



A holistic view on health communication during the Covid-19 pandemic: An analysis with science mapping technique

Covid-19 pandemisi sırasında sağlık iletişimine bütünsel bir bakış: Bilim haritalama tekniğiyle bir analiz

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ABSTRACT

Aim: The purpose of this study is to examine the thematic and strategic development of the topic "health communication", which was often raised during the Covid-19 Pandemic process, and to evaluate this development. **Method:** The science mapping method was used in the research. The articles included in the research were downloaded from the Web of Science Core Collection database and analyzed through the SciMAT science mapping program. In the analysis, the data were divided into periods "1990-1999", "2000-2009" and "2010-2020" and "words" were used as the analysis unit. The research findings were evaluated with an overlap map, thematic network, thematic development map and strategic diagrams. **Results:** It has been determined that the most publications on health communication were made in 2020, and the countries with the most publications were the United States (n=489) and Australia (n=41). The most important motor themes were "internet, behavior, meta-analysis" in the first period, "self, impact, HIV/AIDS, persuasion" in the second period, and "social media, behavior, prevention, awareness, information seeking" in the third period. **Conclusion:** The issue of health communication has been raised frequently, especially in recent years. In this study, it was tried to present a holistic view of the subject with publications on this subject. It is recommended that researchers take into account emerging motor themes in particular when identifying new areas of study. It is evaluated that such science mapping studies can create an important awareness for all stakeholders who are interested in the subject.

ÖZ

Amaç: Bu çalışmanın amacı, Covid 19 Pandemi sürecinde sıkça gündeme gelen "sağlık iletişimi" konusunun tematik ve stratejik gelişimini incelemek ve bu gelişimi değerlendirmektir. **Yöntem:** Araştırmada bilim haritalama yöntemi kullanılmıştır. Araştırmaya dâhil edilen makaleler Web of Science Core Collection veri tabanından indirilmiş ve SciMAT bilim haritalama programı aracılığıyla analiz edilmiştir. Analiz, veriler "1990-1999", "2000-2009" ve "2010-2020" periyotlarına ayrılarak gerçekleştirilmiş ve analiz birimi olarak "kelimeler" kullanılmıştır. Araştırma bulguları; örtüşme haritası, tematik ağ, tematik gelişim haritası ve stratejik diyagramlar ile değerlendirilmiştir. **Bulgular:** Sağlık iletişimi konusunda en fazla yayının 2020 yılında yapıldığı, en fazla yayın yapan ülkelerin Amerika Birleşik Devletleri (n=489) ve Avustralya (n=41) olduğu; en önemli motor temaların birinci dönemde "internet, behavior, metaanalysis", ikinci dönemde "self, impact, HIV/AIDS, persuasion", üçüncü dönemde ise "social media, behavior, prevention, awareness, information seeking" temaları olduğu görülmüştür. **Sonuç:** Sağlık iletişimi konusu özellikle son yıllarda sıkça gündeme gelmektedir. Bu çalışma ile bu konudaki yayınlar ile konuya holistik bir bakış açısı sunulmaya çalışılmıştır. Araştırmacıların yeni çalışma alanları belirlerken, özellikle ortaya çıkan motor temaları dikkate alması önerilmektedir. Bu gibi bilim haritalama çalışmalarının konuya ilgi duyan tüm paydaşlar açısından önemli bir farkındalık oluşturabileceği değerlendirilmektedir.

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INTRODUCTION

During the Covid-19 Pandemic period, in which all health systems have been disrupted, the health systems of the world's most developed countries have become inoperable in almost every aspect. In this period, as well as in terms of all quality components such as efficiency, effectiveness, productivity, optimality, acceptability, and legitimacy; it is argued that the world health systems cannot give a good test in terms of universal ethical and legal principles such as being beneficial to the patient, not harming the patient, equality, justice and using scarce resources. In this pandemic period -in

the context of the mask, distance and hygiene triad - one of the most frequently discussed issues is the issue of health communication. In this respect, this research aims to examine the publications titled health communication with the science mapping technique, to create a holistic perspective on the subject and to discuss the subject in the context of today's pandemic process in the light of the analyzed thematic network, strategic diagram and thematic development maps.

Communication is one of the basic dynamics of daily life. It is essential for the existence and survival of



both social structures and people. It is the process of creating and sharing a common point of view among people. Communication, which is an indispensable element of social life, has a vital role in determining the place of individuals in social life. In today's world, it is accepted that communication is the key to the management function and that individual and social goals cannot be achieved without effective communication. Communication, with the generally accepted definition made by those who are accepted as the authority on the subject, is expressed as "the process by which the participants communicate and/or understand and interpret what is conveyed through various communication methods"(1,2).

The health industry around the world and the health systems using the products produced by this industry are changing rapidly and a strong health communication system is needed to keep up with these rapid changes. It is very important to be able to establish and operate a strong national and international communication network, especially in times of disaster and crisis such as the pandemic process. Health communication is the ability to translate and disseminate professional knowledge to support and educate the healthcare demanding audience.

The Centers for Disease Control and Prevention (CDC) defines health communication as "translating, communicating and presenting health information using science-based strategies to protect and promote the health of diverse populations." The topics that health communication focuses on can be conveyed as global health, disease prevention, strategic marketing and communication skills (3,4).

Considering the social and legal regulations between countries and cultures and the differences in health care demands, the complexity in the structure of health care systems emerges. Despite the pace of modernization, healthcare industries around the world are facing various problems and their solution is considered to be possible with effective health communication. Misinformation or lack of communication can be harmful, especially for low income and education levels. Health communication is used to educate health care seekers. Conscious marketing tactics and sociological data are used to ensure that those who request health services make the right decisions on health issues. Health communication is used by the pharmaceutical industry and government and non-governmental organizations to promote health campaigns. In this way, it is ensured that risks are managed and those who demand health services are influenced and educated on health issues (5,6).

Health communication is important to the health system for many reasons, some of which are listed below:

- Health literacy of the society develops,
- The materials used to encourage those who demand health services to become more qualified, their number increases,
- Social norms change with a focus on health,
- Increases the availability of hospitals and medical services,
- Efforts to improve health in individuals and social groups are strengthened (7).

The number of scientific publications in the world is increasing rapidly. This increase has brought with it the difficulty of following and analyzing scientific developments. Academic staff demands the fastest access to up-to-date information and the data they need. This demand has triggered the use of bibliometric methods (8,9).

Bibliometrics is the analysis of the works produced by the determined persons/institutions and the relations between them, in the designated area or time. As a result of these analyzes, an image covering a very wide area can be obtained of the subject or discipline under examination. In this way, information about works related to the subject or discipline can be accessed. The bibliometric analysis provides the opportunity to examine the literature comprehensively, to see the related discipline at one point, and to obtain information about the citation performance of articles and similar Works (8,10,11).

In addition to the above-mentioned aspects, scientific mapping is also the analysis of the relationships between different elements such as organizations that gather scientific disciplines under its umbrella, various works and authors. Scientific mapping is also one of the main uses of bibliometrics. The definition of Science Mapping can also be made as a visualization of a science discipline (12,13).

Some software and programs are used for scientific mapping. In this study, Scimat software was used to examine the development of articles published on "health communication" over time and to reveal the scientific mapping on the subject. When the related literature was examined, no other research with the theme of health communication was found using Scimat software. With this aspect, it is considered that this research, which offers a holistic view to the subject, can increase awareness and contribute to the literature in all relevant stakeholders, especially in today's world where the need for the restructuring of all world health systems of the Covid-19 epidemic process is discussed.

