a major influence on the dietitian paradigm were placed in each school, with the recent three years (2022–2024), we can assess the changes in the social perception of dietitians due to the revision of laws and regulations related to dietitians and the introduction of the system. The purpose of this study was to understand and use these as basic data to establish and improve dietitian awareness. The specific research questions are as follows:

RQ1: What are the characteristics of dietitian-related keywords between 2007–2009 and 2022–2024 as analyzed through big data?

RQ2: What is the network structure of dietitian-related keywords between 2007–2009 and 2022–2024 as analyzed through big data?

METHODS

Ethics statement

This study utilized publicly available and anonymized datasets. The data used in this research does not contain any personally identifiable information and was provided by the data provider for public access. Therefore, this study does not require approval from an institutional review board. The use of the data strictly adhered to the ethical guidelines and terms of use set by the data provider, which were thoroughly reviewed and meticulously followed before conducting the study.

1. Study design

This study is an exploratory research that analyzes social perceptions of dietitians by collecting and analyzing publicly available data on NAVER using Textom (The IMC).

2. Data collection

The data for this study was collected using the keyword ‘dietitian’ from the domestic portal site NAVER provided by Textom (2024), a big data analysis program. Data collection was centered on nouns related to ‘dietitian’ that appeared on NAVER’s web pages, blog, news, cafe, and intellectuals. The reason NAVER was chosen as a collection channel is that NAVER has the highest average inflow rate among Korean portal sites. And collecting data from multiple major domestic portals risks duplicate exposure due to overlapping and reproducible content, leading to redundant text [12]. The data collection periods were three years (2007.1.1.–2009.12.31.) from 2007 and most recent three years (2022.1.1.–2024.12.31.), and the purpose was to compare and analyze the initial point in time when awareness of dietitian began to spread and the recent point in time, 16 years later.

The collected data included 1,000 NAVER web pages (560.52 KB), 971 blog posts (528.57 KB), 121 news articles (64.25 KB), 394 cafe posts (216.46 KB), and

1,000 intellectual posts (843.08 KB) for the first period (2007.1.1.–2009.12.31.). For the second period (2022.1.1.–2024.12.31.), the data included 1,000 web pages (521.96 KB), 990 blog posts (583.34 KB), 102 news articles (55.30 KB), 518 café posts (248.10 KB), and 1,000 intellectual posts (672.02 KB) for the second period (2022.1.1.–2024.12.31.).

3. Data cleaning

First, the data preprocessing process was as follows: Since the data collected from Textom was in sentence form, the ‘Espresso K’ analyzer was used to reflect proper nouns and compound nouns. Only nouns were selected as the parts of speech, followed by morphological analysis and the removal of stop words. Second, the search term ‘dietitian’ was deleted, as it was considered difficult to interpret meaningfully in structural property and centrality analysis. Compound terms such as ‘Open university’ and ‘National examination’ were merged by removing spaces. Additionally, meaningless words (day, thing, time, related, and, etc.) were deleted. This process was reviewed by three experts in food science and nutrition.

4. Analysis method

The analysis method of this study is as follows: First, frequency analysis was performed on refined data using Textom (2024). The top 50 words with the highest frequency for each period were compared and analyzed. Second, the top 50 keywords were converted into a 50×50 1-mode matrix data set, and the network shape and properties were identified using UCINET6 (Freeman). Third, connection centrality analysis was performed for each period. Connection centrality is the sum of the number of words the word is connected to, and a high connection centrality means that there are also many neighboring words connected, so the connection centrality can be calculated to identify the core words at the structural center [21]. Fourth, CONCOR (CONvergence of iterated CORrelations) analysis was performed to present and compare similar groups between keywords for each period. CONCOR analysis divides each keyword into several subgroups based on repeated correlations.

RESULTS

1. Frequency analysis of keywords related to dietitian

The results of a frequency ranking of the top 50 keywords related to dietitian in the first period (2007–2009) of three years after the nutrition teachers were legislated (Table 1) showed that ‘Food’ ranked the highest, followed by ‘School’, ‘Nutrition’, ‘Examination’, ‘Foodservice’, ‘Health’, ‘Hospital’, ‘Certificate’, ‘University’, ‘Education’, ‘Nutrition’, ‘Teacher’, ‘Enrollment’, and ‘Study.’ As in the first period, the keyword with the highest frequency in the second period (2022–2024) was ‘Food,’ followed by ‘Examination,’ ‘Enrollment,’ ‘Foodservices,’ ‘Certifi-

cate,’ ‘Work,’ ‘Nutrition,’ ‘License,’ ‘Qualification,’ ‘Health,’ ‘School,’ ‘Hospital,’ ‘Nutrition science.’

