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Research Article

A Bibliometric Analysis using VOSviewer of Publications on Horticultural Therapeutic Recreation

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Abstract: The aim of this research is to reveal the scope of the studies published within the scope of Web of Science (WoS) regarding the concept of horticultural therapeutics and the variables used. In this study, bibliometric analysis, one of the quantitative analysis methods, was used to examine the literature on the concept of horticultural through articles published in academic journals indexed in the WoS database and general research trends were determined. Accordingly, the data obtained from the WoS database were analyzed through 1.6.19 VOSviewer. In the study, 673 results were reached in the search made from 1981 to 2024 by selecting "all fields" in WoS with the keywords ("horticultural therapy" OR "horticultural activity" OR "horticulture therapy" OR "therapeutic horticulture" OR "horticulture therapeutic recreation"). However, since the exclusion criteria were determined in the study, only articles and review articles and 458 data in the SCI-Expanded, SSCI, ESCI, and A&HCI indexes were analyzed. In the data analysis, analyses were conducted to determine the number of citations received and works produced by authors, journals, countries, organizations, and the number of most frequently used words. The most frequently used keywords in publications related to the concept of horticultural therapy were horticultural therapy with 149 repetitions, gardening with 50 repetitions, mental health with 30 repetitions, therapeutic horticulture with 28 repetitions, and well-being with 22 repetitions. It is seen that horticultural therapy is the subject of "stress", "anxiety", "depression" and "psychological well-being" keywords.

Keywords: Horticultural, recreation, therapeutic recreation, bibliometrics.

1. Introduction

Horticultural therapeutic recreation is an accessible recreation method that allows individuals to easily adapt to various healthy lifestyle activities by providing various benefits (physical, cognitive, social, emotional, etc.) and for entertainment purposes (Wichrowski et al., 2005). In particular, it includes being intertwined with the soil, garden and nature in order to support the physical and mental well-being of disabled or disadvantaged individuals, their interest and participation in activities (Söderback et al., 2004). Horticultural therapeutic applications ensure that the muscles are active during the physical rehabilitation process and improve balance, coordination, and strength (Verra et al., 2012). In horticultural therapy, physical activities such as moving, planting, watering, and harvesting plants are effective in strengthening muscle groups and revitalising muscles (Karaelmas, 1998). Thus, as a result of the inter-action between the natural environment and the individual, horticultural therapy is one of the most important treatments that provide stress-relieving effects such as peace, trust and calmness on the individual and make positive contributions to physical and mental health. For this reason, in recent years, research on horticultural therapy, which utilises the physical, mental and spiritual benefits of nature on human health and is one of them, has been increasing rapidly (Chan et al., 2017).

It is stated that horticultural therapeutic practices increase social participation (Blake & Mitchell, 2016; Yao & Chen, 2017), improve memory and thinking skills (Blake & Mitchell, 2016), reduce depression (Connell et al., 2007), and improve physical and mental well-being in patients with chronic musculoskeletal pain and in cardiac rehabilitation services (Ng et al., 2018; Verra et al., 2012; Wichrowski et al., 2005). It is stated that horticultural therapy has positive effects on many different disease groups; relieving pain (musculoskeletal pain), improving motor skills, providing emotional comfort, reducing anxiety and depression levels, reducing loneliness by increasing social interaction with peers in elderly individuals and increasing quality of life (Lee et al., 2013; Verra et al., 2012). The technique of producing and transporting plants has provided improvement in hand and finger movement coordination and control in patients with traumatic brain injury and paralysis (Uslu & Shakouri, 2012). In summary, horticultural therapy contributes to the development of biomotor characteristics such as flexibility, balance, coordination, strength, emotional characteristics such as good mood, self-esteem, self-confidence, cognitive characteristics including memory such as recognizing and memorizing plant species, and social characteristics such as making friends or communication (Lantz, 2006; Szofran et al., 2004; Taft, 2004).

When the concept of horticultural therapeutics, which has a significant effect on the cognitive, affective and psychomotor developmental characteristics of individuals, is examined, it is thought that this study will contribute to the literature in the field by determining the citation levels obtained as a result of the relationships between keywords, publications, authors, journals, countries and institutions and by eliminating the lack of studies that will guide future research on the concept of horticultural therapeutic recreation.

Bibliometric studies are considered one of the most popular research methods of recent times. Recently, bibliometric studies have been used to evaluate scientific research through quantitative studies of published studies globally. It can be said that bibliometric analyses are related to the examination and quantitative analysis of certain features of published studies or documents such as "author, subject, cited publication information, cited sources" using statistical methods (Yılmaz, 2021). Bibliometric analysis provides as useful for objectively analysing and mapping large-scale data. Accordingly, qualified bibliometric studies may lay the groundwork for solid foundations by revealing original and meaningful results in a field. With this method, scientists (1) provide a one-stop overview, (2) reveal gaps in the literature, (3) develop new ideas for future studies, and (4) reveal the map of targeted contributions to the field (Donthu et al., 2021). Bibliometric analysis is a research approach used to reveal the global evolution of academic studies published in Scopus or WoS databases and the trends of published studies (Alsharif et al., 2020). This study aims to reveal the processes and relationships of the articles published in the WoS database regarding the concept of horticultural therapeutics from the past to the present. Therefore, it is thought that examining the studies conducted within the scope of the literature on the concept of horticultural therapeutics will provide insight into how much it has been addressed in the discipline of sports (e.g. physical education and sports, recreation for the disabled or recreation for the disabled) and provide a perspective for new studies to be conducted in these areas.

