

Analysis on the Research Trends Related to Senior Sports

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Abstract: Recently, interest in sports for seniors is increasing due to the rise in the senior population. This study is meaningful in that it provides data that can be helpful in presenting the direction of future sports-related research for the senior. For this purpose, research related to sports for seniors was analyzed using a big data analysis method(Textom). Abstracts of 95 papers registered in Research Information Sharing Service (RISS) for the last five years (March 2017 to February 2022) were collected and analyzed using Textom for these papers. The results shows that extensive research is being done on life satisfaction through 'senior sports', and there is extensive interest in leisure sports among the senior sports, and extensive research on instructors is being conducted. The analysis showed the following. Since there is extensive interest in things that can increase life satisfaction through 'senior sports', it can be seen that active research is being conducted to help the senior's sports activities enable health and happiness. Also, there seem to be an extensive interest in the role of senior sports instructors, so it can be seen that researches that can teach in a more effective way are being actively conducted. On the other hand, research on the senior sports infra or ssenior sports welfare policy should be more actively conducted.

Keywords: Senior Sports, Research Status, Big Data, Satisfaction

1. Introduction

It can be said that the greatest interest of the seniors in the aging era is to pursue a healthy and happy life[1]. Because their gradual physical deterioration may affect them mentally, bringing about them questioning the meaning of their lives. It is reported that depression among the elderly is increasing. Meanwhile, research says that participation in exercise is effective in solving psychological problems such as senior health and depression. Recently, the seniors emphasize the importance of satisfying the high-level needs of life, and many studies have shown that programs accompanying physical activity are important for them to overcome their sense of alienation and to satisfy their quality of life[2-5]. Therefore, interest in the problem of the increase in the senior population and the decline in their physical abilities senior is increasing in many countries. In particular, the problem of the senior population is now being dealt with as a national problem rather than an individual problem. In fact, in foreign countries, many studies have been conducted on how to solve the problems of the seniors by involving them in sports[6-8]. In line with this, efforts are being made to promote senior sports in Korea.

In this case, academic interest, academic interest and demand for sports for seniors are also increasing. Therefore, many studies related to sports for this age group have been conducted. have been conducted. In foreign countries, there are studies that emphasize the importance of sports policies for the elderly as participation in sports for the senior can reduce social costs related to related to their health. There are many studies that suggest a positive role, that is, a high level of life satisfaction and emotional stability[7-11]. Therefore, this study aims to analyze domestic research on sports for seniors, which can

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be the basis for helping them enjoy a healthy and happy life through sports activities. Based on this, we intend to identify research trends and derive academic tasks to be pursued in the future. Furthermore, this study aims to suggest policy measures based on the results.

Literature[12], which has investigated research trends related to sports and leisure for seniors at home and abroad, analyzed research trends in the three major journals of leisure studies by using a network analysis of keywords similar to this study. Literature[12] pointed out that previous studies have limitations in not quantitatively revealing which research keywords have been emphasized by period by classifying research topics based on subjective judgment, and performing social network analysis using research keywords. There are also studies that claim that it is important to use research keywords to identify keywords that have emerged as important by period, and to visualize and understand research trends in research fields as a network[13][14]. However, studies on recent research trends is not sufficient. As the population ages, improving the health of seniors is becoming more important, and exercise can be of great help in preventing and improving health problems associated with aging. Therefore, research related to senior sports is necessary to improve the health and quality of life of the elderly in an aging society. It is necessary to increase seniors' participation in sports through more senior sports-related studies, build infrastructure suitable for seniors' exercise needs, and prepare senior sports welfare policies.

Therefore, this study analyzed the research trend of senior sports by analyzing the keywords of the gathered thesis abstracts, targeting senior sports., targeting senior sports studies. From March 2017 to February 2022, frequently mentioned words related to senior sports were identified and the relationship was analyzed. This study further suggested the direction of research to revitalize senior sports.

The research questions of this study are as follows. What was the interest of Korean researchers in senior sports, and what research should be done in the future?

2. Method

This study employed text analysis to gather data. Text analysis is often used in recent years to find out research trends.