METHOD

The data included in the analysis in the study were downloaded from the Web of Science (WoS) Core Collection database (14). The search criteria used to filter related publications from the database are presented below. [TITLE: ("healthcommunication") Refined by: DOCUMENT TYPES: (ARTICLE OR REVIEW) AND LANGUAGES: (ENGLISH) AND [excluding] PUBLICATION YEARS: (2021) Timespan: All years. Indexes: SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI]. As a result of the search made according to these criteria, 703 publications were found and the data related to these publications were downloaded in "plaintext" format and uploaded to the SciMAT program for analysis (15). Before the analysis, 4 publications belonging to the year 1987 and before were excluded from the analysis because they did not contain the necessary data, and the keywords used in 609 publications were grouped by considering the issues such as singular/plural, synonymy and the use of abbreviations. The analyzes were carried out with the data allocated for the periods 1990-1999, 2000-2009 and 2010-2020, and there were 43 publications in the first period, 117 publications in the second period and 539 publications in the last period. The SciMAT program configurations used in the analyzes are presented below. [Unit of analysis: Words (authorRole=true, sourceRole=true, addedRole=true); Kind of network: Co-occurrence; Normalizationmeasure: Equivalenceindex; Cluster algorithm: Centerssimples, Maxcluster size: 6, Mincluster size: 1; Evolutionmeasure: Inclusionindex; Overlappingmeasure: Inclusionindex]. Analysis findings made according to these criteria were presented with strategic diagrams, thematic networks, overlap map, and thematic development map visuals, and the sizes of the themes in the visuals changed depending on the number of publications. The quality evaluations of the themes were made by the number of publications, the total number of citations, and the h-index values. In the strategic diagrams, the centrality and density levels were effective in the placement of the themes. The themes with stronger external relations, that is, more centrality, are placed on the right side of the diagram, while the themes with stronger internal relations, that is, more intense, are placed on the upper side of the diagram. According to these features, themes can be placed in 4 different areas. Motor themes with high centrality and intensity are placed in the upper right area, emerging or disappearing themes with low centrality and intensity are placed in the lower-left area, basic and transformational themes with high centrality and low intensity are located in the lower right area, and advanced and isolated themes with low centrality and high intensity are located in the upper left area.

In thematic networks, the relationships between the themes in the visual have been revealed, and the thickness of the lines has been shaped according to the strength of the relationship. In the overlap map, the quantitative change of the keywords used in the publications according to the analysis periods is visualized. In the thematic development map, the horizontal relations of the themes between the periods are given, and the thickness of the lines is shaped according to the strength of the relationship. Solid lines indicate that the same keywords are shared between the themes as the theme names, and dashed lines indicate that common words are shared except for the theme names (16,21).

RESULTS

The distribution of analyzed publications by years is given in Figure 1. When the graphic is examined, it has been determined that although there was an isolated increase in the number of publications in 1994 and 1999, the main increase occurred after 2002, and there were decreases in the number of publications from time to time in this period, but a significant increase was observed in the number of publications in 2020.

The distribution of analyzed publications by country is given in Figure 2. When the graph is examined, it is seen that while the USA is in the first place with 489 publications, it has significantly more publications than other countries. The USA is followed by Australia with 41 broadcasts and Canada with 32 broadcasts. Turkey, which publishes the same number of publications as France, ranks 19th with 6 publications.

It was seen that the total number of citations of the analyzed publications was 14893, the average of citations per publication was 21.18, the total number of citations decreased to 14420 when self-citations were taken into account, and the h-index value of 703 publications was 54. Information on the most cited publications is given in Table 1. According to this information, the top 3 most cited publications are Moorhead et al. (2013), Houts et al. (2006), Dillard and Shen (2005). In addition to the number of citations (n=803) for the publication produced by Moorhead et al. in 2013, which ranked first, it was found remarkable that the publication produced by Broniatowski et al. in 2018 received 235 citations in a short time.

Information on the authors who produce the most publications is given in Table 2. According to this information, it was determined that the top 3 authors who produced the most publications were Kreps GL (n=13), Noar SM (n=9) and Mackert M (n=8).

The findings regarding the most used keyword groups in the analyzed publications are given in Table 3. According

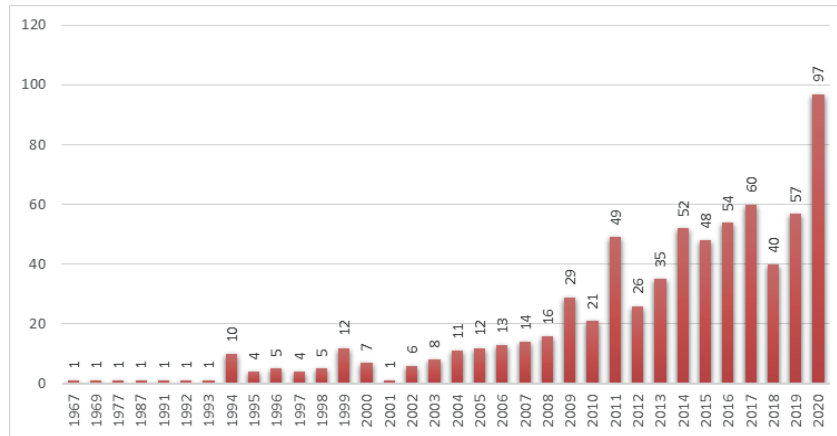


Figure 1. Number of Publications by Years

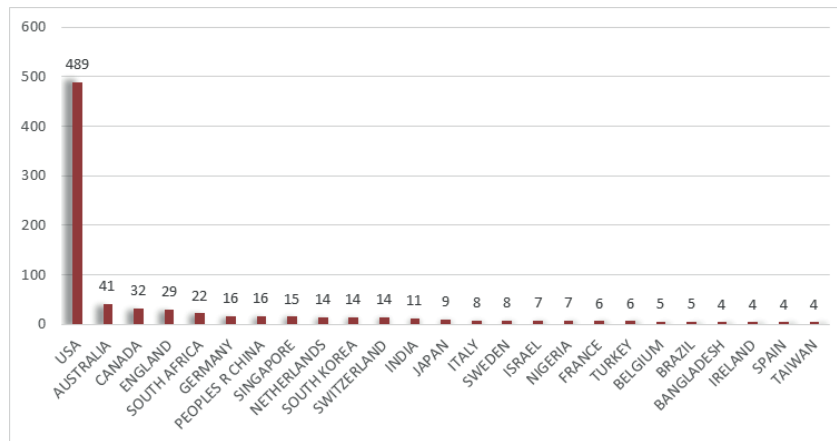


Figure 2. Number of Publications by Country (Top 25 Countries)

Table 1. Most Cited Publications

Rank	Title	Authors	Year	Total Citations
1	A New Dimension of HealthCare: systematic review of the uses, benefits, and limitations of Social Media for Health Communication	Moorhead, S. Anne; Hazlett, Diane E.; Harrison, Laura; Carroll, Jennifer K.; Irwin, Anthea; Hoving, Ciska	2013	803
2	The role of pictures in improving health communication: A review of research on attention, comprehension, recall, and adherence	Houts, Peter S.; Doak, Cecilia C.; Doak, Leonard G.; Loscalzo, Matthew J.	2006	721
3	On the nature of reactance and its role in persuasive health communication	Dillard, JP; Shen, LJ	2005	577
4	Tailored and target ed health communication: Strategies for enhancing information relevance	Kreuter, MW; Wray, RJ	2003	563
5	Social Media Use in the United States: Implications for Health Communication	Chou, Wen-ying Sylvia; Hunt, Yvonne M.; Beckjord, Ellen Burke; Moser, Richard P.; Hesse, Bradford W.	2009	515
6	Interactive health communication Applications for people with chronic disease	Murray, E.; Burns, J.; Tai, See S.; Lai, R.; Nazareth, I	2005	385
7	A meta-analysis of the effect of media ted health communication campaigns on behavior change in the United States	Snyder, LB; Hamilton, MA; Mitchell, EW; Kiwanuka-Tondo, J; Fleming-Milici, F; Proctor, D	2004	292
8	The role of culture in health communication	Kreuter, MW; McClure, SM	2004	291
9	Advancing tailor ed health communication: A persuasion and message effects perspective	Rimer, Barbara K.; Kreuter, Matthew W.	2006	264
10	Weaponized Health Communication: Twitter Botsand Russian Trolls Amplifythe Vaccine Debate	Broniatowski, David A.; Jamison, Amelia M.; Qi, SiHua; AlKulaib, Lulwah; Chen, Tao; Benton, Adrian; Quinn, Sandra C.; Dredze, Mark	2018	235