2. Materials and Methods

2.1. Research Model

In this study, bibliometric analysis, one of the quantitative analysis methods, was used to examine the literature on the concept of horticultural through articles published in academic journals indexed in the WoS database and general research trends were determined. In this research, bibliometric analysis method, which has been a trend in recent years, was used. Bibliometric analysis is a research approach used to identify worldwide research trends in a particular field through the data of academic studies in Scopus or WoS databases (Alsharif et al., 2020). The data obtained in the study were analyzed using the 1.6.19 VOSviewer analysis program. This program is a program developed free of charge by Van Eck & Waltman (2010) that facilitates researchers in processing bibliometric analyses and creating maps. WoS database was used in the current study. WoS database generally publishes quality studies by journals that have proven themselves in their fields and have high impact factors in their own networks. Therefore, the preference of this database is seen as an important factor in terms of the quality, reliability and ethics of the published studies (Dirik et al., 2023).

On 10.02.2025, 673 results were obtained in the search made from 1981 to 2024 by selecting “all fields” in WoS with the keywords (“horticultural therapy” OR “horticultural activity” OR “horticulture therapy” OR “therapeutic horticulture” OR “horticulture therapeutic recreation”). As a result of the research, 372 articles, 160 Proceeding Paper, 73 Review

Article, 52 Meeting Abstracts, 8 Early Access, 7 Book Chapters, 5 Book Reviews, 4 Editorial Material, 3 Letters, 3 Notes, 2 Retracted Publications, 1 News Item and 1 Retraction were obtained. Within the scope of WoS categories, 377 Science Citation Index Expanded (SCI-Expanded), 275 Social Sciences Citation Index (SSCI), 166 Conference Proceedings Citation Index – Science (CPCI-S), 79 Conference Proceedings Citation Index – Social Science & Humanities (CPCI-SSH), 70 Emerging Sources Citation Index (ESCI), 6 Book Citation Index – Social Sciences & Humanities (BKCI-SSH), 5 Arts & Humanities Citation Index (A&HCI) and 4 Book Citation Index – Science (BKCI-S).

However, since in the study included articles and review articles as well as Scı-Expanded, SSCI, ESCI and A&HCI indexes, the analysis process was continued with 428 data. As a result of this analysis, 356 articles and 72 review articles were included in the study. In terms of disciplines, it was seen that the majority of the studies were conducted in the fields of Horticulture (89), Public Environmental Occupational Health (77), Environmental Sciences (67), Rehabilitation (26), Environmental Studies (25), Gerontology (25), Integrative Complementary Medicine (24), Nursing (24), Geriatrics Gerontology (21), Psychiatry (15), Medicine General Internal (14) Psychology Multidisciplinary (14), Social Sciences Biomedical (2), Sociology (2) and Sport Sciences (2). Of these studies, 313 are in the SCI-Expanded, 237 SSCI, 66 ESCI and 3 A&HCI WoS categories. The obtained data was examined through author-citation-journal-country-institution and keyword analysis. The contents indexed in WoS were taken as the database as the criterion.

2.2. Ethics Committee Permission

Ethics Committee Permission is required for all kinds of research conducted with qualitative or quantitative approaches that require data collection from participants using survey, interview, focus group study, observation, experiment, interview techniques, use of humans and animals (including materials/data) for experimental or other scientific purposes, clinical research on humans, research on animals, retrospective studies in accordance with the law on the protection of personal data. Since only WoS data were processed in this study, ethics committee permission was not required.

3. Results

3.1. Co-Authorship of Authors

While analyzing the co-authorship analysis of the authors, in order to determine the authors who are most connected and collaborate with each other, a network map was created for those who meet the condition of creating the criterion of at least 1 publication and 1 citation. According to the created network map, the first 5 authors with the most publications are as follows, respectively: Park, Sin-Ae (n: 53 publications, total link strength: 147), Son, Ki-Cheol (n: 23 publications, total link strength: 90), Lee, A. Young (20 publications, total link strength: 58), Kim, Seon-Ok (12 publications, total link strength: 28) Waliczek, Tina Marie (9 publications, total link strength: 28).

