

Keyword Network Analysis through Big Data on Well-being of Young Children with Disabilities

Hyung Mee Kim¹⁾

Korean Bible University

Abstract

This study was to examine the overall perception of Korean society on well-being of young children with disabilities in big data. For this purpose, Textom, a big data analysis solution, was used to collect data during each period of the 3rd-5th Comprehensive Policy Plan for People with Disabilities, using ‘young children with disabilities + well-being’ as keywords. On the collected raw data, data cleaning was conducted as primary and secondary refinement procedures to select the top 200 keywords, which were then subjected to network analysis. After conducting a network analysis targeting the top 200 keywords, the main results are as follows. First, as a result of the keyword frequency analysis, ‘health’ and ‘education’ ranked highly across the 3rd, 4th, 5th plans, which can be interpreted as indicating that ‘health’ and ‘education’ are most often mentioned in social discussions about the well-being of young children with disabilities. Second, examining the relationship between keyword networks on the well-being of young children with disabilities by the plans, the degree centrality analysis revealed that well-being of young children with disabilities was recognized socially in a physical aspect, but moved towards a comprehensive concept that includes various aspects. In both the closeness and betweenness centrality analyses, ‘health’ was found to be high in all three plans. Based on these results, it is important to understand the social perception of well-being of young children with disabilities and to provide a basis for research, policy, and national support for young children with disabilities.

Keywords : children with disabilities, well-being, big data, network analysis

Corresponding author, ¹⁾ hmksp@bible.ac.kr

Introduction

In Korea, free education is implemented for infants with disabilities under the age of three, and children with disabilities from the age of three to five have the right to compulsory education, under ‘the Act on Special Education for Persons with Disabilities (2007).’ However, in current compulsory education for young children with disabilities, early childhood special education is implemented at kindergartens and childcare centers and there is a large gap between kindergartens and daycare centers in terms of the availability of quality teachers, classroom composition, and funding, all of which are critical to compulsory education (Park, 2022). As the current system of kindergartens and daycare centers is dualized in Korea, statistical surveys on young children with disabilities are conducted separately by the Ministry of Education and the Ministry of Health and Welfare, which makes it difficult to comprehensively identify young children with disabilities and limits inclusive policy support for them (Park & Kim, 2022). Recently, the Korean government has recognized the above issues related to young children with disabilities and has begun to develop a long-term plan to support young children with disabilities and their families in order to advocate for their rights (Joint Ministry related to Social Affairs, 2021).

The following laws and policies have had a major impact on supporting infants and children with disabilities in Korea. ‘The Act on the Prohibition of Discrimination Against Persons with Disabilities and the Remedy Against Infringement of their Rights’ was enacted in 2007, which introduced the Disability Activity Support System. ‘The Act on Welfare Support for Children with Disabilities’ was enacted in 2011, which established the basis for supporting young children with disabilities in daycare centers. ‘The Act on Guarantee of Rights and Support for Persons with Developmental Disabilities’ was enacted in 2014, which provided support for appropriate rehabilitation services for children with disabilities.

The Korean government established every five years ‘the Comprehensive Policy Plan for People with Disabilities,’ which is the core plan that guides the direction of Korea's disability policy in all areas of life for people with disabilities (Korean Joint Ministry, 2008; 2013; 2018). ‘The Comprehensive Policy Plan for People with Disabilities’ has led to the establishment of laws and systems to promote the welfare and rights of people with disabilities, including the creation of a system for each policy area, the expansion of policy

Keyword Network Analysis through Big Data on Well-being of Young Children with Disabilities