2. The structural form of the network

The network structure properties of keywords related to dietitian in first period were as follows: Nodes were 50, density was 0.989, average degree was 48.44, average distance was 1.011, and diameter was 2 (Fig. 1). The network properties in second period were as follows: Nodes were 50, density was 0.969, average degree was 47.48, average distance was 1.031, and diameter was 2 (Fig. 2). These results mean that in first period, one keyword was connected to an average of 1.011 other keywords, and

Table 1. Frequency analysis of keywords related to dietitian by period

First period (2007–2009)						Second period (2022–2024)					
Rank	Keyword	Frequency	Rank	Keyword	Frequency	Rank	Keyword	Frequency	Rank	Keyword	Frequency
1	Food	1,461	26	Major	326	1	Food	1,674	26	Career	421
2	School	1,160	27	Career	317	2	Examination	1,477	27	Announcement	419
3	Nutrition	935	28	Recruitment	316	3	Enrollment	1,287	28	Credit	409
4	Examination	900	29	Subject	313	4	Foodservice	1,092	29	Pass	396
5	Foodservice	798	30	Announcement	312	5	Certificate	1,078	30	Recruitment	393
6	Health	728	31	Pass	307	6	Work	970	31	Cooking	380
7	Hospital	720	32	Exercise	294	7	Nutrition	897	32	Specialist	375
8	Certificate	685	33	Specialization	286	8	License	834	33	Application	375
9	University	653	34	National examination	285	9	Qualification	796	34	Major	362
10-1	Education	570	35	Occupation	278	10	Health	762	35	National examination	359
10-2	Nutrition science	570	36	Company	267	11	School	759	36	Cook	354
12	Teacher	534	37	Department	258	12	Hospital	758	37	Organization	353
13	Enrollment	450	38	Welfare	254	13	Nutrition science	741	38	Study	338
14	Study	447	39	Doctor	254	14	Acquisition	724	39	Employment	328
15	Culinary	441	40	Hygienist	254	15	Diet	641	40	Menu	326
16	Qualification	425	41	Society	254	16	Education	617	41	Completion	294
17	Graduation	421	42	Diet	253	17	Graduation	599	42	Recommendation	292
18	Counseling	373	43	Student	251	18	University	597	43	Clinical	287
19	Application	360	44	Patient	246	19	University transfer	558	44	Culinary	284
20	Cook	343	45	Employment	230	20	Application	546	45	Required	275
21	Cooking	339	46	Child	223	21	Open university	534	46	Welfare	274
22	Cuisine	339	47	Business	214	22	Information	526	47	Law	264
23-1	License	337	48	Meal	212	23	Practice	490	48	Region	262
23-2	Public health	337	49	Healthcare	209	24	Subject	477	49	Department	261
25	Information	332	50	Nurse	207	25	Task	437	50	Society	259

Table 2. Degree centrality for keywords related to dietitian by period

First period (2007–2009)						Second period (2022–2024)					
Rank	Keyword	Centrality	Rank	Keyword	Centrality	Rank	Keyword	Centrality	Rank	Keyword	Centrality
1	Food	0.192	11	Foodservice	0.072	1	Food	0.232	11	Application	0.098
2	School	0.107	12	Graduation	0.064	2	Examination	0.182	12	University transfer	0.097
3	Examination	0.106	13	Hospital	0.058	3	Certificate	0.159	13	Work	0.096
4	Nutrition	0.094	14	Education	0.047	4	Enrollment	0.146	14	Graduation	0.092
5	Certificate	0.084	15	Health	0.044	5	Qualification	0.133	15	University	0.085
6	University	0.080	16	Teacher	0.040	6	Foodservice	0.126	16	Hospital	0.079
7	Enrollment	0.074	17	Study	0.038	7	Acquisition	0.121	17	School	0.070
8-1	Nutrition science	0.073	18	Cook	0.037	8	Nutrition	0.118	18	Diet	0.068
8-2	Qualification	0.073	19	Culinary	0.022	9	License	0.114	19	Education	0.061
8-3	National examination	0.073	20	Counseling	0.021	10	Nutrition science	0.105	20	Health	0.098

Table 3. CONCOR analysis of keywords related to dietitian by the first period (2007–2009)

Clusters	Keywords	Number
Major education	University, Student, Subject, Nutrition science, Qualification, Study, Pass, National examination, Major, Examination, Food, Graduation, Student, Certificate, Public Health, Cooking, Department, Employment, License, Hygienist	20
Wellness	Society, Healthcare, Patient, Specialization, Exercise, Health, Meal, Information, Doctor, Foodservice, Culinary, Education, Diet, Counseling, Child, Business	16
Health and welfare	Welfare, Enrollment, Recruitment, Nurse, Hospital, Career, Announcement	7
Occupation	Teacher, School, Occupation, Cuisine, Nutrition, Cook, Company	7

CONCOR, CONvergence of iterated CORrelations.

with high degree centrality rankings in the 2nd period were ‘Food’ (0.232) > ‘Examination’ (0.182) > ‘Certificate’ (0.159) > ‘Enrollment’ (0.146) > ‘Qualification’ (0.133) > ‘Foodservice’ (0.126) > ‘Acquisition’ (0.121), etc. Words such as ‘Certificate’, ‘Qualification’, ‘Acquisition’, and ‘Application’ had higher degree centrality than frequency ranking.