Table 2: Most Prolific Writers

Rank	Name	Number of documents
1	Kreps GL	13
2	Noar SM	9
3	Mackert M	8
4	Viswanath K	7
5	Bernhardt JM	6
6	Dutta MJ	6
7	Kreuter MW	6
8	Parrott R	6
9	Salmon CT	6
10	Andersen PA	5

Table 3. Most Used Keywords in the Research

No	Phrase	Number of Uses
1	Health Communication	152
2	Behavior	78
3	Care	71
4	Information	65
5	Interventions	59
6	Impact	51
7	Prevention	51
8	Risk	48
9	Communication	46
10	Education	43
11	Internet	43
12	Adolescents	42
13	Knowledge	40
14	Attitudes	35
15	Model	34
16	Social Media	33
17	Public Health	31
18	Media	31
19	Messages	30
20	Perceptions	29

to these findings, it was seen that the most used keyword was “health communication” (n=152), followed by the keywords “behavior” (n=78) and “care” (n=71).

As a result of the analysis, 7 themes emerged in the strategic diagram for the period 1990-1999 (Figure 3). 3 of these themes are engine themes (“internet”, “behavior”, “metaanalysis”), 1 of them is the isolated and advanced theme (“America responds”), 1 of them is a basic and transformational theme (“information”), 2 of them are the themes that appear or disappear (“disease”, “program”).

The findings related to the themes of the 1990-1999 period are given in Table 4. In this period, the most published themes (n=5) were “behavior” and “internet” themes. The h-index value of both of these themes is 5, while the total number of citations for the “behavior” theme is 136, while the total number of citations for the “internet” theme is 408. The fact that the total number of citations for the “program” theme, which has only 2 publications, is 62, which is a remarkable finding. When the thematic networks in Figure 4 are examined, the “internet” theme is related to the

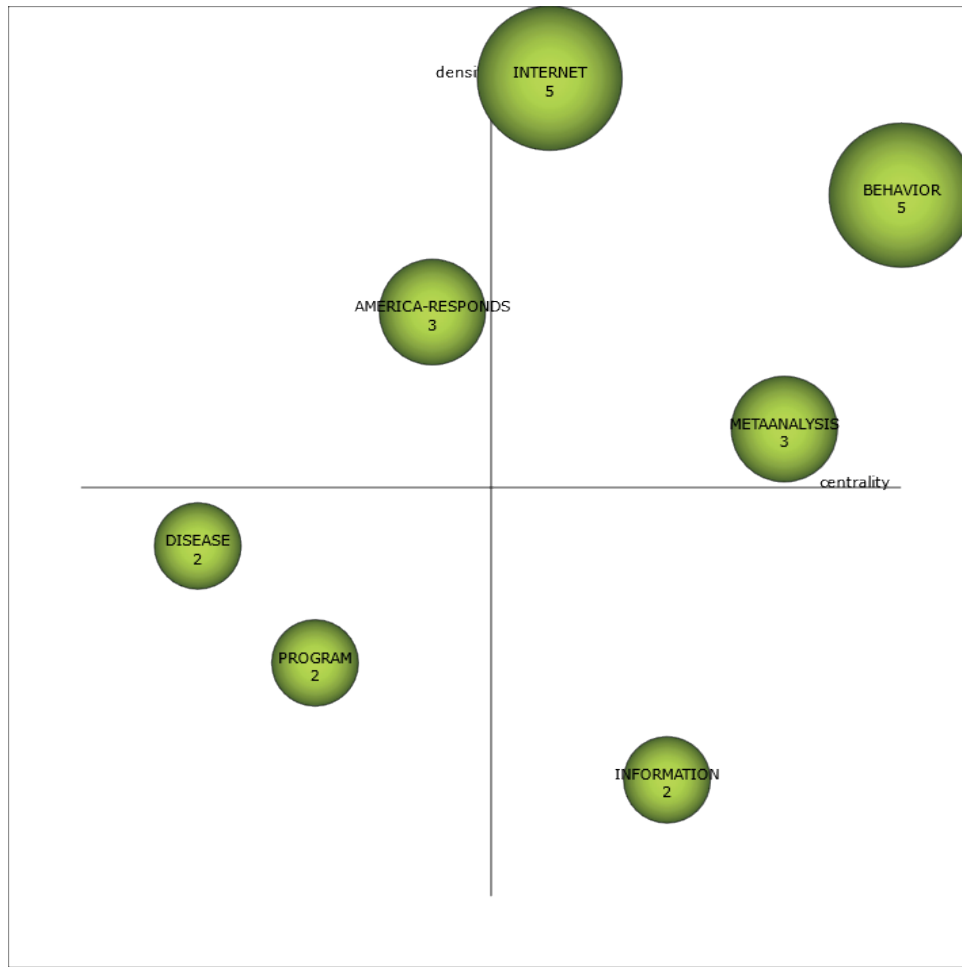


Figure 3. Strategic Diagram (1990-1999 Period)

Table 4. Findings Related to Themes (1990-1999 Period)

Name	No. of documents	No. of citations	h-Index	Centrality	Density
Behavior	5	136	5	104.28	61.67
Internet	5	408	5	56.26	88.03
America Responds	3	42	3	51.37	54.17
Metaanalysis	3	46	3	94.42	50
Disease	2	19	2	25.92	25
Program	2	62	2	40.49	23.44
Information	2	41	2	85.87	7.78

“evaluation”, “computers”, “healthcommunication”, “care” and “quality” themes, and the “behavior” theme is “adherence”, “campaigns”, “interventions”, “physicians” and “predictors”.

As a result of the analysis, 10 themes emerged in the strategic diagram for the 2000-2009 period (Figure 5). 4 of these themes are motor themes (“self”, “impact”,

“HIV/AIDS”, “persuasion”), 2 are isolated and advanced themes (“breastcancer”, “readability”), 2 are the basic and transformational theme (“internet”, “risk”), 2 of them are emerging or disappearing theme (“media”, “cancer”).

The findings related to the themes of the 2000-2009 period are given in Table 5. The theme with the most