Table 1. *Specific Plans Related to Children with Disabilities*

The 3rd Comprehensive Policy Plan for People with Disabilities (2008-2012)	The 4th Comprehensive Policy Plan for People with Disabilities (2013-2017)	The 5th Comprehensive Policy Plan for People with Disabilities (2018-2022)
- Providing support services for children with disabilities and families (rehabilitation services, parenting counseling, psychological counseling, temporary care) - Introduced a special pension for children with disabilities - Support for therapy services for children with disabilities - Free hearing screening for newborn babies, expanded congenital metabolic screening, and support for medical expenses for children with disabilities	- Establishment of a system for early detection of developmental disabilities (support developmental delay screening fee) - Provide appropriate rehabilitation services for children with developmental disabilities - Emotional support and capacity building for families of children with developmental disabilities - Expanding rehabilitation services for children with disabilities and care aid programs for families - Enhancing childcare services for preschoolers with disabilities	- Expanding family support services for children with disabilities - Building a rehabilitation medical system for children with disabilities - Enhancing childcare services for young children with disabilities - Strengthen support for welfare services for children with developmental disabilities
The 3rd Five-Year Plan for Advancing Special Education (2008-2012)	The 4th Five-Year Plan for Advancing Special Education (2013-2017)	The 5th Five-Year Plan for Advancing Special Education (2018-2022)
1. Establish a lifecycle education support system for people with disabilities - Full implementation of free education for infants with disabilities - Implement compulsory education for preschoolers with disabilities 2. Internalization of inclusive education for school-aged children - Expand support for students with special needs in general education - Strengthening special education expertise of general education teachers - Strengthening special education teachers' competence in inclusive education 3. Enhancing Special Education Support - Expand establishment and operation of special education support centers - Expand support for special education related services - Expand full-day special education kindergarten programs - Establish a diagnosis and placement system for early detection of young children with disabilities	1. Improve capacity and performance of special education - Expanding opportunities for inclusive education in kindergarten (establishing and expanding special classes in kindergarten) - Increase the professionalism of teachers for young children with disabilities - Develop and disseminate education programs for young children with special needs - Supporting elementary school enrollment 2. Enhanced Special Education Support - Improvement of the special education diagnosis and placement system (strengthening the early detection of special education support centers for young children with disabilities) - Internalization of special education related services and administration of after-school programs 3. Creating a human rights-friendly atmosphere for students with disabilities - Strengthening support for students with disabilities in inclusive education settings	1. Ensure Equal and Fair Educational Opportunity - Expand inclusive kindergartens and special classes in kindergarten 2. Internalization of support for inclusion and special education - Strengthen support for kindergartens with inclusive education - Internalization of education for children with special needs 3. Promote a culture of disability empathy and strengthen support systems - Strengthen cooperation with related ministries for early detection of disabilities and educational services - Enhancing early detection, diagnosis, and evaluation of special education centers - Increase transition support to kindergarten or elementary school - Establishment of a support system for after-school programs with education and care

targets and benefits, and the continuous expansion of the budget for disability welfare (Kim, 2018). In addition, the Korean Ministry of Education (2008, 2013, 2017) established ‘the Five-Year Plan for Advancing Special Education,’ which is a policy for the education and welfare of persons with disabilities to emphasize the education sector of ‘the Comprehensive Policy Plan for People with Disabilities.’ The parts of the government's main two long-term plans for people with disabilities that affect the lives of young children with disabilities are summarized in Table 1.

As the above Table 1, the Korean government has enhanced support for education and welfare of young children with disabilities. However, there are still deep concerns about the quality of life or well-being of young children with disabilities in Korea, despite supporting young children with disabilities through legislation and policy. There is a large gap between kindergartens and daycare centers for young children within compulsory education (Park, 2022). In addition, there are still policy needs for teachers, schools, curriculum, home-school collaboration, and funding to meet the needs of for young children with disabilities and improve their quality of life or well-being (Ji & Kim, 2023).

While research on the quality of life of young children with disabilities is needed, there are many studies on the quality of life of parents and families raising children with disabilities (Bourke-Taylor, Joyce, Grzegorzczyn, & Tirlea, 2022; Kim, Lee, & Kim, 2011; Lahaije, Luijkx, Waninge, & van der Putten, 2023; Pancsofar, Petroff, & Carlani, 2022; Yoo, 2007). Currently, research on the well-being of young children with disabilities was rarely conducted. A search for Korean research using the keywords ‘disability + well-being’ in the index of Korean journals provided by the National Research Foundation of Korea revealed few studies on the well-being of children with disabilities. However, there were studies on the well-being of mothers raising children with disabilities (Kim, 2007; Kim & Oh, 2010), studies analyzing the effects of sports participation of parents of children with developmental disabilities on parenting stress and psychological well-being (Lee, & An, 2011), and a number of studies analyzing the effects of physical activity and sports participation of people with disabilities on psychological well-being (Kim, 2016; Kim, Jeong, & Pak, 2011; Lee, 2019; Oh, Kim, Koo, & Cho, 2009).

In early childhood education, young children’s well-being is considered an important issue. In the Developmentally Appropriate Practice (DAP) Position Statement, the National

Association for the Education of Young Children (NAEYC, 2020) emphasized all young children's well-being at the part of 'Principles of Child Development and Learning and Implications That Inform Practice.' In especial, the NAEYC recommended that young children's well-being should be understood based on the interrelatedness of developmental domains. Furthermore, UNICEF has highlighted the importance of well-being in early childhood and researched to develop positive indicators of child well-being (Lippman, Moore, & McIntosh, 2009). According to the Annual Population Survey (APS) in the United Kingdom, well-being variables are satisfaction, worth, happiness, and anxiety (Weerakkody, Sivarajah, Mahroof, Maruyama, & Lu, 2021). Satisfaction refers to the degree to which you are satisfied with your life overall. Worth is the degree to which you feel that the things you do in your life are worthwhile overall. Happiness means the degree to which you felt happy yesterday. Anxiety refers to how anxious you were yesterday.

Likewise, well-being of young children with disabilities is also important, and since little research has been conducted on this topic, it is necessary to explore social perceptions of well-being of young children with disabilities. Considering the research that analyzed social perceptions of well-being through big data (Algan et al., 2016), big data is recommended as an effective resource for investigating social perceptions of well-being of young children with disabilities. Big data refers to large amounts of structured and unstructured data spanning a variety of platforms (Mayer-Schonberger & Cukier, 2013). Big data also refers to any data analysis process that collects, processes, analyzes, interprets, and utilizes large amounts of data (Park, 2018) and network analysis, which analyzes big data to examine the social perception of a particular term or topic, has the potential to provide meaningful information (Oh, 2017). In conclusion, network analysis through big data is an appropriate research method for exploring social perceptions of well-being of young children with disabilities.