4. CONCOR analysis

In order to cluster keywords with similarities in the social perception of dietitian and to identify their characteristics, CONCOR analysis was performed. According to the CONCOR analysis results for first period (Table 3), Cluster 1 contained a total of 20 keywords, including ‘University’, ‘Student’, ‘Subject’, ‘Nutrition science’, ‘Qualification’, ‘Study’, ‘Pass’, and ‘National examination’, and was named ‘Major education’. Cluster 2 contained a total of 16 keywords, including ‘Society’, ‘Healthcare’, ‘Patient’, ‘Exercise’, and ‘Health’, and was named ‘Wellness’. Cluster

3 contained a total of 7 keywords, including ‘Welfare’, ‘Enrollment’, ‘Recruitment’, and ‘Nurse’, and was named ‘Health and welfare’. Finally, Cluster 4 contained a total of 7 keywords, including ‘Teacher’, ‘School’, and ‘Occupation’, and was named ‘Occupation’.

CONCOR analysis results for the second period (Table 4), cluster 1 included 17 keywords including ‘University’, ‘Open university’, ‘Specialist’, ‘Major’, ‘License’, and ‘University transfer’, and was named ‘Major education and qualification’. Cluster 2 included 13 keywords including ‘Welfare’, ‘Work’, ‘Task’, ‘Region’, and ‘Recruitment’, and was named ‘Health and welfare regional service’. Cluster 3 included 10 keywords including ‘Subject’, ‘Qualification’, ‘Study’, ‘Pass’, ‘National examination’, and ‘Graduation’, and was named ‘Professional competency certification process’. Finally, cluster 4 included 10 keywords including ‘Society’, ‘Recommendation’, ‘School’, and ‘Foodservice’, and was named ‘Foodservice management’.

Table 4. CONCOR analysis of keywords related to dietitian by the second period (2022–2024)

Clusters	Keywords	Number
Major education and qualification	University, Open university, Specialist, Major, License, University transfer, Nutrition science, Department, Required, Food, Employment, Law, Cooking, Clinical, Certificate, Credit, Acquisition	17
Health and welfare regional service	Welfare, Work, Task, Region, Recruitment, Cook, Hospital, Education, Information, Enrollment, Career, Announcement, Registration	13
Professional competency certification process	Subject, Qualification, Study, Pass, National examination, Graduation, Application, Practice, Examination, Completion	10
Foodservice management	Society, Recommendation, School, Nutrition, Foodservice, Menu, Organization, Health, Diet, Culinary	10

CONCOR, CONvergence of iterated CORrelations.

DISCUSSION

According to the 「National Nutrition Management Act」, a dietitian can take the exam only after graduating from the Department of Nutrition or Food and Nutrition, holding an undergraduate degree in Food Science, Nutrition, or Food and Nutrition, and completing 52 credits in 18 nutrition-related subjects [5]. Reflecting this, the top 10 keywords related to dietitians in this study included ‘Food’, ‘Nutrition’, ‘Examination’, and ‘Certificate’. In the first period, keywords such as ‘School’ (2nd) and ‘Education’ (10th), which reflect the institutionalization of nutrition teachers, were among the top 10, with ‘Teacher’ ranking 12th. However, in the second period, these keywords dropped out of the top 10, while health-care-related keywords like ‘Health’ (6th place) and ‘Hospital’ (7th place) ranked 9th and 12th, respectively. Meanwhile, the keyword ‘Foodservice’, which is closely associated with the primary work setting for many dietitians, remained prominent, ranking 5th in the first period and 4th in the second. The dietitian licensing system, which was established with the enactment of the 「Food Sanitation Act」 in 1962, and transitioned to a nationwide examination in 1978, is reflected in the study [22]. The keyword ‘License’ rose from 23rd in the first period to 8th place in the second period. Additionally, ‘University transfer’, which did not appear in the top 50 during the first period, ranked 19th in the second period, and considering that employment-related keywords such as ‘Recruitment’, ‘Work’, and ‘Qualifications’ are at the top, the purpose of university transfer is to obtain a professional license and get a job rather than to improve academic ability at university.