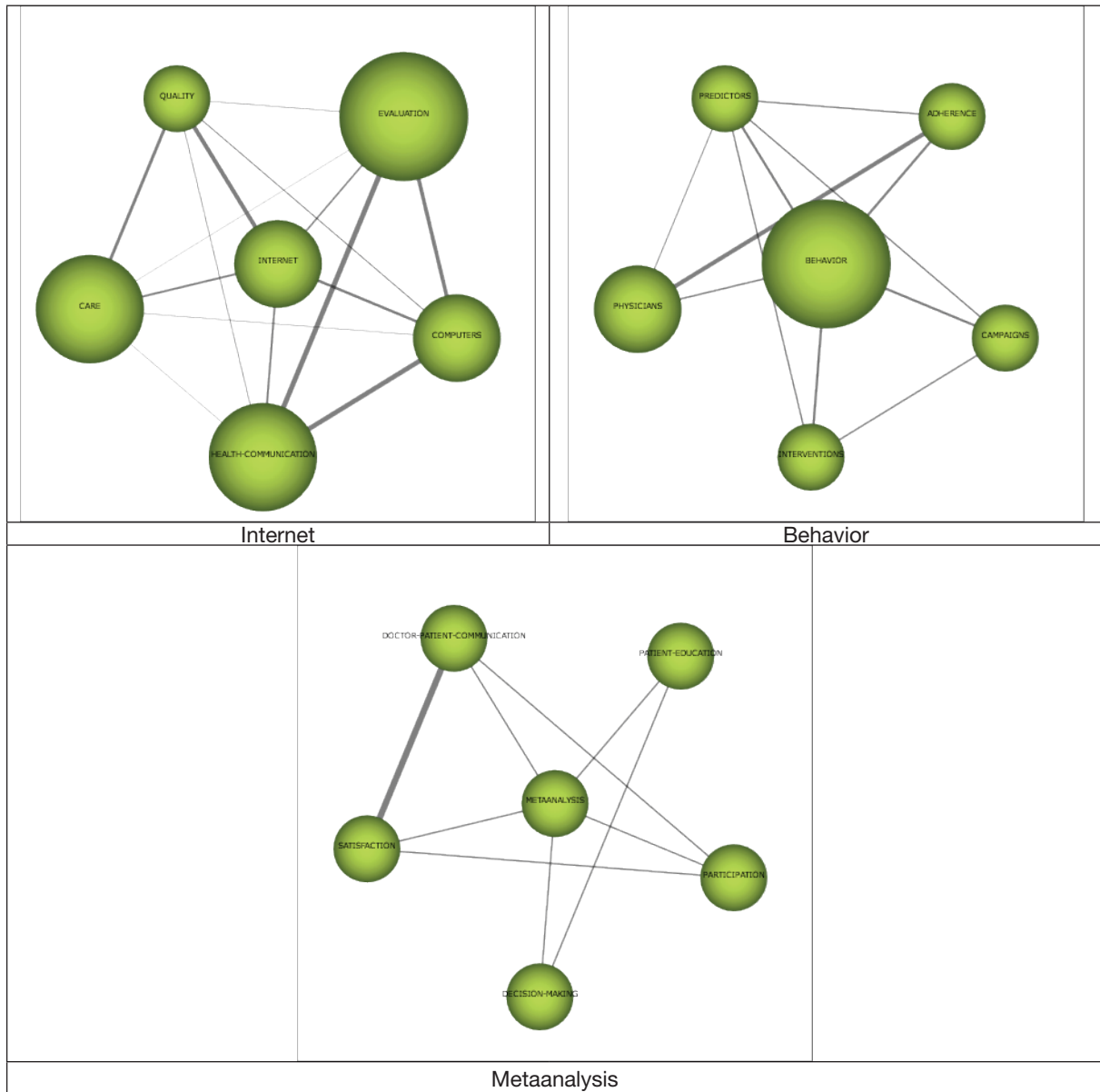


Figure 4. Thematic Network

publications (n=11) in this period is the “impact” theme. The total number of citations for this theme is 1109, and the h-index value is 9. The number of publications of the “Internet” theme is 9, the total number of citations is 836, and the h-index value is 8. It is noteworthy that the total number of citations for the “persuasion” theme, which has 6 publications and an h-index value, is 1109, while the total number of citations for the “readability” theme, which has a 4 publication number and h-index value, is 765. When the thematic networks in Figure 6 are examined, the theme of “impact” is related to the themes of “smoking”, “behavior”, “interventions”, “care”

and “information”, the theme of “persuasion” is related to the “responses”, “prevention”, “fear”, “quality” and “involvement” themes; “HIV/AIDS” theme is related to “massmedia”, “adolescents”, “healthdisparities”, “strategies” and “behaviorchange” themes; It is seen that the theme of “self” is related to the themes of “culture”, “fearappeals”, “messages”, “model” and “knowledge”.

As a result of the analysis, 22 themes emerged in the strategic diagram for the 2010-2020 period (Figure 7). 9 of these themes are motor themes (“condom use”, “persuasion”, “adolescents”, “social media”, “behavior”,

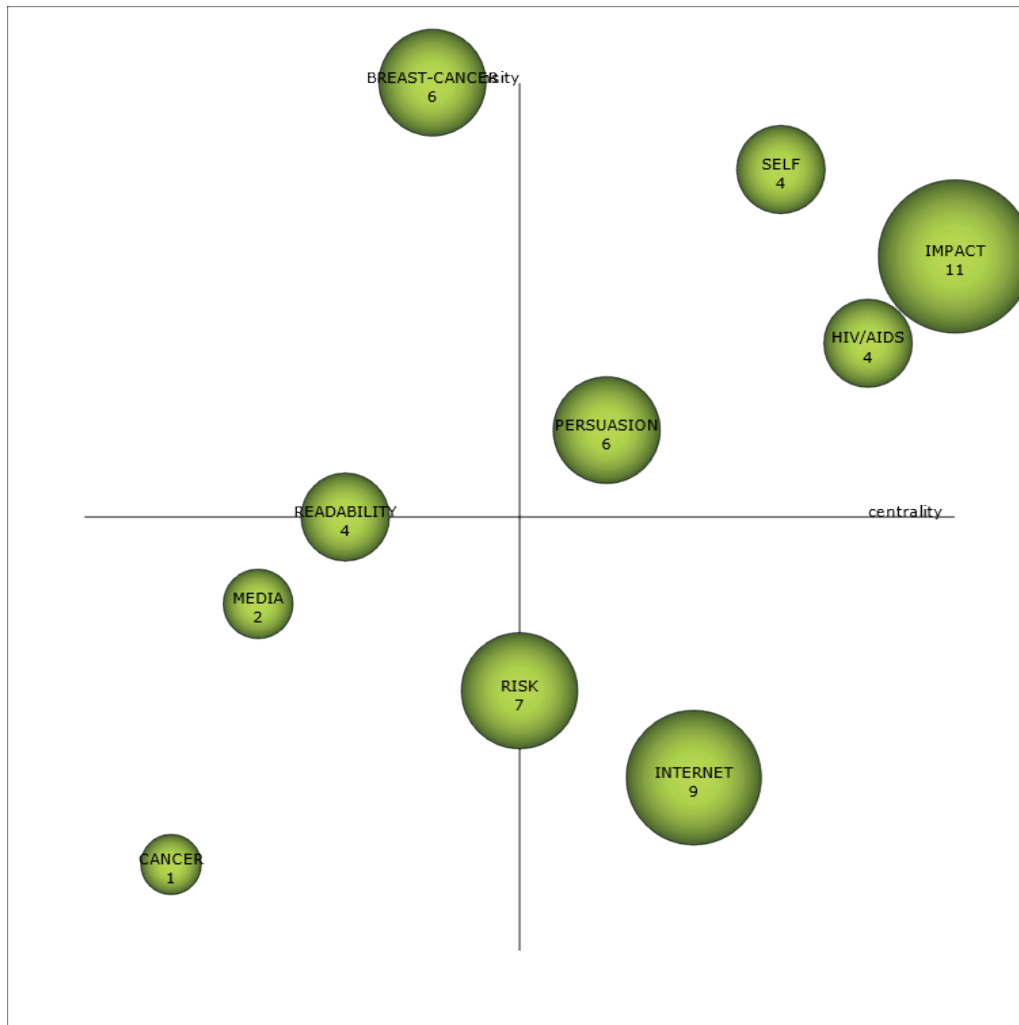


Figure 5. Strategic Diagram (2000-2009 Period)

Table 5. Findings Related to Themes (2000-2009 Period)

Name	No. of documents	No. of citations	h-Index	Centrality	Density
Impact	11	1,109	9	41.7	14.93
Internet	9	836	8	29.99	6.04
Risk	7	251	7	28.9	9.61
Persuasion	6	1,109	6	29.63	12.79
Breast Cancer	6	586	5	26.03	36.63
Self	4	270	4	32.24	15.79
HIV/AIDS	4	206	4	33.11	14.47
Readability	4	765	4	22.58	12.58
Media	2	194	2	18.79	11.67
Cancer	1	14	1	3.23	4.17