Therefore, the purpose of this study is to examine the social perceptions of well-being of young children with disabilities during each period of the 3rd~5th Comprehensive Policy Plan for People with Disabilities through a big data analysis with main portal sites in Korea.

Method

Data Collection

For the analysis of this study, Textom, a big data solution, was utilized to collect big data centered on core keywords from web pages, blogs, news, cafes, GisikiNs, academic information, and Facebook texts searchable on NAVER, Daum, and Google, which are representative portal sites in Korea. In order to analyze society's overall perception of well-being of young children with disabilities, big data analysis was conducted by selecting three collection periods of 5 years from January 1, 2008 to December 31, 2012(the 3rd Comprehensive Policy Plan for People with Disabilities' period), 5 years from January 1, 2013 to December 31, 2017(the 4th Comprehensive Policy Plan for People with Disabilities' period), and 5 years from January 1, 2018 to December 31, 2022(the 5th Comprehensive Policy Plan for People with Disabilities' period), and selecting 'young children with disabilities + well-being' as keywords to collect big data. The data collected under these conditions were 3,427 web pages, 2,154 blogs, 645 news, 816 cafes, 35 GisikiNs, 2 academic information, and 54 Facebook posts, totaling 7,133 as presented in Table 2.

Table 2. *Collected Data*

	The 3rd Comprehensive Policy Plan for People with Disabilities (2008-2012)	The 4th Comprehensive Policy Plan for People with Disabilities (2013-2017)	The 5th Comprehensive Policy Plan for People with Disabilities (2018-2022)	Total
Web	1078	1125	1224	3427
Blog	225	1165	764	2154
News	133	419	93	645
Cafe	415	245	156	816
GisikiN	20	10	5	35
Academic information	1	1	0	2
Facebook	0	7	47	54

Analysis Tools

This study used the Textom program (TEXTOM, 2023), which was developed as a solution for big data analysis, to collect and refine data on well-being of young children with disabilities. Among the previous studies that utilized big data, studies related to young children (Choi, 2020; Lee & Choi, 2020) and studies in the field of early childhood special education (Kim, 2022; Kim & Shin, 2023) used the Textom program to perform big data analysis. The network between various keywords related to well-being of young children with disabilities identified by the analysis using Textom was analyzed using UCINET 6.774 (Borgatti, Everett, & Freeman, 2002), and the network visualization was performed using NetDraw 2.183.

Analysis Procedures

The data processing process for big data analysis in this study was conducted in the order of keyword extraction and refinement, network construction, network analysis, and visualization, which is a common process in the studies of Kang & Lee (2018) and Choi (2020), whose research topics are related to young children, and Kim (2022) and Kim & Shin (2023), whose research topics are related to early childhood special education. Using Textom, raw data were collected from web pages, blogs, news, cafes, GisikiNs, academic information, and Facebook titles and texts searched on Naver, Daum, and Google, which are representative portal sites in Korea. The following preliminary refinement tasks were performed on the collected raw data. On the raw data, Espresso K, Textom's morphological analyzer, was selected and text mining was executed to extract nouns related to the study.

As a secondary refinement, Textom's edit feature was utilized to convert the keywords used in the data collection to synonyms and similar words, and to delete single-syllable keywords that were simply repeated in the sentences, as presented in Table 3. No keywords required spacing correction. To ensure reliability and validity, one professor majoring in early childhood special education reviewed and discussed details during the first and second rounds of data cleaning.

Table 3. *Example of Secondary Refinement on Collected Data*

Data cleaning	Sample of the 2 nd data cleaning
Modification	-
Refinement	infant, baby, toddler, children → young children
Remove	Exclude the keywords 'young children with disabilities' & 'well-being, and the Korean single-letter words such as 'that,' 'besides,' 'side,' 'in,' 'floor,' 'etc,' 'thing,' 'year,' 'day,' 'year,' etc.

Analysis on Data

For this study, the following network analysis procedures were performed on the data after the first and second rounds of data cleaning. First, frequency analysis was conducted to select the top 30 keywords based on frequency in each period. Second, a 200*200 one-mode network matrix by period was created by selecting the top 200 keywords in order of frequency to verify the statistical significance of the network and to analyze the structural properties of the entire network using the UCINET 6.774 program. The structural properties of the network include nodes, density, average degree, average distance, components, diameter, and network centralization. The network was visualized with the top 30 keywords using the program NetDraw 2.183. Third, among the network centrality indices, degree centrality, closeness centrality, and betweenness centrality were analyzed to determine the relationship between keywords in the network. According to Menczer, Fortunato, & Davis (2020), degree centrality measures the degree to which keywords in a network are directly connected, indicating the degree to which keywords influence other neighboring keywords; closeness centrality measures the degree to which a keyword is located close to other keywords, indicating the degree to which it explains them; and mediation centrality measures the degree to which keywords mediate between keywords, indicating the degree to which keywords play a mediating role in the network. All network centralities were analyzed using the UCINET 6.774 program.