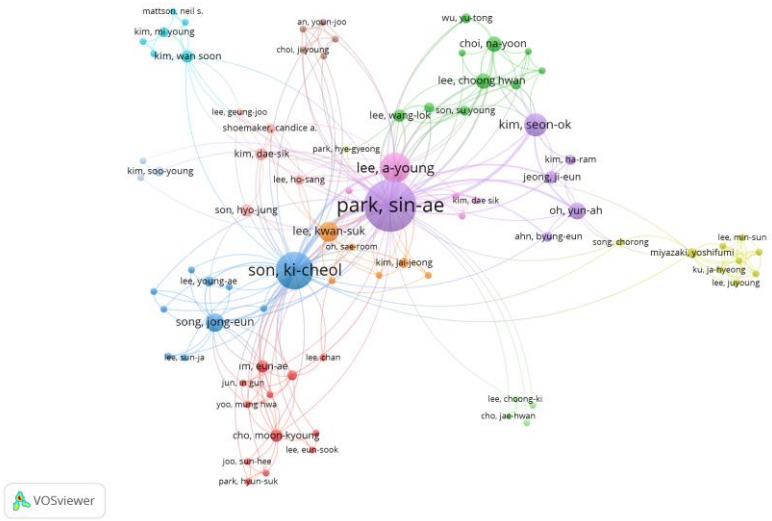

Figure 1. Co-author analysis

3.2. *Citation of Authors*

In this section, in order to reveal the citation networks of the authors, an analysis was conducted based on the criteria of at least 1 publication and 1 citation for the authors. As a result of the analysis, it was determined that 999 units of the authors were connected to each other. This link was grouped under 23 clusters, had 19246 links, and the total link strength was determined as 23883. In this case, it was determined that the first 5 most cited authors were Park, Sin-Ae (n: 816 citations, total link strength: 1829), Hartig, Terry (n: 455 citations, total link strength: 405), Son, Ki-Cheol (n: 447 citations, total link strength: 1048), Kirkevold, Marit (n: 281 citations, total link strength: 455) and Grahn, Patrik (n: 265 citations, total link strength: 167).

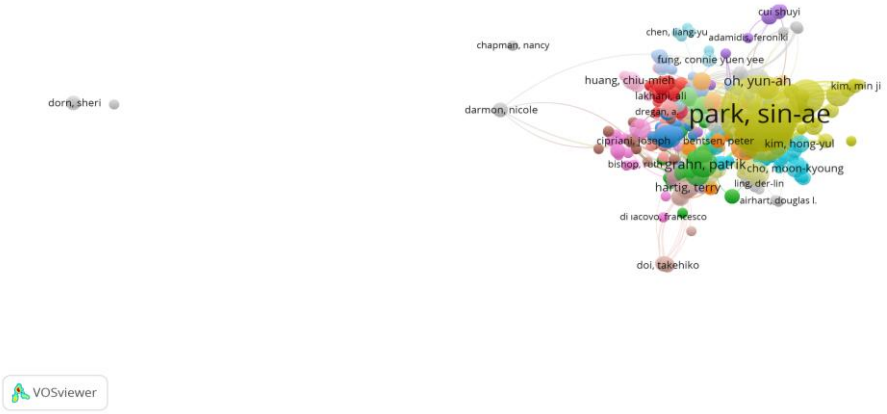

Figure 2. Author citation analysis

3.3. *Citation of Countries*

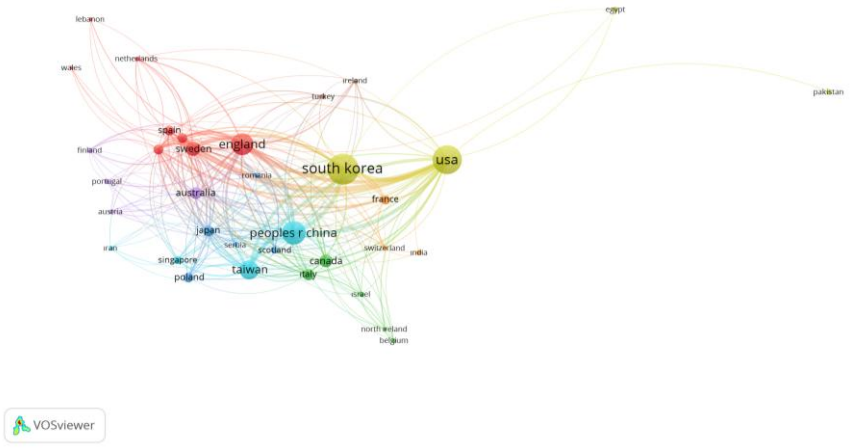

Figure 3. Citation of countries links

In this section, it was aimed to create a network map for the citations received by the published study based on the countries where the authors are located. In order to create this network map, it was determined that there were 43 observation units that were in relation to each other and fulfilled the condition of at least 1 work being published and 1 citation being received by a country. 8 clusters, 261 connections and 1421 total link strength were obtained under these 43 observation units. According to this connection, the countries with the most citations were USA (n: 1876 citations, total link strength: 436), England (1349 citations, total link strength: 305), Switzerland (n: 1303 citations, total link strength: 202), South Korea (n: 1030 citations, total link strength: 1829). In terms of the number of works, the order is as follows: South Korea (88 publications), America (78 publications), People's Republic of China (52 publications), England (45 publications), Taiwan (33 publications) and Switzerland (19 publications).

3.4. Citation and Publications of Organizations

In this section, it was aimed to create a citation network map as a result of the cooperation of organizations. In the formation of this network map, the condition that at least 1 work should be published by an institution and 1 citation should be provided is taken as basis. Within the scope of this condition, it was determined that there were 561 observation units with an inter-organizational citation network. It was observed that these units formed a total of 20 clusters, had 5924 connections and the total link strength was 7777. Accordingly, it was seen that the organizations with the highest publications were Konkuk University (n: 60, total link strength: 757), Swedish University of Agricultural Sciences (n: 12, total link strength: 234), Natl Taiwan University (n: 9, total link strength: 82). It was found that the address institutions of the publications with the most citations were Konkuk University (844 citations), Swedish University agr sci (687 citations), Uppsala University (564 citations) and Norwegian University life sci (467 citations).