The centrality analysis in the first period revealed a higher connectivity between the ‘Food’, ‘School’, ‘Examination’, and ‘Nutrition’ keywords, as confirmed by the frequency analysis results, but the keywords ‘Foodservice’, ‘Health’, and ‘Hospital’ were outside the top 10. Instead, keywords related to qualification acquisition and credentials, such as ‘Enrollment’, ‘Qualification’, and ‘Examination’, were more closely associated with dietitians. In the second period, the connectivity between keywords like ‘Food’, ‘Examination’, ‘Certification’, ‘Foodservice’, ‘Nutrition’, ‘License’, and ‘Acquisition’ was stronger than in the first period. As the perception of dietitians is shaped around these keywords, it is essential to provide opportunities to obtain a dietitian license and related certifications through a systematic food and nutrition major curriculum, which includes food, nutrition, and foodservices. This approach can ultimately lead to employment. As a result of structural analysis to see the positioning of keywords related to dietitians, in the first period, a close network was shown centered on the keywords ‘Teacher’, ‘School’, ‘Health’, ‘University’, and ‘Specialization’, showing that the legislation of nutrition teachers was influencing social perception. In the second period, connections were concentrated on keywords such as ‘Specialist’, ‘Qualification’, ‘Work’, and ‘Task’, showing that the expertise of dietitians was being strengthened and their perception the profession was being solidified.

Changes in social issues or policies can change perceptions about occupations [23]. According to the results of the first CONCOR analysis of the social perception of dietitians, the ‘Major education’ cluster included subjects related to ‘Food’, ‘Nutrition science’, ‘Public health’,

and 'Cooking', as well as acquired 'Certificate' and 'License'. Wellness is a recent concept in healthcare that has rapidly spread in Korea since 2000 and includes disease treatment and prevention, health promotion, and quality of life improvement [24]. The 'Wellness' cluster included wellness-related keywords such as 'Healthcare', 'Health', 'Meal', 'Culinary', 'Education', and 'Counseling', all of which are connected to physical wellness and linked to dietitians. Additionally, through the 'Health and welfare' cluster, dietitians are recognized as healthcare personnel alongside nurses [1]. The 'Occupation' cluster expressed interest in nutrition teachers, newly institutionalized in the dietitian profession, through keywords such as 'Teacher', 'School', and 'Nutrition'.

The CONCOR analysis results for the second period revealed the advancement and differentiation of dietitian awareness compared to the first period. The keywords forming the 'Major education and qualifications' cluster have evolved from the 'Major education' cluster in the first period. This indicates that a dietitian can now obtain a license only by completing the required curriculum prescribed by law. Additionally, the license can be obtained through institutions such as the Korea Communications and the Communications University or via university transfer. This indicates an awareness of the possibility of obtaining this qualification. The 'Health and welfare regional service' cluster showed the advancement of 'Health and welfare' from the first period, with the recognition that dietitians are active in providing health and welfare services in the community. This was reflected in keywords such as 'Welfare', 'Region', 'Hospital', and 'Education'. Recently, as the position and role of the curriculum have become more important in university education, efforts are being made to increase external competitiveness by operating a competency-based curriculum to improve quality [25]. Reflecting this trend, the 'Professional competency certification process' cluster emerged, differentiating itself from the 'Major education' cluster of the first period. Dietitian competencies are now recognized as being developed and equipped with a focus on 'Subject', 'Practice', 'Examination', and 'Certification'. The 'Foodservice management' cluster included keywords such as 'Menu', 'Culinary', 'Diet', 'Health', and 'Nutrition', which are related to foodservice, the sector in which most dietitians are

engaged.

Nonetheless, this study is valuable in that it examined the evolution of social perceptions of dietitians by exploring the structural relationships between keywords after implementing policies, such as the legalization of nutrition teachers and the transition to national certification for clinical dietitians. This study highlights the need to train dietitians who will play active roles in community health, welfare, and foodservice fields through a major curriculum that enables the acquisition of professional competencies as a dietitian.

Limitations

A limitation of this study is that the data were collected only in Korean from domestic social media resources, meaning that languages other than those used in the search terms may have been omitted. The limited data-collection period limited the comparison of perceptions. The reason why we analyzed data from three years is that the early 2000s were a time when Internet use was relatively inactive compared to recent times, so there was a lack of data, and thus, we cannot guarantee that the distribution of comparative data is even. However, since social perception and discourse due to institutional changes are reflected with a certain amount of time lag, we used three years to compare the initial reaction to the introduction of the system and the gradual settlement of discourse.

Conclusion

This study is valuable in that it examined the changes in social perception of dietitians through the structural relationship between keywords after the implementation of the policy of legalizing nutrition teachers related to the occupational prestige of dietitians. Through the results of this study, it was confirmed that the perception of dietitians as a profession is becoming more solid and that there is a need to train dietitians who will work in the fields of community health, welfare, and foodservice with enhanced expertise.

CONFLICT OF INTEREST

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

FUNDING

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DATA AVAILABILITY

The data that support the findings of this study are openly available in “Textom” at <https://www.texom.co.kr>.

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