Results

Keyword Frequency Analysis on Well-being of Young Children with Disabilities

The results of analyzing the frequency of the top 30 keywords related to well-being of young children with disabilities according to the 3rd to 5th Comprehensive Policy Plan for People with Disabilities are represented in Table 4. For the 3rd plan, the top keywords were nutrition (n=348), Korea (n=228), speech (n=150), children (n=147), interest (n=146), intake (n=141), pregnancy (n=138), health (n=137), food (n=133), and brain (n=125). The top 30 keywords accounted for 14.26% of all text-mined keywords. For the 4th plan, the top keywords were health (n=471), fetal (n=387), medical treatment (n=330), actual cost (n=296), suggestion (n=278), article (n=206), issue (n=195), political economy (n=187), self-governance era (n=187), and housing (n=185). The top 30 keywords accounted for 9.15% of all text-mined keywords. In final, for the 5th plan, the top keywords were health (n=420), education (n=166), person (n=138), research (n=131), support (n=115), life (n=104), program (n=101), therapy (n=98), speech (n=93), and problem (n=92). The top 30 keywords accounted for 7.68% of all text-mined keywords.

To summarize the results of the keyword frequency analysis above, 'health,' and 'education' were highly ranked through the 3rd, 4th, 5th plans and, especially, the frequency of 'education' increased significantly in the 5th plan. The frequency of 'therapy' increased significantly in the 5th plan compared to the frequency in the 4th plan. In addition, the frequency of 'fetal,' and 'insurance' increased significantly in the 4th plan compared to the frequency in the 3rd plan.

Keyword Network Analysis by Plan

Network Analysis for the 3rd Plan

As a result of analyzing the structural properties of the entire network for the top 200 keywords related to well-being of young children with disabilities in the 3rd plan, it was revealed that there were 200 nodes, a density of .258, an average degree of 51.440, an average distance of 1.802, components of 1, a diameter of 5, and a network centralization of 9.46%.

Table 4. *Frequency Analysis (top 30 words)*

Rank	The 3rd Comprehensive Policy Plan for People with Disabilities (2008-2012)		The 4th Comprehensive Policy Plan for People with Disabilities (2013-2017)		The 5th Comprehensive Policy Plan for People with Disabilities (2018-2022)	
	Keyword	Frequency	Keyword	Frequency	Keyword	Frequency
1	Nutrition	348	Health	471	Health	420
2	Korea	228	Fetal	387	Education	166
3	Speech	150	Medical Treatment	330	Person	138
4	Children	147	Actual Cost	296	Research	131
5	Interest	146	Suggestion	278	Support	115
6	Intake	141	Article	206	Life	104
7	Pregnancy	138	Issue	195	Program	101
8	Health	137	Political Economy	187	Therapy	98
9	Food	133	Self-governance era	187	Speech	93
10	Brain	125	Housing	185	Problem	92
11	Required	124	Discharge	185	Development	90
12	Eyes	124	Insurance	137	Vitamin	88
13	Nerves	123	Comparison	136	Influence	86
14	News	122	Cancer	118	Society	86
15	Frenzy	121	Necessity	113	Happiness	85
16	Fetal	121	Female	98	Teenager	85
17	Cause	117	Possibility	96	Sleep	81
18	Excess	115	Representative	94	Variety	81
19	Ministry of Health and Welfare	114	Use	93	Importance	77
20	Criteria	114	Loss	93	Offer	77
21	National Health and Nutrition Examination Survey	111	Food	92	Increase	76
22	Living	108	Person	88	Mental	76
23	Shortage	105	Parents	88	Adult	72
24	Resistance	90	Question	88	Necessity	72
25	Reproductive function	90	Living	87	Female	71
26	Blog	84	Education	84	Use	71
27	Guidance	80	Program	79	Efficacy	69
28	Information disclosure	80	Society	76	Broadcast	68
29	Education	79	Therapy	75	Stress	68
30	Insurance	76	Korea	75	Possibility	67