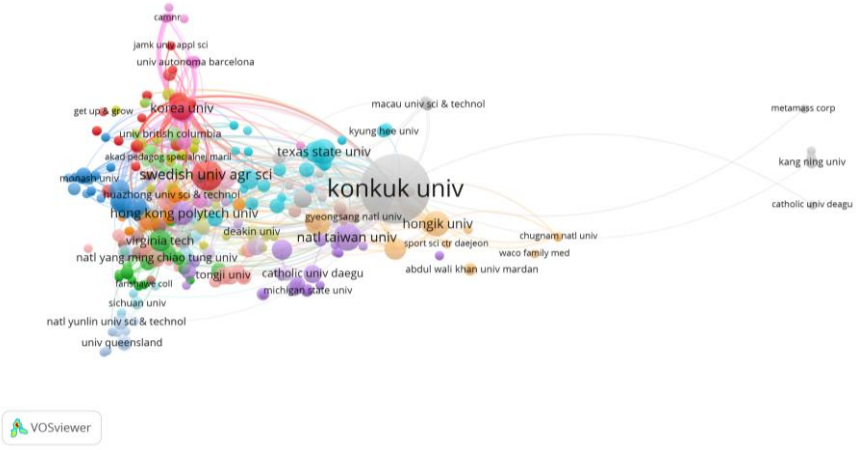

Figure 4. Bibliometric networks of number of organizations publication

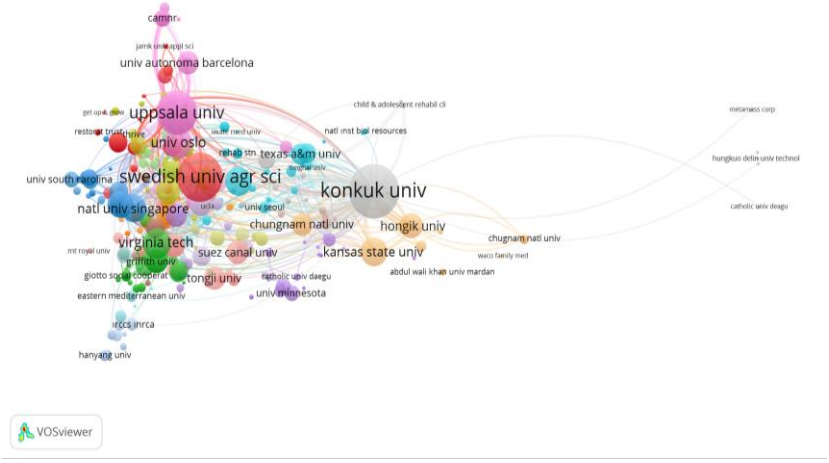

Figure 5. Organization Citation Count Bibliometric Networks

3.5. Co-occurence of All Keywords

In determining the keywords of the published studies related to the concept of horticultural therapeutics, an analysis was conducted on 105 observation units with a relationship between them based on the criterion of at least 3 occurrences. These units have a total of 10 clusters, 571 connections and 999 total link strengths. The most frequently used words in this network relationship are horticultural therapy with 149 repetitions, gardening with 50 repetitions, mental health with 30 repetitions, therapeutic horticulture with 28 repetitions, and well-being with 22 repetitions. The

strongest concepts in terms of the total link strength of these expressions are "horticultural therapy, gardening and mental health".

