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A Bibliometric Analysis of the Journal of Telemedicine and Telecare: 2007-2022

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ABSTRACT

Journal of Telemedicine and Telecare (JTT) is one of the leading journals in the world of telemedicine and has a strong influence on research in this field. This study aims to understand the change of the journal over the years and to present a summary about the emerging issues in the field of telemedicine. The analysis used a bibliometric method. JTT has published 1489 articles, 68 reviews, 30 letters, 17 editorials, 6 Erratum and 5 notes until August 2022. All these studies yielded a rate of approximately 19 citations per study, and the journal received a total of 29,423 citations, excluding self citations of all authors. Although the most significant year in terms of publications is 2021 (176), it is 2007 (2948) in terms of the number of cited publications. Moreover, the research by Smith et al.(2020) has been the most cited article (727) in JTT. America (the US) is the leading country in the categories of total publications (495) and the total citations (9625). Australia and the United Kingdom (the UK) are ranked second and third, respectively. European countries are mostly in the top 10. Additionally, JTT has received a significant attention from authors in Europe, America and Australian. Telemedicine is an evolving field and has provided an opportunity to follow the issues of journals in this field and to examine developments in telemedicine. This study presents a telemedicine framework by examining the process of JTT.

Keywords **:** Bibliometric Analysis, Journal of Telemedicine and Telecare, VOSviewer, Gephi, Telehealth

Teletıp ve Telebakım Dergisi'nin Bibliyometrik Analizi: 2007-2022

ÖZ

Teletıp ve Telebakım Dergisi (JTT), teletıp dünyasının önde gelen dergilerindenbiridir ve bu alandaki araştırmalar üzerinde güçlü bir etkiye sahiptir. Bu çalışma, derginin yıllar içindeki değişimini anlamayı ve teletıp alanında ortaya çıkan konular hakkında bir özet sunmayı amaçlamaktadır. Analizde bibliyometrik yöntem kullanılmıştır. JTT, Ağustos 2022'ye kadar 1489 makale, 68 inceleme, 30 mektup, 17 editör yazısı, 6 düzeltme yazısı ve 5 not yayınlamıştır. Yayınlar açısından en önemli yıl 2021 (176) olmasına rağmen atıf yapılan yayın sayısı açısından 2007 (2948) yılı olmuştur. Ayrıca Smith ve arkadaşlarının (2020) araştırması JTT'de en çok alıntı yapılan makaledir (727). Amerika (ABD), toplam yayın (495) ve toplam atıf (9625) kategorilerinde başı çeken ülkedir. Avustralya ve Birleşik Krallık sırasıyla ikinci ve üçüncü sırada yer almaktadır. İlk 10'da çoğunlukla

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Avrupa ülkeleri yer almaktadır. Ayrıca JTT, Avrupa, Amerika ve Avustralya'daki yazarlardan da büyük ilgi görmüştür. Teletıp gelişen bir alandır ve çalışma, bu alandaki dergilerin sayılarını takip etme ve teletıptaki gelişmeleri inceleme fırsatı sağlamıştır. Bununla birlikte bu çalışma, JTT sürecini inceleyerek bir teletıp çerçevesi sunmaktadır.

Anahtar Kelimeler **:** *Bibliyometrik Analiz, Teletıp ve Telebakım Dergisi, VOSviewer, Gephi, Telesağlık*

INTRODUCTION

Since the 1950s, the advent of various tremendous technological advances in healthcare services (Kissi et al., 2020, p.1867), the ever-increasing difficulties to provide quality (Luciano et al., 2020, p. 2345), and in person healthcare service coupled with the COVID-19 pandemic in particular have led to the rapid development of the telemedicine field (Miner et al., 2021, p.508). Compared to traditional service delivery methods, telemedicine is convenient and offers advantages for patients and clinicians (Snoswell et al., 2021, p. 1). As the field of telemedicine is still in a period of rapid growth, it can be difficult to keep up with the latest developments and trends. However, bibliometrics provides a useful quantitative tool for assessing the large amount of literature in the field (Yang et al., 2015, p. 474).

Bibliometric analysis is effectively used to evaluate citations in the article database and to identify the most influential journals and publication features in the field of telemedicine (Sikandar et al., 2021, p. 54). Recently, the development of bibliometric analysis, which has become an increasingly popular technique among researchers, has been facilitated by computer science and the internet (Gaviria-Marin et al., 2019, p. 195), and its popularity has contributed to the accessibility, usability and advancement of scientific databases such as Web of Science (WoS) and Scopus, bibliometric software such as Gephi, Leximancer, VOSviewer (Donthu et al., 2021, p. 285). Bibliometrics is a measurable informatics method that analyses the knowledge structure and emerging trends in a given field to obtain measurable, reproducible and objective data (Guo et al., 2020, p. 2).