Table 5. *Centrality Analysis for the 3rd Plan*

Rank	Degree centrality		Closeness centrality		Betweenness centrality	
	Keyword	Centrality	Keyword	Centrality	Keyword	Centrality
1	Nutrition	0.654	Pregnancy	0.906	Pregnancy	6.964
2	Intake	0.250	Korea	0.879	Health	4.129
3	Pregnancy	0.249	Speech	0.853	Speech	3.852
4	Interest	0.248	Interest	0.853	Children	3.537
5	Brain	0.247	Health	0.806	Korea	3.374
6	Eyes	0.247	Food	0.806	Interest	2.986
7	Fetal	0.247	Brain	0.806	Criteria	2.514
8	Food	0.246	Required	0.806	Food	1.273
9	Nerves	0.246	Frenzy	0.806	Required	1.114
10	Cause	0.246	Fetal	0.806	Brain	0.911
11	Excess	0.246	Criteria	0.806	Frenzy	0.911
12	Speech	0.245	Nutrition	0.784	Fetal	0.911
13	Frenzy	0.245	Intake	0.784	Nutrition	0.154
14	Required	0.244	Eyes	0.784	Intake	0.154
15	Ministry of Health and Welfare	0.242	Nerves	0.784	Eyes	0.154
16	Criteria	0.241	Cause	0.784	Nerves	0.154
17	Korea	0.227	Children	0.763	Cause	0.154
18	Children	0.013	Excess	0.763	Excess	0.058
19	Health	0.013	Ministry of Health and Welfare	0.744	News	0.031
20	News	0.001	News	0.518	Ministry of Health and Welfare	0

As a result of the degree centrality analysis, nutrition (.654), intake (.250), pregnancy (.249), interest (.248), and brain (.247) highly ranked within the network. A higher degree centrality index indicates that the keyword has many direct connections to other keywords and influences other neighboring keywords. These results indicate that keywords such as nutrition, intake, pregnancy, interest, and brain are socially recognized in relation to well-being of young children with disabilities. The closeness centrality analysis indicated that pregnancy (.906), Korea (.879), speech (.853), interest (.853), and health (.806) all ranked highly. A keyword with a high closeness centrality index means that it has the closest relationship with the other keywords and explains the other keywords.

As a result of the betweenness centrality analysis, pregnancy (6.964), health (4.129), speech (3.852), children (3.537), and Korea (3.374) ranked highly. Betweenness centrality refers to the degree to which a keyword plays a mediating role in the connection between keywords in the network. To summarize the results of the centrality analysis in the network above, the keywords that ranked highly in the results for degree centrality, closeness centrality, and betweenness centrality were “pregnancy,” “speech,” “health,” “Korea,” and “interest,” which are keywords that play a key role in the relationship between keywords related to well-being of young children with disabilities in the 3rd plan.

Network Analysis for the 4th Plan

Analyzing the structural properties of the entire network for the top 200 keywords, some network measures were found as follows; there are 200 nodes, a density of .378, an average degree of 75.250, an average distance of 1.632, components of 1, a diameter of 3, and a network concentration of 5.38%. The statistical significance of the network was also tested

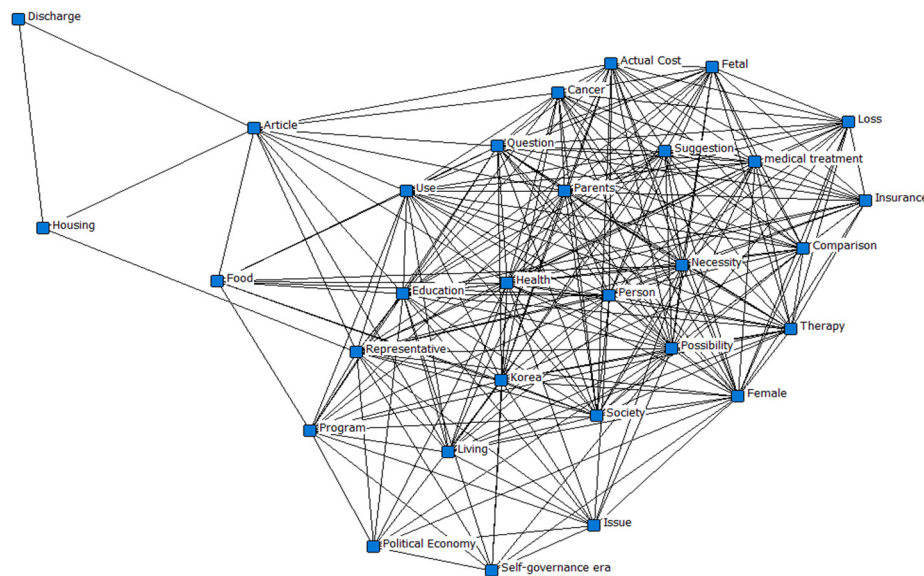


Figure 2. Keyword network structure of the 4th Comprehensive Policy Plan for People with Disabilities (top 30 keywords)

for well-being of young children with disabilities in the 4th plan. The mean of the tabulated distribution of the network data was 1.5153, the standard error was 0.1300, and the Z value was 11.5832. The probability that the test statistic was observed to be larger than the absolute value of the Z value is 0.0002, which is statistically significant ($p < .05$). A visualization of the structure of the entire network for the top 30 keywords related to well-being of children with disabilities in the 4th plan is presented in Figure 2.

Centrality Analysis for the 4th Plan

Based on the results of the frequency analysis of keywords related to well-being of young children with disabilities in the 4th plan, the network centrality was analyzed. For the top 20 keywords in the frequency analysis, degree centrality, closeness centrality, and betweenness centrality were analyzed, and the results are shown in Table 6.