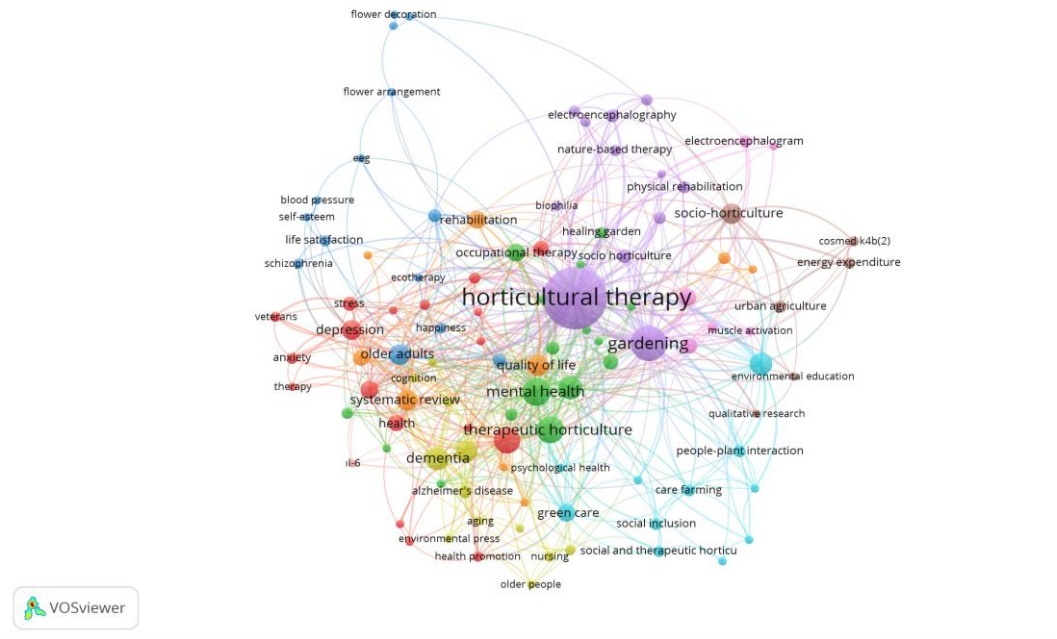

Figure 5. Most frequently used keyword links

3.6. Bibliografic coupling of documents

Bibliographic matching refers to the citation of a common work by two unrelated sources. The criterion for determining this situation was that the source had at least 1 citation. Based on this criterion, 340 units of works that were related to each other were identified. It was observed that these units were grouped into 8 clusters, had 15294 connections, and had a total link strength of 30768. The publications with the highest bibliographic matches were Bringslimark (2009) with 240 citations, Annerstedt (2011) with 210 citations, Coventry (2021) and Clatworthy (2013) with 168 citations. The works with the highest total link strength were Howarth (2020, total link strength: 778), Odeh (2017, total link strength: 711), and Summers (2018, total link strength: 700).

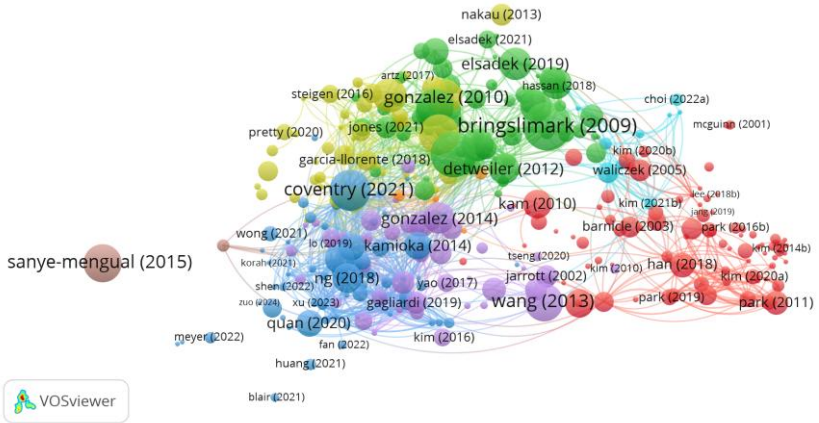

Figure 6. Bibliographic matching links of documents

3.7. *Co-citaiton of co-authors*

The aim of the co-citation section is to determine two different sources cited in a publication. In order to determine this, the number of citations was selected as at least 10 and it was seen that 202 units were formed. Accordingly, it was determined that this unit was grouped under 5 clusters, had 11023 connections and had a total connection strength of

45601. Therefore, the most common authors were listed as follows: Park, SA (281), Ulrich, RS (158), Kaplan, R (107), Gonzalez, MT (97), and Kaplan, S (93).

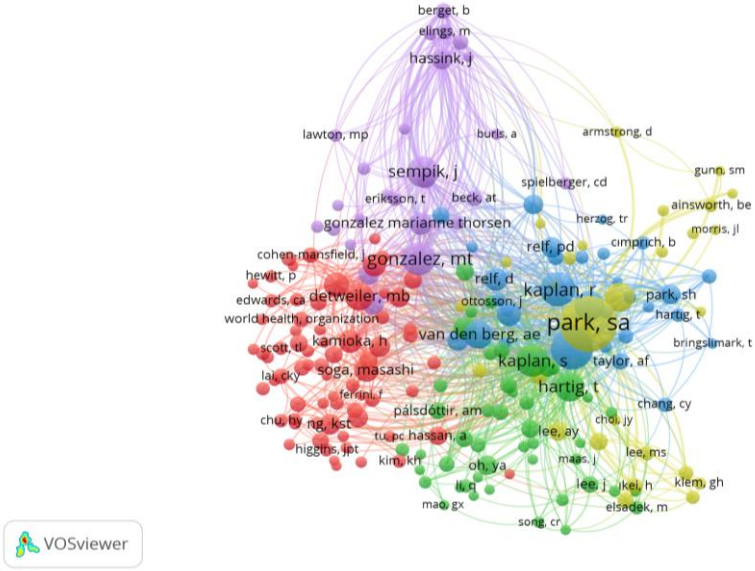

Figure 7. Links between co-cited authors

3.8. Bibliometric analysis of cited journals

In this section, it is aimed to determine the current publication and citation numbers of journals. In this case, at least 2 publications and 2 citation criteria were created. As a result of this criterion, 50 journals were analyzed.