Bibliometric analysis is one of the main tools used to evaluate collaboration between institutions, researcher productivity, contribution of scientific funds to academic quality and R&D production (Moral-Muñoz et al., 2020, p. 2). The discovery and differentiation of well-known authors and the development of new ways of working are facilitated by bibliometric analysis (Sreenivasan & Suresh, 2022, p. 5).

A bibliometric analysis of specific topics or subfields in the field of telemedicine was conducted by the researchers. These topics included such as teledermatology (Şenel & Demir, 2015), Telemedicine and E-health (Sikandar et al., 2021), technoinnovation (Drago et al., 2023), remote healthcare delivery (Leena & Gochhait, 2020), orthopaedics and trauma (Kumar et al.,

2022), COVID-19 (Samadbeik et al., 2022), diabetes mellitus (Nuari, 2022), cardiology (Yeung et al., 2022), and mobile health applications (Peng et al., 2020).

In this mean, Journal of Telemedicine and Telecare (JTT) is the most important journal that searched all issues like telemedicine, e-health, telecare, etc. JTT first appeared in 1995, by Royal Society of Medicine Press. Before reviewing JTT, it would be appropriate to review a few of the other telemedicine journals.

International Journal of Telemedicine and Applications (IJTA) has been published since 2008. When IJTA is examined, in this study, the studies between 2008-2022 were examined. Accordingly, 219 publications were found in Scopus. With 2022, 211 documents, 188 of which were articles, were reviewed, and the journal received a total of 3605 citations, excluding self citations of all authors between the examined dates. IJTA has published 188 articles, 23 reviews, 4 editorials, 3 Erratum and 1 conference paper in 2022. The document h-index is 31. In other words, at least 31 of 211 papers were cited. The general h-index of IJTA is 30 and Citations per document in 2021 are 2.692 according to Scimago. IJTA received 11 citations in 2008 and a total of 511 citations in 2022. The impact factor of IJTA is 2.111. The general h-index of IJTA is 81 according to Scimago.

When the other journal is examined, Telemedicine journal and e-health (TJEH) has been published since 1995. For this journal, sufficient data could not be found in Scopus. There were studies in WOS between 2007-2010. A total of 1030 studies were found for 4 years. A total of 902 studies were found for new item, article and review. According to Scimago, 2319 publications were found between 2007-2021. The total number of citations of TJEH is 13267. The total number of citations is 11935, excluding self-citations. Citations per document in 2021 are 5.231. TJEH received 108 citations in 1999 and a total of 2722 citations in 2021. The impact factor of TJAE is 5.033. The general h-index of IJTA is 81 according to Scimago.

This study provides readers with information about (1) the citation and publication structure of the journal, (2) the 25 most cited articles published in the journal, (3) the most productive and influential authors, (4) the most productive and influential countries, and (5) the most effective occurrences. Understanding the factors influencing the journal provides readers with perspective on emerging issues, as well as forms a framework within the field of telemedicine. In this respect, the study may be a subject of interest to researchers.

1. METHOD

Today, JTT is one of the leading journals in the world of telemedicine and has a strong influence on research in this field. It is an international peer-reviewed journal published by Sage publications, which examines the ways in which different countries use technology in health systems and follows developments in telemedicine and e-health. The current exclusive

editors of the journal are Anthony Smith (University of Queensland) and Gary Doolittle (University of Kansas Medical Center).

In this study, bibliometric analysis was used. To create a sample, the data such as JTT articles and their authors were saved in comma separated values (csv) file format via the Scopus database and were then sorted. Additionally, the publications between 2007 and August 2022 were taken as a basis. The study was analyzed using performance analysis techniques such as publication-related metrics such as total publications, citation-related metrics such as total citations, publication and citation-related metrics such as the number of cited publications, average citations per publication, h-index (Donthu et al., 2021). For science mapping, one of the main techniques of bibliometric analysis (Gutiérrez-Salcedo et al., 2018), steps such as citation and co-word analysis, bibliographic coupling, co-aurthorship analysis were applied. Finally, various techniques of network analysis such as degree of centrality, betweenness centrality (Bazm et al., 2016), and visualization (Liao et al., 2018) were implemented. Vosviewer 1.6.18 version was utilised for the network analysis of the data, and Gephi 0.9.7 version was used to visualise the obtained analysis.