As a result of the degree centrality analysis, suggestion (.137), medical treatment (.134), actual cost (.132), health (.089), and fetal (.078) ranked highly within the network. These results indicate that keywords such as suggestion, medical treatment, actual cost, health, and fetal are socially recognized in relation to well-being of young children with disabilities. The closeness centrality analysis indicated that health (.935), possibility (.829), necessity (.784), fetal (.763), and representative (.763) all ranked highly. A keyword with a high closeness centrality index means that it has the closest relationship with the other keywords and explains the other keywords. As a result of the betweenness centrality analysis, article (8.339), representative (7.234), health (5.104), possibility (2.761), and fetal (2.232) ranked highly. Betweenness centrality refers to the degree to which a keyword plays a mediating role in the connection between keywords in the network. To summarize the results of the centrality analysis in the network above, the keywords that ranked highly in the results for degree centrality, closeness centrality, and betweenness centrality were 'health,' 'fetal,' 'possibility,' and 'representative,' which are keywords that play a key role in the relationship between keywords related to well-being of young children with disabilities in the 4th plan.

Network Analysis for the 5th Plan

Analysis of the structural properties of the entire network for the top 200 keywords revealed that there were 200 nodes, a density of .467, an average degree of 92.880, an average

Table 6. *Centrality Analysis for the 4th Plan*

Rank	Degree Centrality		Closeness Centrality		Betweenness Centrality	
	Keyword	Centrality	Keyword	Centrality	Keyword	Centrality
1	Suggestion	0.137	Health	0.935	Article	8.339
2	Medical treatment	0.134	Possibility	0.829	Representative	7.234
3	Actual Cost	0.132	Necessity	0.784	Health	5.104
4	Health	0.089	Female	0.763	Possibility	2.761
5	Fetal	0.078	Representative	0.763	Female	2.232
6	Issue	0.073	Use	0.763	Necessity	1.693
7	Political Economy	0.072	Cancer	0.744	Use	1.537
8	Self-governance era	0.072	Actual Cost	0.725	Cancer	1.288
9	Insurance	0.069	Suggestion	0.725	Actual Cost	1.090
10	Article	0.066	Medical treatment	0.707	Suggestion	0.608
11	Housing	0.064	Comparison	0.707	Housing	0.556
12	Discharge	0.064	Fetal	0.674	Comparison	0.466
13	Comparison	0.056	Insurance	0.659	Medical treatment	0.404
14	Loss	0.047	Loss	0.644	Issue	0.292
15	Necessity	0.041	Article	0.63	Fetal	0.264
16	Cancer	0.037	Issue	0.617	Insurance	0.148
17	Female	0.033	Political Economy	0.580	Loss	0.06
18	Possibility	0.026	Self-governance era	0.580	Political economy	0.053
19	Representative	0.025	Housing	0.492	Self-governance era	0.053
20	Use	0.016	Discharge	0.397	Discharge	0.000

distance of 1.532, components of 2, a diameter of 3, and a network concentration of 17.60%. The statistical significance of the network was also tested for well-being of young children with disabilities in the 5th plan. The mean of the tabulated distribution of the network data was 1.6676, the standard error was 0.1416, and the Z value was 11.7672. The probability that the test statistic was observed to be larger than the absolute value of the Z value is 0.0002, which was statistically significant ($p < .05$). A visualization of the structure of the entire network for the top 30 keywords related to well-being of young children with disabilities in the 5th plan is represented in Figure 3.

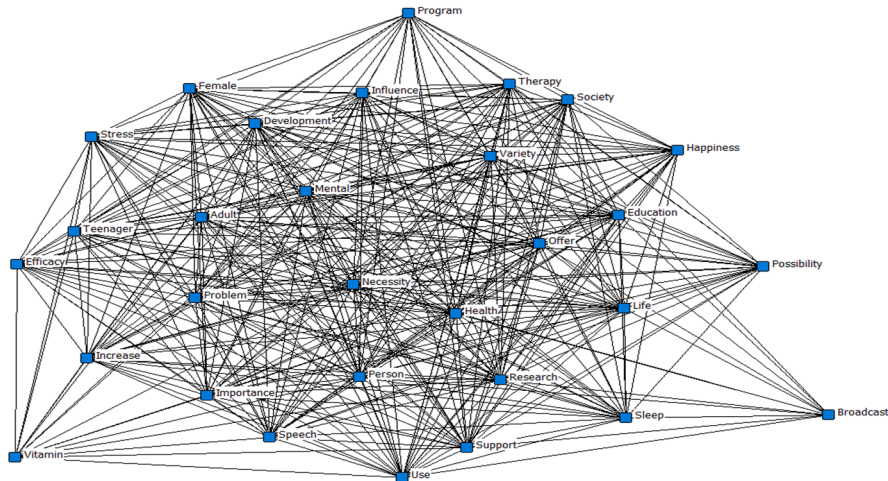


Figure 3. Keyword network structure of the 5th Comprehensive Policy Plan for People with Disabilities (top 30 keywords)

Centrality Analysis for the 5th Plan

Based on the results of the frequency analysis of keywords related to well-being of young children with disabilities in the 5th plan, the network centrality was analyzed. For the top 20 keywords in the frequency analysis, degree centrality, closeness centrality, and betweenness centrality were analyzed, and the results are presented in Table 7.