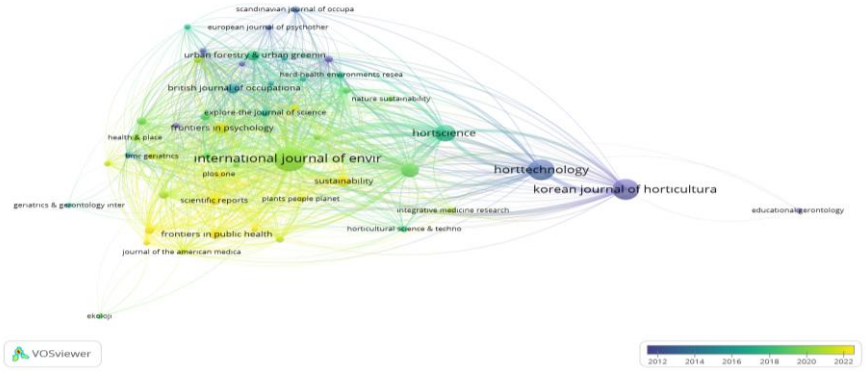

Figure 8. Links to publications produced by journals

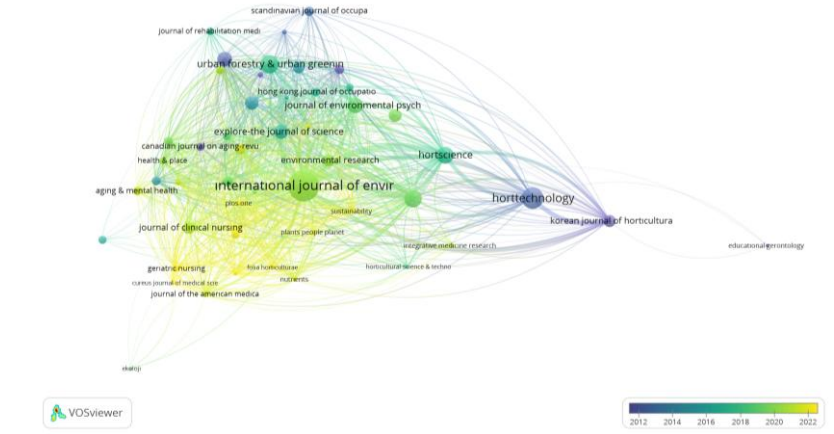

Figure 9. Link between the number of citations produced by journals

Accordingly, the first 6 journals that produce the most publications are listed as follows: "International Journal of Environmental Research and Public Health" (n: 41 publications, total link strength: 5760), "Horttechnology" (n: 29 publications, total link strength: 1352), "Korean Journal of Horticultural Science Technology" (n: 29 publications, total link strength: 1091), "Hortscience" (n: 18 publications, total link strength: 2181), "Complementary Therapies In Medicine" (n: 13 publications, total link strength: 1782) and "Frontiers in Psychology" (n: 8 publications, total link strength: 1487).

As a result of the analysis, the first 6 journals with the most citations were determined as follows, respectively: "International Journal of Environmental Research and Public Health" (n: 1000 citations, total link strength: 5760), "Horttechnology" (n: 491 citations, total link strength: 1352), "Urban Forestry & Urban Greening" (n: 343 citations, total link strength: 1085), "Complementary Therapies in Medicine" (n: 329 citations, total link strength: 1782), "Hortscience" (n: 303 citations, total link strength: 2181), and "Journal of Environmental Psychology" (n: 250 citations, total link strength: 665).

4. Discussion

It was tried to reveal the whole perspective of the studies on the concept of horticultural therapeutic recreation. As a result of the analyses on the concept of horticultural therapeutic recreation, it is seen that the most used keyword is "horticultural therapy" as expected. The other most used keywords in the research are "gardening", "mental health", "therapeutic horticulture", and "well-being". In general, it is recognized that horticultural therapy contributes to the subject of stress, anxiety, depression, and psychological well-being keywords. It can be said that whether horticultural therapeutic recreation reduces stress, anxiety and depression and whether it increases psychological well-being has become a subject of curiosity and has been researched.

Another result of our bibliometric study is that the researcher with the highest number of publications and citations is Sin-Ae Park. The researcher works in the institution of "Konkuk University", which is a foundation university located in the capital of South Korea and study in the fields of Agricultural, Environmental Sciences & Ecology Public, Environmental & Occupational Health, Integrative & Complementary Medicine, and Science & Technology. In total, the researcher has 84 publications in the WoS database and 71 of these publications are articles, 2 reviews, 7 abstracts, 2 editorial materials and 2 proceeding papers. It is seen that 53 of these studies are in the field of Horticulture WoS Category. In addition, the study has a WoS H-index of 19 and a total of 1,043 WoS citations. The second author Ki-Cheol Son, like Sin Ae Park, works at Konkuk University, South Korea, and studies in the fields of Agriculture Public, Environmental & Occupational Health, Integrative & Complementary Medicine, Environmental Sciences & Ecology, and Geriatrics & Gerontology. In total, the researcher has 43 publications in the WoS database and 29 of these publications are articles, 1 review, 7 meeting abstracts, 1 editorial material, and 5 proceeding papers. It is seen that 38 of these studies are in the field of Horticulture WoS Category. The researcher has an H-index of 14 and a total of 639 WoS citations. The third author Lee, A. Young, like the other two authors, works at the institution "Konkuk University". The researcher studies in the fields of Agricultural, Environmental Sciences & Ecology Public, Environmental & Occupational Health Integrative, Complementary Medicine, and Ophthalmology. The researcher has a WoS H-Index of 11 and a total of 315 citations.