2.1 Research Target and Data Collecting

In order to understand the recent research status of senior sports, the keyword 'senior sports' was searched. The subjects were papers published in domestic journals registered or candidates for registration in the last 5 years (March 2017 to February 2022), and were searched through the Academic Research Information Service (RISS). Bibliographic information includes Korean and English title, name and affiliation, journal name, and year of publication. The papers with insufficient, redundant, and irrelevant information were removed. Duplicate or irrelevant studies were excluded by direct judgment by two researchers. The number of papers used in the final analysis was 95. Among these papers, 17 papers are from 2017, 12 from 2018, 25 from 2019, 20 from 2020, 16 from 2021 and 3 from 2022. In addition, by reviewing the references of the collected studies, it was also confirmed whether there were any previous studies that were not included in the database search process. "Text analysis" was not conducted to gather data. Instead, it was used to analyze the collected papers.

2.2 Data Analysis

Recently, studies on research trend analysis using big data analysis techniques are being conducted in various academic fields. Usually, text mining and network analysis are performed for studies related to keywords, depending on the purpose of such study. As an analysis tool, programs such as R, Textom,

and Python, which are capable of text mining, are mainly used. Additionally, UCINET, NodeXL, and R are used for network analysis [15].

In this study, the analysis was conducted using the Textom program. The keyword network analysis procedure is as follows. First, bibliographic information of the thesis to be analyzed was collected and saved in Microsoft Excel. Second, the data collected from the papers to be analyzed were refined and morphologically analyzed. For this purpose, the Textom program was used, and keywords derived through automatic pre-processing and morphological analysis of collected data were saved, data were reviewed, unnecessary research, conjunctions were organized, and terminology was unified. Morphological analysis was based on the dictionary (Mecab-ko). Third, major keywords were analyzed and visualized through Bar-chart and N-gram of the Textom program. Matrix analysis was also performed and visualized.

3. Results and Discussion

3.1 Frequency and TF-IDF Analysis

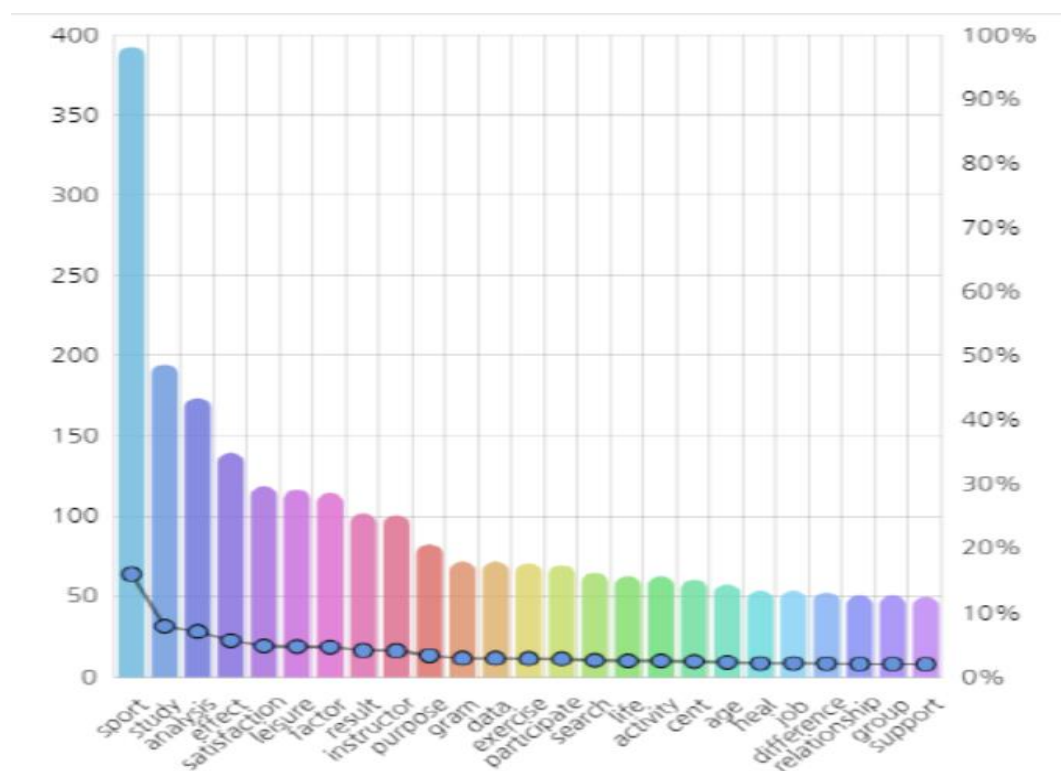
[Table 1] and [Table 2] show the word frequency analysis and TF-IDF (Frequency-Inverse Document Frequency Word Importance Index) of papers related to senior sports. After refining the unstructured data through the morpheme analysis method and extracting the main keywords, [Table 1] shows the top 50 keywords of the entire analyzed data centered on the frequency. Words with a high frequency of occurrence in senior sports-related papers published from March 2017 to February 2022 are frequently mentioned in the thesis or research, such as 'sport', 'study', 'analysis', 'effect', etc. In addition, words such as 'satisfaction,' 'leisure,' 'instructor,' 'participate,' 'heal,' 'relationship,' 'dance,' and 'welfare' were also included in the top rankings. In this study, rather than the ranking itself, we focused on the overall analysis of which subject words show the highest frequency and find meaningful words among them.