As a result of the degree centrality analysis, health (.448), person (.131), life (.119), education (.114), and research (.113) ranked highly within the network. These results indicate that keywords such as health, person, life, education, and research are socially recognized in relation to well-being of young children with disabilities. The closeness centrality analysis indicated that health (1.000), person (1.000), research (1.000), education (.967), and support (.967) all ranked highly. A keyword with a high closeness centrality index means that it has the closest relationship with the other keywords and explains the other keywords. As a result of the betweenness centrality analysis, health (.826), person (.826), research (.826), support (.800), and education (.583) ranked highly. Betweenness centrality refers to the degree to which a keyword plays a mediating role in the connection between keywords in the network. To summarize the results of the centrality analysis in the network above, the keywords that ranked highly in the results for degree centrality, closeness centrality, and betweenness

Table 7. *Centrality Analysis for the 5th Plan*

Rank	Degree centrality		Closeness centrality		Betweenness centrality	
	Keyword	Centrality	Keyword	Centrality	Keyword	Centrality
1	Health	0.448	Health	1.000	Health	0.826
2	Person	0.131	Person	1.000	Person	0.826
3	Life	0.119	Research	1.000	Research	0.826
4	Education	0.114	Education	0.967	Support	0.800
5	Research	0.113	Support	0.967	Education	0.583
6	Importance	0.108	Life	0.967	Life	0.583
7	Influence	0.107	Problem	0.967	Offer	0.583
8	Speech	0.102	Development	0.967	Variety	0.574
9	Development	0.102	Offer	0.967	Therapy	0.490
10	Problem	0.1	Speech	0.935	Problem	0.444
11	Vitamin	0.093	Influence	0.935	Development	0.444
12	Sleep	0.083	Variety	0.935	Speech	0.364
13	Support	0.077	Importance	0.935	Importance	0.364
14	Society	0.073	Therapy	0.906	Sleep	0.336
15	Offer	0.073	Teenager	0.906	Teenager	0.303
16	Program	0.066	Society	0.879	Influence	0.243
17	Happiness	0.065	Happiness	0.853	Society	0.162
18	Teenager	0.065	Sleep	0.853	Program	0.115
19	Variety	0.063	Program	0.806	Happiness	0.099
20	Therapy	0.061	Vitamin	0.690	Vitamin	0.021

centrality were ‘health,’ ‘person,’ ‘research,’ ‘education,’ and ‘support,’ which are keywords that play a key role in the relationship between keywords related to well-being of young children with disabilities in the 5th plan.

Discussion

This study examined the social perceptions of well-being of young children with disabilities in Korea through a keyword network analysis using big data by selecting three

collection periods of the 3rd, 4th, and 5th Comprehensive Policy Plan for People with Disabilities. This study searched for data on well-being of young children with disabilities, extracted keywords, and performed frequency analysis using the Textom program, a big data analysis solution. The network between keywords was analyzed using UCINET 6.774 and visualized using NetDraw 2.183.

First, the results of keyword frequency analysis related to well-being of young children with disabilities by the 3rd, 4th, and 5th plans are as follows. During the 3rd plan period, the top keywords were 'nutrition,' 'Korea,' 'speech,' 'children,' 'interest,' 'intake,' 'pregnancy,' 'health,' 'food,' and 'brain' in the order of highest frequency. Although well-being in early childhood should be understood as a multidimensional concept that includes physical, social, emotional, and cognitive health (Moore & Theokas, 2008), this finding may be a reflection of how society discusses well-being in early childhood with an emphasis on the physical aspect. For the 4th plan, the top keywords were 'health,' 'fetal,' 'medical treatment,' 'actual cost,' 'suggestion,' 'article,' 'issue,' 'political economy,' 'self-governance era,' and 'housing' in the order of highest frequency. This finding may be understood that many terms related to child insurance and social structures were mentioned in discussions about well-being of young children with disabilities in Korean society. For the 5th plan, the top keywords were 'health,' 'education,' 'person,' 'research,' 'support,' 'life,' 'program,' 'therapy,' 'speech,' and 'problem' in the order of highest frequency. These keywords were relevant to the specific plans of the 5th Comprehensive Policy Plan for People with Disabilities, such as 'expanding family support services,' 'building a rehabilitation medical system for children with disabilities,' 'enhancing childcare services,' and 'strengthen support for welfare services for children with developmental disabilities' (Korean Joint Ministry, 2018).