As a result of the analyses, the publication with the highest number of citations was published in the journal "Complementary Therapies in Medicine" in 2018 with the title "Reduced stress and improved physical functional ability in elderly with mental health problems following a horticultural therapy program" by Park, Sin-Ae. This publication study was conducted together with Ah-Reum Han and Byung-Eun Ahn. In the study, it was aimed to determine whether the horticultural therapeutic 10-session programmed activities had an effect on twenty-eight elderly Korean individuals with mental health problems. In the study, saliva samples of elderly individuals with mental health problems who participated in horticultural therapeutic program activities were examined at the end of the program. As a result of the examination, it was determined that individuals participating in horticultural therapeutic program activities had a decrease in cortisol levels, a decrease in stress levels, and a significant improvement in physical functional abilities (Han et al., 2018). The second most cited study is "Nature and Health" by Hartig et al. (2014) and published in the Annual Review of Public Health. In the study, the links between nature and health, including physical activity, social harmony and stress reduction of positive resources such as air in nature, were investigated in order to

minimize the negative effects of lifestyle changes caused by urbanization on humans, and it was stated that spending time in nature has many benefits on health (Hartig et al., 2014). The third most cited study is "Determining exercise intensities of gardening tasks as a physical activity using metabolic equivalents in older adults", conducted by Son, K.C. with Park and Lee, and published in the journal "HortScience". This study, published in 2011, aimed to determine the effect of exercise intensities on the metabolic health of 20 Korean individuals over the age of 65 while performing 15 garden tasks. The study found that low and moderate intensity horticultural therapeutic activities were effective on the metabolic health of elderly individuals (Park et al., 2011). It is noteworthy that all three first authors are from the same institution, "Konkuk University" in Seoul, the capital of South Korea. In the fourth place is the study titled "Therapeutic horticulture in clinical depression: A prospective study of active components", published in the "Journal of Advanced Nursing" by Gonzalez et al. (2010). The study aimed to investigate the effects of a 12-week horticultural therapeutic program on the severity of depression, perceived attention status and rumination of individuals with clinical depression. It was determined that the applied horticultural therapeutic applications reduced the severity of depression and improved the perceived attention capacity of individuals with clinical depression. It was also stated that the decrease in the severity of depression continued for up to 3 months after the completion of the 12-week horticultural therapeutic program (Gonzalez et al., 2010). The last author with high citations is Patrik Grahn's study titled "The relation between perceived sensory dimensions of urban green space and stress restoration", conducted with Ulrika K. Stigsdotter and published in the journal "Landscape and urban planning". This study, conducted in 2011, investigated whether there was a relation between perceived sensory dimensions of urban green spaces and stress restoration. According to this study, it was determined that sensory perception of natural environments has positive effects on human health. It was stated that it positively affects the mental and psychological well-being of stressed individuals in particular (Grahn & Stigsdotter, 2010).

According to another result of our study, the country citation bibliometric analysis, it was seen that the country with the most citations was the United States. The United States is followed by the United Kingdom, Switzerland, and South Korea. It is seen that South Korea, despite producing more publications than the United States and other countries, is the last in terms of country citations. However, it can be said that the publication years of the United States are much older than other countries, and that this is a product of other countries feeding off of the United States in this regard. It was seen that other countries have more recent publications.

The organization with the most publications is "Konkuk University", where a private university founded in South Korea in 1931. The institution ranked second is "Swedish University of Agricultural Sciences", where founded in Sweden in 1977. The university was founded in 1977 by merging three separate colleges for veterinary medicine, forestry, and agriculture, as well as some smaller units into a single organization in order to increase efficiency through resource sharing between departments. The institution ranked third is "University of Queensland", where founded in Australia in 1909. The institution ranked fourth is "National Taiwan University", where founded in Taiwan in 1928. National Taiwan University is a university located in Taipei, where the capital of Taiwan. It was founded in 1928 and is considered one of the most prestigious universities in the country and one of the best universities in the world.

When the results of bibliometric analysis for inter-organisational citations were analysed, it was seen that Konkuk University was in the first rank and Swedish University of Agricultural Sciences was in the second rank as in the institution with the highest number of publications. However, the third institution with the highest number of citations is Uppsala University. Uppsala University is a research university located in Uppsala, Sweden. The university, where founded in 1477, is the oldest university in Sweden. The university gained importance during the rise of Sweden as a great power in the late 16th century. The institution with the most citations in fourth place was Norwegian University of Life Sciences. The Norwegian University of Life Sciences was founded in 1859 as the Higher Agricultural College (Den høiere Landbrugsskole). Then in 1897 the institution was transformed into the Norwegian Agricultural College (Norges Landbrugshøiskole, later Norges Landbrukshøiskole, Norges Landbrukshøyskole and Norges Landbrukshøgskole, abbreviated NLH). It acquired the status of a university-level college (vitenskapelig høgskole). In 2005 it acquired university status and was renamed the Norwegian University of Life Sciences (Universitet for miljø- og biovitenskap; UMB) (URL).