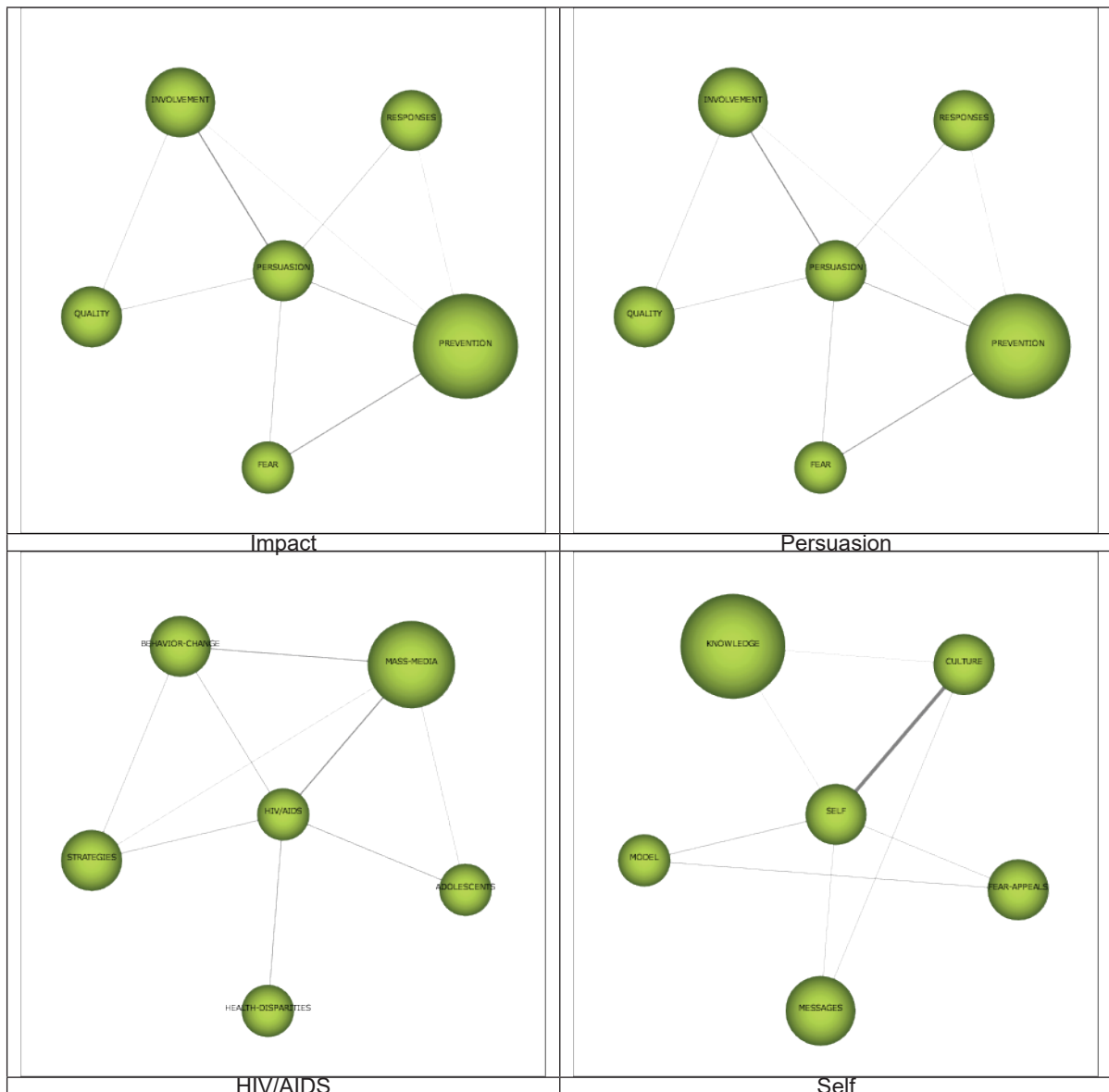


Figure 6. Thematic Network

“prevention”, “care”, “awareness”, “information seeking”), 3 of them are isolated and advanced themes (“physicalactivity”, “HIV”, “decisionmaking”), 3 of them are basic and transformational themes (“management”, “adult”, “risk”), 7 of them are emerging or disappearing themes (“disparities”, “risk perception”, “children”, “age”, “healthliteracy”, “campaigns”, “model”).

Findings related to the themes of the 2010-2020 period are given in Table 6. In this period, the theme that received the most publications (n=34) and the most cited (n=1330) was the theme “care”, with an h-index value of 12. While the total number of citations for the theme “prevention”, which ranks 2nd in terms of the number of publications (n=33), is 342, and the h-index

value is 12. It is noteworthy that the total number of citations for the “socialmedia” theme, which has 27 publications and 8 h-index value, is 1057, and the total number of citations for the “healthliteracy” theme, which is in the last place in terms of the number of publications (n=7) and has an h-index value of 4, is 225. When the thematic networks in Figure 8 are examined, it is seen that the “care” theme is related to the “satisfaction”, “patient”, “technology”, “internet” and “mixedmethods” themes, and that the “prevention” theme is “efficacy”, “AfricanAmerican”, “fearappeals”, “impact” and “interventions” themes; “behavior” theme is associated with “metaanalysis”, “predictors”, “sexualhealthcommunication”, “information” and “AIDS”

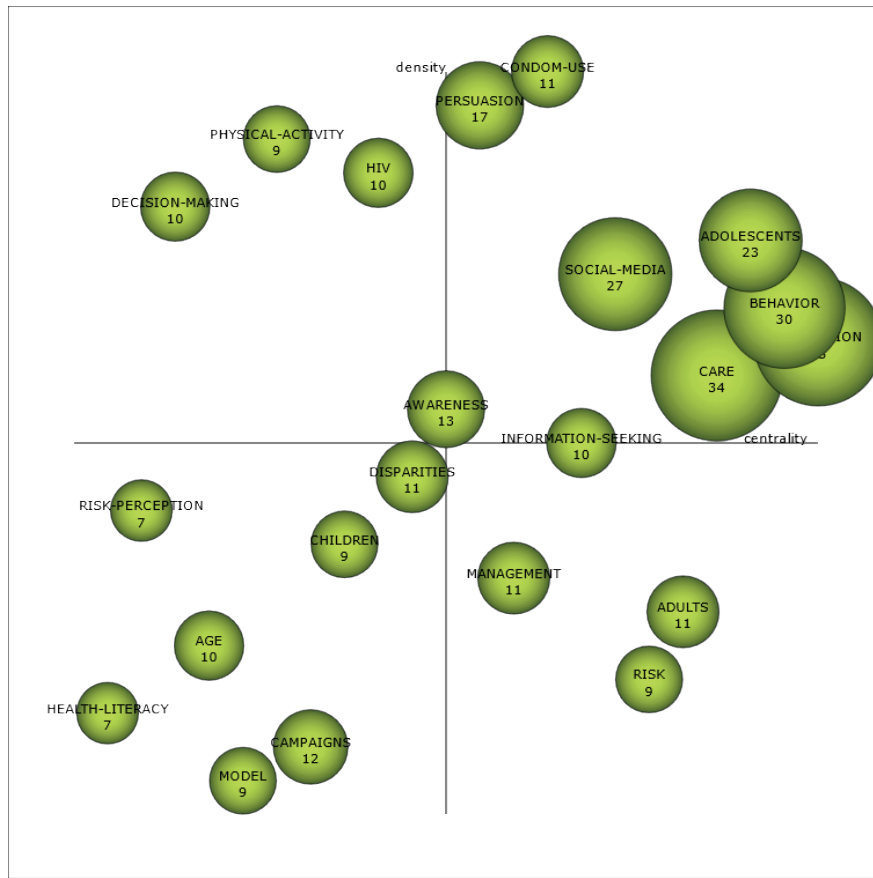


Figure 7. Strategic Diagram (2010-2020 Period)