[Table 2] shows TF-IDF, which is not simply the frequency of a word, but the most commonly used weight in text mining, that is, a number that indicates how important a word is in a specific document. It is also a value that is usually used by search engines to determine the ranking of search results. In this TF-IDF analysis, 'satisfaction,' 'leisure,' and 'instructor' were ranked 1, 2, and 3, respectively. These results mean that extensive research is being done on life satisfaction through 'senior sports', and there is extensive interest in leisure sports among the senior sports, and extensive research on instructors is being conducted. [Fig. 1] shows the visualization of the high frequency words. Analyzing the papers in which these keywords appear, it can be seen that most of them mention the effect of sports for the senior on life satisfaction, and among them, there are many references to leisure life, and there is also extensive interest in the role of instructors.

[Table 1] Word and Frequency Analysis

Word and frequency Analysis				Word and frequency Analysis			
		n	%			n	%
1	sport	393	6.15%	26	dance	49	0.77%
2	study	195	3.05%	27	welfare	48	0.75%
3	analysis	174	2.72%	28	people	45	0.70%
4	effect	140	2.19%	29	method	44	0.69%
5	satisfaction	119	1.86%	30	influence	43	0.67%
6	leisure	117	1.83%	31	women	42	0.66%
7	factor	115	1.80%	32	participant	40	0.63%
8	result	102	1.59%	33	program	35	0.55%
9	instructor	101	1.58%	34	self	34	0.53%
10	purpose	83	1.30%	35	facility	33	0.52%

11	gram	72	1.13%	36	motivate	33	0.52%
12	data	72	1.13%	37	questionnaire	32	0.50%
13	exercise	71	1.11%	38	variable	30	0.47%
14	participate	70	1.09%	39	depression	30	0.47%
15	search	65	1.02%	40	train	30	0.47%
16	life	63	0.99%	41	service	28	0.44%
17	activity	63	0.99%	42	ability	27	0.42%
18	cent	61	0.95%	43	total	27	0.42%
19	age	58	0.91%	44	time	26	0.41%
20	heal	54	0.84%	45	frequency	26	0.41%
21	job	54	0.84%	46	week	26	0.41%
22	difference	53	0.83%	47	seoul	26	0.41%
23	relationship	51	0.80%	48	safety	25	0.39%
24	group	51	0.80%	49	fit	25	0.39%
25	support	50	0.78%	50	spss	24	0.38%



[Fig. 1] Bar Chart of Word and Frequency Analysis

[Table 2] TF-IDF Analysis

TF-IDF			TF-IDF		
1	satisfaction	186.46	26	service	71.34
2	leisure	178.55	27	influence	71.12
3	instructor	139.14	28	gram	69.17
4	analysis	122.13	29	body	67.92
5	job	117.72	30	train	67.80
6	exercise	114.27	31	facility	67.22
7	effect	113.83	32	people	66.91