It is seen that the journal named "International Journal of Environmental Research and Public Health" has the most publications and citations. It is seen that the journal is indexed in the "SSCI" category in the Q 1 class and the publisher

of the journal is “MDPI”. It is seen that the journal started its publication life in 2004 and publishes articles monthly. The second-ranked journal, “Horttechnology”, is indexed in the Q2 class within the scope of “SCI-E” and publishes 6 issues per year. It was determined that the journal was founded in 1991 and the publisher of the journal is the “American Society for Horticultural Science”. It is seen that the journal “Korean Journal of Horticultural Science Technology”, which is in the third-ranked, was founded in 1998 and is indexed within the scope of Q3 “SCI-E”. It was determined that the publisher of the journal is “Korean Society of Horticultural Science” and the journal publishes once every two months. The journal “Hortsicence”, which is ranked fourth, was founded in 1966 and is indexed in the "SCI-E" category in the Q2 class. The publisher of the journal is the “American Society for Horticultural Science”, and the journal publishes 4 issues per year. The journal “Complementary Therapies in Medicine”, which is ranked fifth, was founded in 1986 under the name “Complementary Medical Research” and continued its publication life under its current name “Complementary Therapies in Medicine” in 1993. It is seen that the journal is indexed in the Q2 class within the scope of “SCI-E” and the publisher of the journal is “Hurchill Livingstone”. While the journal was published three times a year by Routledge in its initial phase, it is currently published eight times a year by Elsevier. It is seen that the journal "Frontiers in Psychology", which is ranked sixth, was founded in 2007 and is indexed in the Q2 class within the scope of "SSCI". It was determined that the publisher of the journal is "Frontiers Media Sa".

It is seen that the journal “Urban Forestry & Urban Greening”, which is ranked 3rd in the citation ranking, was founded in 2006. It has been determined that the journal is included in the Q1 class within the scope of “SSCI and SCI-E” index. The publisher of the journal is “Elsevier GMBH” and publishes 1 publication per month. This journal deals with topics related to urban design and greening. It is seen that the “Journal of Environmental Psychology” journal, which is ranked 6th in the citation ranking, started its publication life in 1938 and the journal publishes 10 issues per year. It was determined that the journal is indexed in the Q4 class within the scope of the “SCI-E” category and the publisher of the journal is the “National Environmental Health Association”. It is seen that the journal covers themes related to environmental health.

Based on the above findings, it can be seen that horticultural therapeutic applications are mostly addressed by disciplines such as life sciences, urban and environment, and complementary medical sciences. Since the horticultural garden is more related to the concepts of forest, plant, soil, etc., it has been observed that more research has been carried out by disciplines such as life sciences, urban and environment, complementary medical sciences. It can be said that the examination of the concept of horticultural therapeutic recreation emphasises the psychological well-being, social solidarity, quality of life, health improvements in the physical and mental rehabilitation process of horticultural activities. Accordingly, although it is determined that the concept of horticultural therapeutics is related to physical activity and therapy practices in the rehabilitation and socialisation of disadvantaged or disabled individuals in leisure time, it is seen that the concept has been addressed at a very limited level with only two research studies within the scope of sports sciences discipline. For example, one of these is the study titled “Nature-assisted rehabilitation for reactions to severe stress and/or depression in a rehabilitation garden: long-term follow-up including comparisons with a matched population-based reference cohort” published by Wahrborg et al. (2014) in the Journal of rehabilitation medicine. The study aimed to determine the effect of a nature-assisted rehabilitation program on 118 individuals with severe stress or mild to moderate depression, and as a result, various benefits were obtained in terms of the health outcomes of the individuals. The second and last study addressed within the sports discipline is the study titled “A randomized controlled trial of nature-based post-stroke fatigue rehabilitation” published by Pálsdóttir et al. (2015) in the “International Journal of Stroke”. In this study, the effects of a nature-based therapeutic program on the quality of life, depression, stress, and anxiety of elderly individuals were investigated, and it was determined that positive results were observed.

5. Conclusions

As a result, academic studies on the concept of horticultural therapeutics within the scope of recreation in outdoor disabilities within the sports discipline can be expanded and contribute to the field. Especially recreation in disabled people or physical education and sports fields in disabled people are considered to be among the important functions of rehabilitation and socialization of disadvantaged individuals. Horticultural therapy, through light or moderate physical activities such as planting and watering, can enhance the physical fitness parameters of individuals with

disabilities or those from disadvantaged groups (such as muscle strength, flexibility, coordination, etc.); support the development of their psychological aspects (such as reducing stress and burnout, enhancing psychological well-being); and simultaneously support the development of their social skills (such as communication, teamwork, leadership, group dynamics, sharing, and peer support).Therefore, it is thought that the consideration of horticultural therapeutic applications within the scope of recreation in disabled people will bring a new dimension to therapeutic applications for disabled or disadvantaged individuals.

This bibliometric research review reveals the direction in which the studies conducted on the concept of horticultural therapeutics by journals, authors, publishers, countries and institutions have evolved and the number of researchers conducting research on this subject. We believe that it will guide researchers who want to conduct research on this subject.

Limitations

This current study has some limitations. One of the important limitations of this study is that our research data was obtained only from the reliable, prestigious and widely used WoS database and that data from other databases were not consulted. Therefore, we assume that studies not indexed in the WoS database or published in journals with different indexes may not have been included in the scope of the review. For future research, studies on the concept of horticultural therapeutics can be examined through the Scopus and PubMed databases.

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