Name	No. of documents	No. of citations	h-Index	Centrality	Density
Care	34	1,330	12	30.06	5.03
Prevention	33	342	12	36.4	5.05
Behavior	30	398	11	35.38	5.48
Social Media	27	1,057	8	25.39	5.87
Adolescents	23	146	8	34.52	6.01
Persuasion	17	201	5	23.29	9.61
Awareness	13	80	4	23.11	4.64
Campaigns	12	104	5	21.65	1.68
Adults	11	71	6	28.01	3.16
Condom Use	11	166	7	24.17	14.76
Management	11	102	5	23.31	3.38
Disparities	11	94	5	22.82	4.23
HIV	10	70	4	21.98	6.66
Age	10	136	6	17.9	3.14
Information Seeking	10	188	7	24.23	4.46
Decision Making	10	145	6	17.67	6.65
Model	9	122	4	18.09	1.43
Risk	9	64	4	26.87	2.11
Children	9	65	5	21.85	3.65
Physical Activity	9	77	4	21.07	7.18
Risk Perception	7	170	5	16.28	4.15
Health Literacy	7	225	4	14.13	1.84

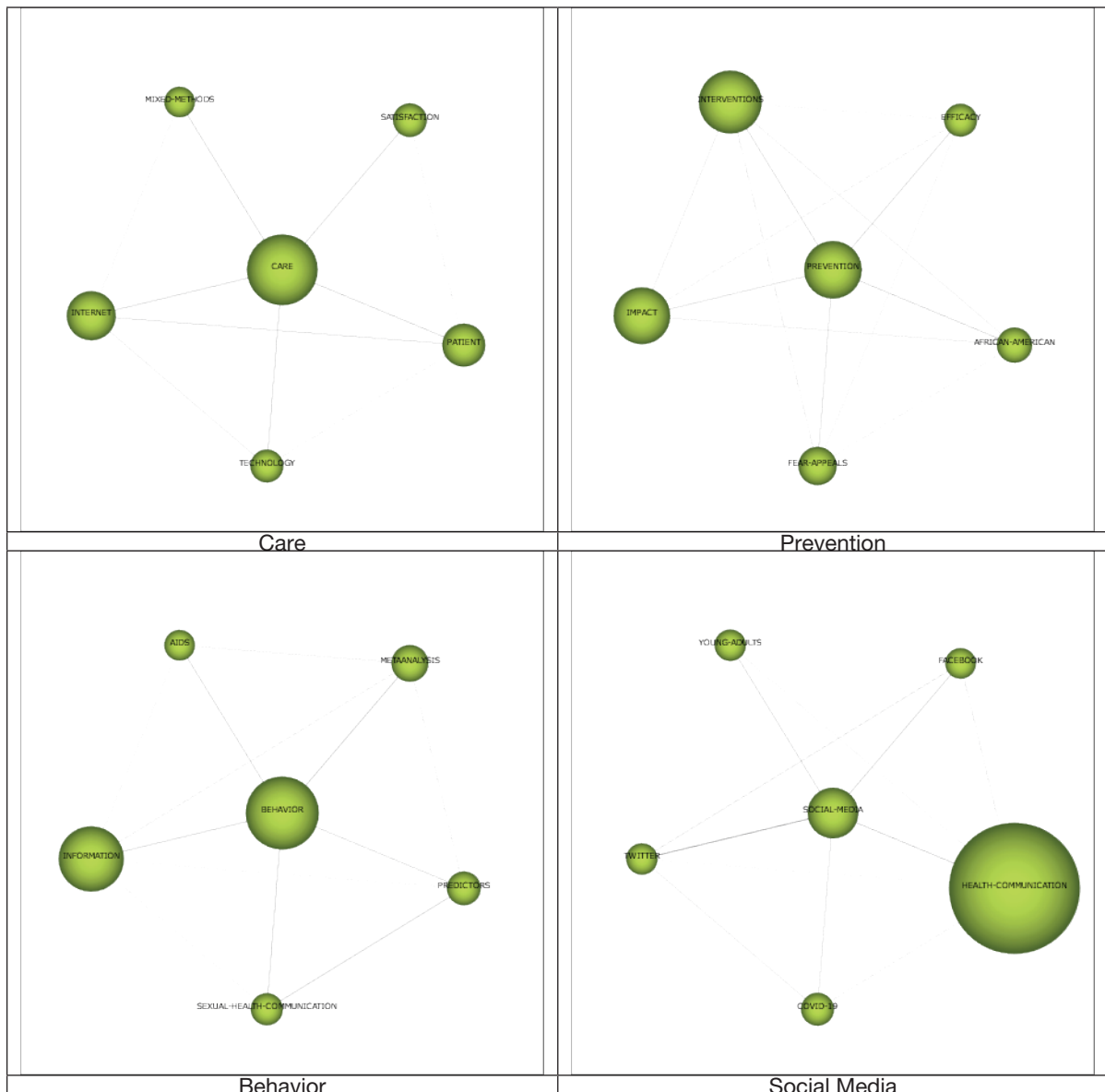


Figure 8: Thematic Network

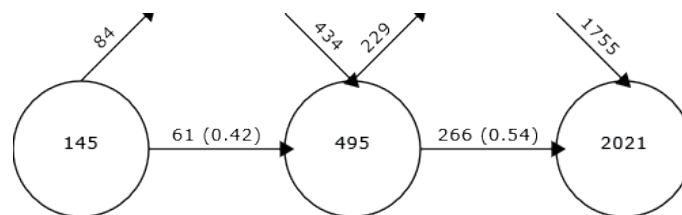


Figure 9. Overlap Map

themes; “socialmedia” theme is related to “facebook”, “healthcommunication”, “Covid-19”, “Twitter” and “youngadults” themes.

When the overlap map in Figure 9 is examined, the number of keywords used in the publications in the 1st period was 145, 61 (42%) words used in this period

continued to be used in the 2nd period, and the number of words used in the 2nd period reached 495 with the newly used words. Also, it has been observed that 266 (54%) of these words have been used recently and the number of words used recently is 2021 together with the newly used words.