8	support	113.00	33	participant	66.16
9	factor	107.90	34	behavior	61.31
10	activity	98.71	35	program	61.22
11	participate	96.43	36	relationship	60.67
12	life	96.14	37	data	59.97
13	dance	93.67	38	week	58.76
14	group	91.83	39	community	58.62
15	difference	90.12	40	mot	58.34
16	age	88.51	41	fit	56.50
17	heal	84.61	42	intention	56.44
18	motivate	84.07	43	capital	54.69
19	depression	83.97	44	method	53.62
20	women	82.84	45	ability	53.25
21	cent	79.97	46	time	52.96
22	self	79.80	47	vitality	52.67
23	safety	73.83	48	sign	52.67
24	welfare	73.25	49	variable	52.48
25	search	71.98	50	image	52.19

3.2 Word Connection Centrality

Word connection centrality shows how many connections a word has and how central it is [Table 3]. It can be seen that the more connections there are, the greater the degree of influence on other words. As a result of the analysis, words frequently mentioned in these papers, such as ‘sport,’ ‘study,’ ‘effect,’ ‘result,’ ‘factor,’ and ‘analysis,’ have high connection centrality values. Also, ‘leisure,’ satisfaction, and ‘instructor’ connection centrality were at the top. As in the frequency, it can be said that the importance of these keywords was confirmed in the word connection centrality result.

[Table 4] shows the word connection centrality ranking of the top 50 words in word and frequency analysis.

[Table 3] Word Connection Centrality

Word connection centrality			Word connection centrality		
1	sport	0.21	26	influence	0.05
2	study	0.15	27	method	0.05
3	effect	0.13	28	job	0.05
4	result	0.11	29	program	0.05
5	factor	0.11	30	variable	0.05
6	analysis	0.10	31	cent	0.05
7	leisure	0.08	32	questionnaire	0.04
8	search	0.08	33	welfare	0.04
9	data	0.08	34	service	0.04
10	instructor	0.08	35	facility	0.04
11	satisfaction	0.08	36	total	0.04
12	difference	0.08	37	dance	0.04
13	gram	0.08	38	self	0.04
14	heal	0.08	39	ability	0.04
15	age	0.07	40	depression	0.04
16	exercise	0.07	41	subject	0.04
17	group	0.07	42	week	0.03
18	women	0.07	43	train	0.03
19	activity	0.06	44	time	0.03
20	life	0.06	45	fit	0.03

21	people	0.06	46	level	0.03
22	participate	0.06	47	conclusion	0.03
23	relationship	0.06	48	order	0.03
24	participant	0.05	49	motivate	0.03
25	support	0.05	50	sample	0.03

[Table 4] Word and Frequency Analysis vs. Word Connection Centrality

Word	frequency	centrality	Word	frequency	centrality
sport	1	1	dance	26	37
study	2	2	welfare	27	33
analysis	3	6	people	28	21
effect	4	3	method	29	27
satisfaction	5	11	influence	30	26
leisure	6	7	women	31	18
factor	7	5	participant	32	24
result	8	4	program	33	29
instructor	9	10	self	34	38
purpose	10	57	facility	35	35
gram	11	13	motivate	36	49
data	12	9	questionnaire	37	32
exercise	13	16	variable	38	30
participate	14	22	depression	39	40
search	15	8	train	40	43
life	16	20	service	41	34
activity	17	19	ability	42	39
cent	18	31	total	43	36
age	19	15	time	44	44
heal	20	14	frequency	45	89
job	21	28	week	46	42
difference	22	12	seoul	47	60
relationship	23	23	safety	48	69
group	24	17	fit	49	45
support	25	25	spss	50	67

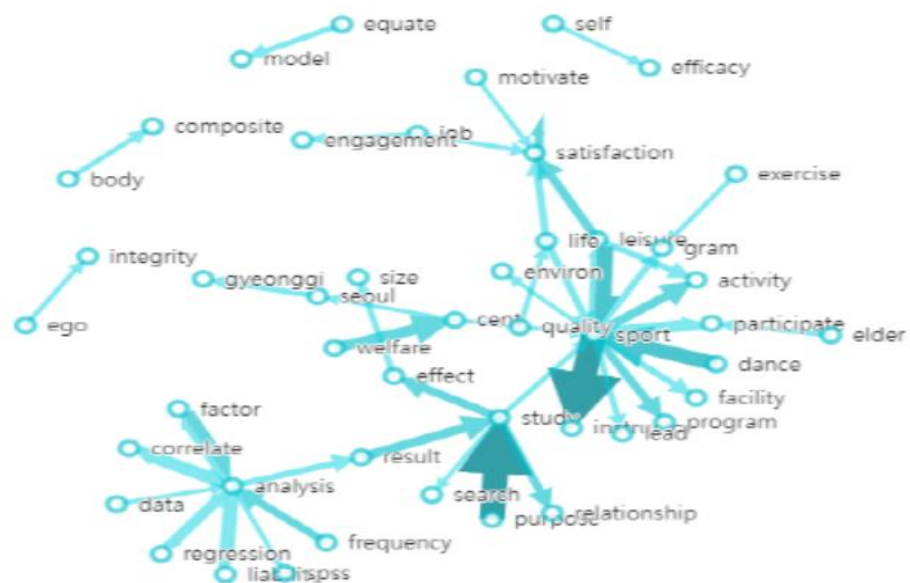
3.3 N-GRAM Network Analysis and Network Visualization Analysis