To summarize the results of the keyword frequency analysis, 'health,' and 'education' were highly ranked through the 3rd, 4th, 5th plans. Considering that in network analysis, the relationships between entities are more important than the properties of individual entities (Lee, 2012), these results can be interpreted that 'health' and 'education' are mentioned most often in social discussions about the well-being of young children with disabilities. In particular, the frequency of 'education' increased significantly during the 5th plan period, which is likely related to the effects of the expansion of inclusive kindergartens and special classes in kindergarten and increased support for kindergartens with inclusive education

according to the 5th Five-Year Plan for Advancing Special Education, the education sector of ‘the 5th Comprehensive Policy Plan for People with Disabilities’ (Korean Joint Ministry, 2018).

In addition, the frequency of ‘therapy’ increased significantly in the 5th plan compared to the frequency in the 4th plan. ‘The Act on Guarantee of Rights and Support for Persons with Developmental Disabilities’ enacted in 2014, began to expand rehabilitation services for children with disabilities, including various types of therapy such as speech therapy, art-based psychotherapy, sensory developmental therapy, and so on. Following these changes, rehabilitation services for children with disabilities were strengthened in the 5th plan (Korean Joint Ministry, 2018). As a result of analyzing the use of developmental rehabilitation services in Korea, children under the age of 6 were the most frequent users (Kim, Park, Lee, & Kim, 2022).

The frequency of ‘fetal,’ and ‘insurance’ also increased significantly in the 4th plan compared to the frequency in the 3rd plan. In 2000, Korean insurance companies introduced a special contract for fetal subscription and began adding it to children’s insurance products allowing mothers to subscribe to children’s insurance even while pregnant, and major insurance companies in Korea began providing children’s insurance in 2003-2004 by introducing a coverage product, it changed the landscape of the children’s insurance market (Kim, Kim, & Lee, 2018). Considering that fetal insurance and children’s insurance take time to become widespread in society, this may explain the significant increase in the frequency of ‘fetal,’ and ‘insurance’ in the 4th plan (2013-2017) compared to the frequency in the 3rd plan (2008-2012).

Second, examining the relationship between keyword networks on the well-being of young children with disabilities by the plans, the results are as follows. The degree centrality analysis revealed that ‘nutrition,’ ‘intake,’ ‘pregnancy,’ ‘interest,’ and ‘brain’ were highly ranked in the network of the 3rd plan; ‘suggestion,’ ‘medical treatment,’ ‘actual cost,’ ‘health,’ and ‘fetal’ in the network of the 4th plan; and ‘health,’ ‘person,’ ‘life,’ ‘education,’ and ‘research’ in the network of the 5th plan. The results may be interpreted as the fact that well-being of young children with disabilities has been socially recognized in terms of the physical aspects, but has been moved to a comprehensive concept that includes various aspects.

The closeness centrality analysis revealed that ‘pregnancy,’ ‘Korea,’ ‘speech,’ ‘interest,’

and 'health' were highly ranked in the network of the 3rd plan; 'health,' 'possibility,' 'necessity,' 'female,' and 'representative' in the network of the 4th plan; and 'health,' 'person,' 'research,' 'education,' and 'support' in the network of the 5th plan. In the closeness centrality analysis, 'health' was found to be high in all three plans. This finding may mean that 'health' has the closest relationship with the other keywords and explains the other keywords.

The betweenness centrality analysis revealed that 'pregnancy,' 'health,' 'speech,' 'children,' and 'Korea' were highly ranked in the network of the 3rd plan; 'article,' 'representative,' 'health,' 'possibility,' and 'female' in the network of the 4th plan; and 'health,' 'person,' 'research,' 'support,' and 'education' in the network of the 5th plan. In the betweenness centrality analysis, 'health' was also found to be high in all three plans. The finding suggested that 'health' played a mediating role in the connection between keywords in the network. In both the closeness and betweenness centrality analyses, 'health' was found to be high in all three plans.

Finally, 'health' was a highly ranked keyword through the 3rd, 4th, 5th plans in the frequency analysis and centrality analysis both. This is also linked to improving the health and well-being of children with disabilities, which is supported by the World Health Organization (Scherer, Banks, Murko, & Chisholm, 2023). It is possible that 'health' is considered as a key factor in Korean comprehensive support for children with disabilities. The Korean Ministry of Education emphasized the provision of healthcare services to children with disabilities as an important policy (Park, Kim, Kim, & Joeng, 2021). In addition, while the social perceptions of well-being of young children with disabilities in Korea focus on health and physical aspects, in other countries, research has been conducted on various aspects of well-being of children with disabilities such as the social and academic well-being (McCoy, Maître, Watson, & Banks, 2016), financial well-being (Parish & Cloud, 2006), and so on. It is important to consider and study the well-being of young children with disabilities in various aspects beyond health.

In conclusion, the keyword network analysis of this study revealed that various keywords for well-being of young children with disabilities were expelled and the degree of interaction between keywords according to the centrality analysis showed that the social discourse on well-being of young children with disabilities was active and changing. The results of this

study are able to be served as a basis for preparing more effective policy or strategies to enhance well-being of young children with disabilities. This study has limitations in that the data was collected through big data analysis of three major portal sites in Korea, and it may reflect the perceptions of Korean society, it is necessary to expand the study to various countries and societies in the future.

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