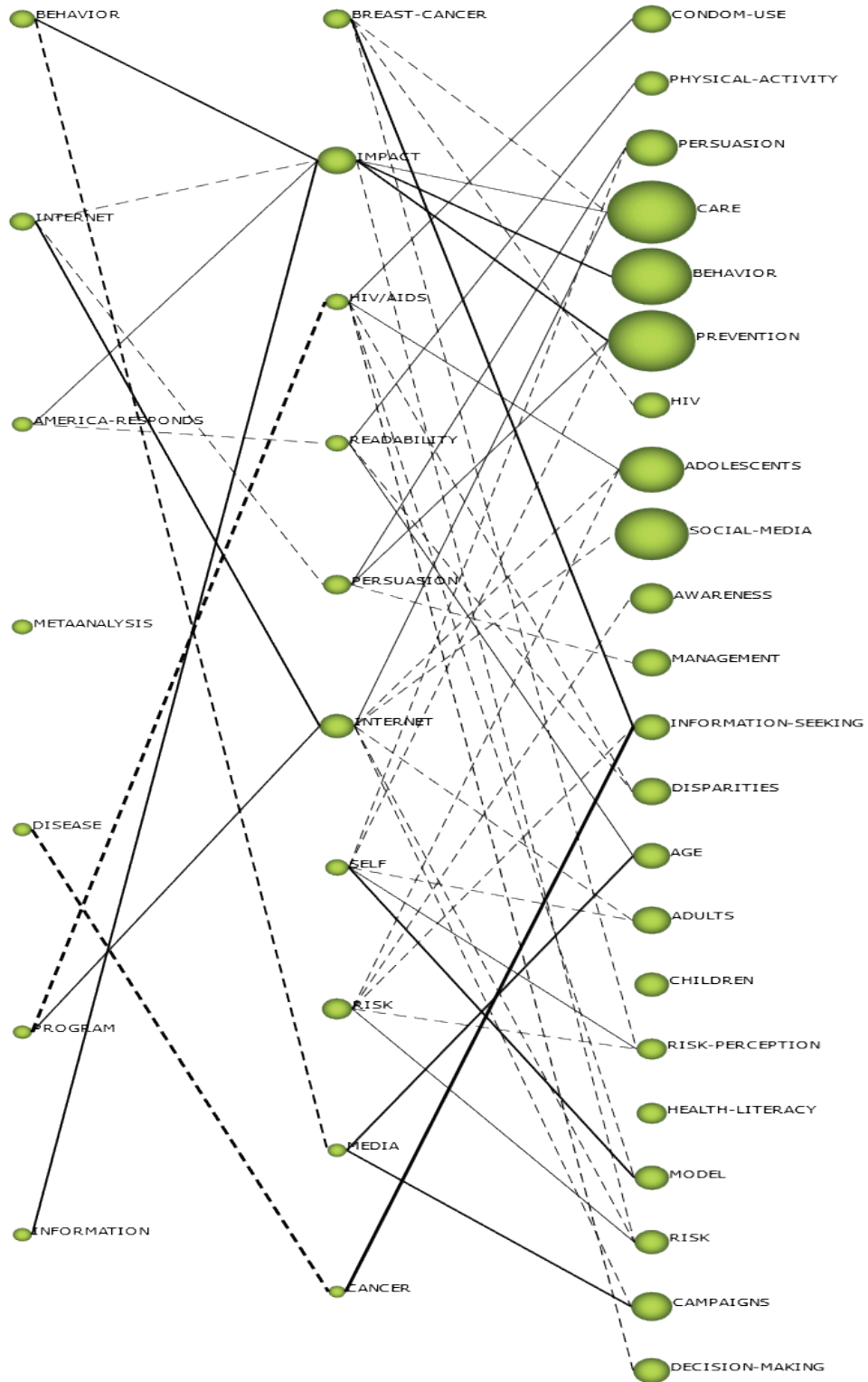


Figure 10. Thematic Development Map

The thematic development map, in which the relationships between the themes in the analysis periods are seen, is given in Figure 10. When the prominent findings in the thematic development map are evaluated;

“Breastcancer” and “cancer” themes are in a strong relationship with the “informationseeking” theme from the last period, and the “cancer” theme is also in a strong relationship with the “disease” theme from the first period,

The “impact” theme, which is related to the “behavior” themes in the first and last period and the “information” theme from the first period, also shows a strong relationship with the “prevention” theme from the last period,

While the “HIV/AIDS” theme was related to the “program” theme from the first period, it was related to the “condomuse” and “adolescents” themes in the last period,

Showing a strong relationship in the first two periods, the “internet” theme is in a relationship with the “program” theme from the first period and “care” from the last period,

The “self” theme is related to the “model” theme from the last period,

It was seen that the “media” theme, which was related to the “behavior” theme from the first period, was related to the “age” and “campaigns” themes from the last period.

DISCUSSION

The distribution of the articles analyzed in our research by years was examined. Accordingly, there is an isolated increase in the number of articles in 1994 and 1999. The number of articles, which was only one in previous years, has increased in these years. The other period, in which a significant increase was experienced, started after 2008, and an increased process was recorded in 2009, which was characterized by decreases for some years and continued until 2020. The year in which the most significant jump in the number of articles was noted is 2020. This year the number is nearly double the previous year. This significant increase is thought to be related to the Covid-19 pandemic. As the Covid-19 pandemic progresses, the need to provide reliable information around the world has become obvious, and it has been stated that the most effective measure to be taken against the panic caused by the pandemic is to disseminate verified information. The Covid-19 pandemic has shown the whole world that the most important and necessary factor in saving lives while experiencing extraordinary conditions is health communication. In the pandemic, the world

public has seen that improved health communication is the key for societies to cope with uncertainty and fear, to stick to the necessary behavior change, and to feed hope by overcoming fears. In this way, no doubt it is one of the most important developments recorded during the Covid-19 pandemic period is the understanding of the importance that should be given to health communication. For this reason, it is expected that the works on health communication will increase significantly in 2020 (22-24).

According to the distribution of articles by country, the highest number of articles were published by the USA, followed by Australia, Canada, England and South Africa. Turkey is behind with six articles. It is seen that countries that are ahead of other countries in the academic field such as the USA, England, Australia and Canada also come to the fore in studies on health communication. When all the medical publications produced around the world are taken into account, the USA, China, England and Germany are in the top ranks and Turkey is in the 16th place. Considering the number of citations, the USA, China, England and Germany maintain their leadership, while Turkey lags behind. It is an expected result that countries that stand out in almost every field of academic studies have also come to the fore in the field of health communication (25).

It has been stated above that the works given in the field of health communication mainly focus on the Covid-19 pandemic period. On the other hand, it is noteworthy that countries such as China and Italy, where the pandemic first broke out and where a significant part of the parameters related to the pandemic spread to the world, did not produce articles at the expected level. Considering all the medical publications produced around the world, it is noteworthy that the Republic of South Africa, which has no significant place, is ahead of many countries. The fact that the expected level of articles has not been published by China, where the pandemic first broke out, maybe due to the administrative barriers placed by the country’s administration to share what happened during the pandemic period with the international public. This situation was confirmed by the international public opinion, and it was stated that the information was not shared properly, at least the sharing was delayed (26,27).

When the distribution of analyzed articles by countries is examined, it is seen that the USA ranks first with 489 articles, and it publishes significantly more articles than other countries. The USA is followed by Australia with 41 articles and Canada with 32 articles. The USA has published more than 10 times more articles than the countries that have published the highest number of articles. The total number of articles published by

the following 25 countries cannot reach the number of articles published by the USA. This situation shows the size of the production capacity of the USA in the academic field. The reason for this situation can be understood by examining the Academic Ranking of World Universities (ARWU). ARWU is published annually by the JiaoTong University Education Institute based in Shanghai, China, and was last published in 2020. While creating the ranking, six different parameters such as the number of scientists cited by universities and the works scanned and produced in SSCI and SCI are used. According to the ranking results, 15 of the top 20 universities are US universities (28).

The total number of citations of the analyzed articles is 14893, and the average number of citations per article is 21.18. The top 3 most cited articles were Moorhead et al. (2013), Houts et al. (2006), Dillard and Shen (2005). It was seen that the article published by Moorhead et al. in 2013 received 803 citations. When the article is examined, it is seen that it is a systematic review article. The purpose of the article is expressed as to determine the benefits and limitations of the use of social media for health communication between health service demanders and health professionals.

To review peer-reviewed studies published between January 2002 and February 2012, a systematic literature review was conducted by examining nine electronic databases and using a manual search. It has been evaluated that the article is a comprehensive review article and that it deals with the use of social media for health communication, which is a popular topic, making the article an important resource for researchers who examine it, and therefore it is frequently referenced. To confirm this inference, the second most cited article is a systematic review article. In the article published by Houts et al., it was aimed to evaluate the effects of pictures on health communication, and peer-reviewed studies in health education, psychology, education, and marketing journals were reviewed. It is noteworthy that the article published by Broniatowski et al. in 2018 received 235 citations in a short time. When the subject of the article is examined, it is seen that it is aimed to examine the effects of some users on Twitter, one of the social media applications, on the online vaccine discourse with an observational study. In the study, the effect of Twitter users, called trolls, on reinforcing polarizing and anti-vaccine messages was measured. The subject of the study is the key to getting a large number of citations in a short time. In the recent Covid-19 pandemic, there have been intense debates on vaccines and it has been emphasized that anti-vaccination is triggered by social media discussions. It is thought that the article sharing the results of a recent

study on the subject is also frequently examined in this context.