In the relationship between the related words that appeared together, it is possible to grasp the trend of core research topics in research related to 'senior sports' that have been conducted so far. [Table 5] shows the results of this N-GRAM network analysis. In addition to the combinations that appear together in most studies, such as purpose-study, 'sports-instructor,' 'dance-sports,' and leisure-sports showed significant relationships. In addition, through the results of N-GRAM network analysis, it can be seen that 'sports' in senior sports is most often related to 'instructor,' 'dance,' 'leisure,' and 'activity'. Moreover, in this study, a network analysis was also performed to examine the structural relationship. Through network analysis, structural features, significant regularities or patterns can be identified.

[Table 5] N-GRAM Network Analysis

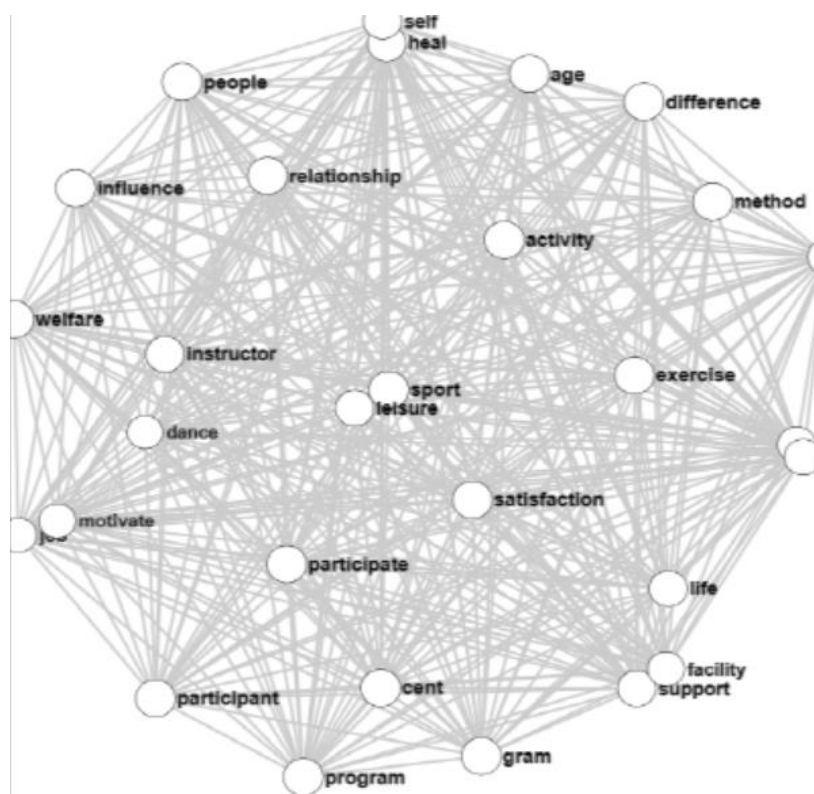
	N-gram				N-gram		
1	purpose	study	67	26	seoul	gyeonggi	14
2	sports	instructor	67	27	equate	model	14

3	dance	sports	47	28	analysis	liability	14
4	leisure	sports	41	29	analysis	factor	13
5	welfare	center	32	30	regression	analysis	12
6	factor	analysis	29	31	sport	lead	12
7	result	study	27	32	effect	size	12
8	sports	activity	25	33	body	composite	12
9	study	effect	23	34	sport	leisure	11
10	leisure	satisfaction	22	35	study	sport	11
11	frequency	analysis	21	36	elder	participate	11
12	satisfaction	satisfaction	20	37	job	satisfaction	11
13	sport	program	20	38	analysis	regression	10
14	study	relationship	19	39	ego	integrity	10
15	sport	participate	17	40	quality	life	10
16	correlate	analysis	17	41	exercise	gram	10
17	analysis	result	17	42	job	engagement	10
18	sport	facility	16	43	cent	sport	10
19	liability	analysis	16	44	motivate	satisfaction	9
20	life	sport	16	45	cent	seoul	9
21	leisure	activity	16	46	sport	environ	9
22	life	satisfaction	16	47	data	analysis	9
23	sport	gram	15	48	study	search	9
24	analysis	correlate	15	49	analysis	spss	9
25	participate	sport	14	50	self	efficacy	9



[Fig. 2] N-GRAM Network Analysis

The diagram in [Fig. 3] displays the network's visualization outcome, which primarily extracts the pattern and connection associations within the network.



[Fig. 3] Network Visualization Analysis

4. Conclusion and Suggestion

The research questions of this study are as follows. What was the interest of Korean researchers in senior sports, and what research should be done in the future? To answer this research question, this study analyzed research trends in senior sports by analyzing the keywords of the thesis abstracts, targeting senior sports studies. For the senior sports research keywords, the researchers found out the keywords that are of high interest in sports for the senior and analyze their relationships. As a result, words with a high frequency of appearance in the papers related to sports for the senior published from March 2017 to February 2022 were 'sport', 'study', 'analysis', and 'effect'. The reason is probably because these words are often used in the paper. Meanwhile, words such as 'satisfaction,' 'leisure,' 'instructor,' 'participate,' 'heal,' 'relationship,' 'dance,' and 'welfare' were also included in the top rankings. In the TF-IDF analysis, 'satisfaction,' 'leisure,' and 'instructor' were ranked 1, 2, and 3, respectively. These results mean that extensive research is being done on life satisfaction through 'senior sports', and there is extensive interest in leisure sports among the senior sports, and extensive research on instructors is being conducted. The reason instructor was mentioned a lot is inferred to be because there are many studies on senior physical education instructors. In addition, in the word connection centrality analysis result, the connection centrality of words frequently mentioned in papers such as 'sport,' 'study,' 'effect,' 'result,' 'factor,' 'analysis,' etc. Similarly, the connection centrality of 'leisure,' 'satisfaction,' and 'instructor' was also at the top. It can be said that the importance of these keywords was also confirmed in the word connection centrality result. Also, in the N-GRAM network analysis, sports-instructor, dance-sports, and leisure -sports showed significant relationships in addition to the combinations that appeared together in most studies such as purpose-study. Also, 'sports' was found to be most related to instructor, dance, leisure, and activity.

Based on these research results, the following implications can be drawn. Since there is extensive

interest in things that can increase life satisfaction through 'senior sports', it can be seen that active research is being conducted to help the senior's sports activities enable health and happiness. Also, there seem to be an extensive interest in the role of senior sports instructors, so it can be seen that researches that can teach in a more effective way are being actively conducted.

On the other hand, research is needed to expand senior sports infrastructure. A study on facilities where seniors can enjoy various sports, a study on how existing sports facilities can be renovated into a form that seniors can enjoy, or a facility design where seniors can enjoy sports research is needed on. In addition, research on the senior sports welfare policy should be more actively conducted. In Korea, the senior sports participation environment has recently developed a lot, but the reality is that related welfare policies need to be improved. It will be necessary to carry out research to find out the opinions and demands of seniors and to propose policies that can be of practical help to them. In addition to this, research on senior sports in the future needs to be conducted more actively. Recently, with the development of technology, many methods of increasing the effectiveness of sports have been developed, so it is thought that more research on this is needed.

This paper examines the current state of sports-related research for the elderly and highlights the importance of understanding future research directions as interest in sports increases with the growing elderly population. In addition, this paper identifies current trends and major topics in research related to sports for the elderly, and provides useful information for future research and policy decisions. It is expected to contribute to the development of effective policies to promote the participation of the elderly in sports and improve the welfare of the elderly.

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