In our research, it has been determined that the most prolific author is Prof.Dr.Gary L. Kreps. Dr. Kreps is a Health and Risk Communication specialist at George Mason University. Her research interests include health communication/promotion, health equity, multicultural relations, social organization, applied research methods, health informatics, communication campaigns, global health and social change. Prof.Dr.Gary L. Kreps is also a scientific advisor to many international health institutions, research firms, and foundations, such as the United States Food and Drug Administration's Risk Communication Advisory Committee, the National Institutes of Health, and the Center for Disease Prevention. Prof.Dr.Gary L. Kreps's work, which focuses on the culture of research methods and their subcultures in general, has been cited 2348 times (29).

According to the findings of our research, the second most productive author is Seth M. Noar. Noar is a professor at the University of North Carolina in the USA. His specialty is behavior change and the use of communication to improve the health of individuals and communities. HIV prevention, prevention of cancer, prevention of tobacco are the main topics that he focuses on. An article published in 2007 by Seth M. Noar has been cited 2115 times. This article explores whether and to what extent the large and growing literature on behavior change interventions is working. A meta-analytic review of the aforementioned literature is presented in the article (30).

According to the findings related to the themes of the 2000-2009 period in our research, the theme with the highest number of articles published is the "impact" theme. The number of articles for this theme is 9, the total number of citations is 1109, and the h-index value is 9. The number of articles, the total number of citations is 836, and the h-index value is 8 for the "internet" theme following the impact theme. The number of publications and the h-index value is 6, and the total number of citations for the theme "persuasion" is 1109. It is clear that the themes listed above are very appropriate themes for health communication. Today, health communication is mostly carried out over the internet. Most of the articles examining health communication focus on communication over the internet. In addition, in the analysis of the data obtained as a result of health communication studies, he focuses on the effects of communication and persuading the masses. For this reason, besides the internet theme, the themes of influence and persuasion are the most frequently used themes. Similarly, the "behavior" and "interventions" themes, which are related to the subject,

stand out among other themes in terms of frequent use. It is considered that one of the reasons why the theme of persuasion is frequently encountered is the articles produced from the studies on the Persuasive Possibility Model, which is used as a useful framework for interpreting and predicting the impact of health communication on attitudes and behaviors. The Persuasive Possibility Model tries to explain how people process stimuli differently and their consequences and examines the processes for changing attitudes and therefore behaviors. This model has been frequently referred to in the research on health communication. One of the remarkable themes is “readability”. Readability refers to the ease of understanding written text. Readability depends on the presentation of the text as well as its content. This concept is one of the most frequently studied concepts in health communication research. In particular, the readability of the prepared texts and educational materials is a frequently examined issue. It was thought that the reason why the Readability theme received so many citations could be explained in this way (31-35).

As a result of the analyzes made, 22 themes emerged in the strategic diagram for the 2010-2020 period. In this period, the theme that published the most articles (n=34) and received the most citations (n=1330) was the theme “care”. The h-index value of this theme is 12. In terms of the number of publications (n=33), the theme of “prevention” takes second place. It is necessary to translate the “care” theme, which has the most articles published in this period, as health services. In the examined period of 2010-2020, health communication; its impact on the delivery of health services, health promotion, and similar issues are the subject that has been extensively studied. When the literature is examined, in this period; it is seen that the studies on health communication are a very important process in the effective delivery of health services and the development of public health. In addition, topics such as the best health care delivery, the adoption of health-promoting behaviors, and the effective use of health communication to implement evidence-based public health policies have also been frequently examined. In some articles, it is emphasized that it is important to follow health communication programs regularly, meticulously and continuously to evaluate the effectiveness of health communication. It is stated that the data obtained should guide program improvements and strategic planning. Numerous articles written on the above-mentioned topics have highlighted the “care” theme among other themes (36,37).

It is noteworthy that the total number of citations for the “socialmedia” theme, which has 27 articles and 8 h-index value, is 1057, and the total number of citations for the “healthliteracy” theme, which is in the last place in terms of article number (n=7) and has a h-index value of 4, is 225. In the studies, the rapid changes in the communication environment brought about by the use of the internet and social media were examined, the effects of these technologies and health communication were investigated, and the characteristics of social media users were determined. The lack of information about the uses, benefits and limitations of social media for health communication among health care users and health professionals has been the subject of many studies in this period. Numerous articles have been published on identifying gaps in the literature to identify the benefits and limitations of the use of social media for health communication among health care users and health professionals, to provide recommendations for studies and future health communication research. This is the reason why the “socialmedia” theme stands out among others (36-38).

Health communication consists of interpersonal or mass communication activities focused on improving the health of individuals and communities. The ability to understand and apply information about health problems is critical to health communication and has a significant impact on health behaviors. In this respect, the role of health literacy in health communication and also the research areas to be done in this field are frequently discussed topics. Health communication, health education, and health literacy are based on a shared understanding of human communication and share the goals of promoting human health, improving health outcomes and reducing health inequalities. It is important that these disciplines work together to collaborate and foster new research and understanding. In this respect, there are many articles published to provide a conceptual basis for advancing multidisciplinary understanding and collaboration in health communication, health education and health literacy. As a result of the interest shown in this field, the number of articles on the theme of health literacy has reached a high number of citations, even if the number of articles is relatively low (39,40).

When the thematic networks are examined, it is seen that the theme of “socialmedia” is related to the themes of “facebook”, “health communication”, “Covid-19”, “Twitter” and “young adults”. When the aforementioned themes were examined, it was determined that the publication dates were 2019 and later, and that the relationship between the themes stemmed from the researches on Covid-19. When the literature is

examined, it is seen that there are articles that include comprehensive analyzes of the data of platforms such as Twitter, Instagram, YouTube and Facebook in terms of the dissemination of information about Covid-19. In the articles, evaluations were made about the evolution of the data in question on a global scale and its spread patterns, and it was determined that there were different volumes of misinformation spread from dubious sources on each platform (41,42).

CONCLUSION

Health communication is one of the most important issues in recent years. This is also evident from the increase in the number of articles on the subject in recent years. Planning an effective health communication or social marketing campaign requires careful thought and knowledge of the problem to be addressed. Such planning should include identifying the behaviors, conditions or policies to be changed. With the research to be done, the needs, wishes and values of the target audience can be determined and prioritized.

The current Covid-19 pandemic on health communication has functioned as a social laboratory. In this context, the importance of the following titles has emerged in the field of health communication in particular with Covid-19.

- There is no argument that health communication is an important and necessary factor in saving lives during the Covid-19 pandemic crisis.
- Accurate and well-developed health communication can facilitate how societies cope with uncertainty and fear, encourage and implement necessary behavioral change, and enable individuals to meet their fears and nurture hope in the face of a crisis.
- An unprecedented flow of information has emerged in the Covid-19 crisis through government responses, 24/7 news, press conferences by political leaders and health authorities, prime-time public talks, news analysis, discussions, and social media posts.
- Young people prefer to receive information through social media such as Instagram or YouTube, while older adults generally prefer national evening news and newspapers.
- Political leaders and health professionals have a specific responsibility to provide accurate information and take action that requires a behavioral change to combat the epidemic.
- In the chaotic flow of information in times of crisis, everyone should contribute to improving the flow of information and discussion.

• What is known and what is not known should be stated openly and honestly, and the facts should be adhered to. It should be noted that the data we have today will be updated as new evidence comes in regarding the disease and its management.

• Information to be shared should be consistent and specific. It must be admitted that there is much that we do not know.

• Studies on crises have revealed that official recommendations are viewed with skepticism by many people. This should be taken into account in communication.

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