2. RESULTS

This section presents the bibliometric results of JTT articles found in Scopus between 2007 and 2022. JTT's citation structure, most popular publications, authors, countries and institutions were analyzed. Additionally, the most prominent study topics of the journal during the last 15–16 years were also included. JTT published 41 documents in 1995, the year of its first publication and received 23 citations. With August 2022, 1615 documents, 1489 of which were articles, were reviewed, and the journal received a total of 29,423 citations, excluding self citations of all authors the between the examined dates. JTT has published 1489 articles, 68 reviews, 30 letters, 17 editorials, 6 Erratum and 5 notes until August 2022. All these studies yielded a rate of approximately 19 citations per study (citation/study). The h-index is 65. In other words, at least 65 of 1615 papers were cited. The general h-index of JTT is 80 according to Scimago. Table 1 shows the annual publication and citation structure of the journal and figure 1 shows the publication trend by citations per cited publication and total publications. The impact factor of JTT is 6.344. According to the CiteScore provided by Scopus, it ranks 3rd out of 109 journals in health informatics. According to Scimago Journal Rank, its h-index is 80, and according to Google Scholar, its h-index is 49. It is also indexed by many databases such as Science Citation Index Expanded, EBSCO, Elsevier, MEDLINE, Scopus, WoS.

According to Table 1, although the most significant year in terms of publications is 2021 (176), it is 2007 (2948) in terms of the number of cited publications. During 2007, JTT was cited 2948 times and each article was cited an average of 18.65 times. Furthermore, the most popular year in terms of average citations per cited publication is 2011 (31.63), which was followed by 2018 (28.37). The most popular publication published in 2011 is the article entitled

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"Smartphone applications for pain management" by Benjamin A. Rosser and Christopher Eccleston. When the h-index effect of the journal is examined, it is seen that 2008 (29), 2011 (29) and 2012 (29) are the most popular years. Moreover, it is possible to say that 8 articles received at least 250 citations, 26 were cited at least 100 times, 70 were cited at least 50 times, and 240 were cited at least 25 times. Between 2007 and 2022, 1100 publications were cited at least once. Figure 1 shows the trend of publications and average citations per cited publication in JTT over 16 years. Although there was a partial decrease in the total number of publications between 2012 and 2016, high trend was noticed in the average citations per cited publication that were cited up to 2021. Despite the highest number of publications in 2021 and 2022, the low average citations per cited publication are thought to be **because** the articles were newly published. Generally, it can be said that the citation and publication trend of JTT has a positive and high performance in its field.

According to Cozzens (1989), citation counts are an important part of the evaluation of basic research activities. Table 2 shows the most cited articles in the JTT between 2007 and 2022. In a study by Askari et al. (2014), they examined the 60 highest-cited articles published in the Journal of Telemedicine and Telecare and Telemedicine Journal and E-health (TJEH) in 2012 (Askari et al., 2014). According to this study, the annual number of citations did not show a clear trend. In most of the years, the average cites per year in the JTT was slightly higher than in the TJEH.

Table 1: Citation structure of JTT publications between 2007 and 2022.

							Publications with citations≥				
Years	**Total Publications**	**number of cited publications**	**total citations**	**average citations per publication**	**average citations per cited publication**	**h-index**	**250**	**100**	**50**	**25**	**1**
2007	158	136	2948	18.65	21.67	28	2	4	6	20	101
2008	111	110	2754	24.81	25.03	29	2	2	10	21	74
2009	89	85	1996	22.42	23.48	27	0	2	6	23	54
2010	98	93	2255	23.01	24.24	25	0	3	6	16	68
2011	89	87	2752	30.92	31.63	29	1	5	9	16	55
2012	108	107	2871	26.58	26.83	29	1	3	6	25	73
2013	90	87	1602	17.8	18.41	24	0	0	2	22	63
2014	76	74	1372	18.05	18.54	24	0	0	3	19	50
2015	68	65	1783	26.22	27.43	21	0	6	3	7	50
2016	78	78	1502	19.25	19.25	24	0	0	6	17	57

2017	104	98	1899	18.25	19.37	24	0	0	3	20	74
2018	80	78	2213	27.66	28.37	25	1	1	5	18	53
2019	69	69	1035	15	15	18	0	0	4	9	58
2020	116	105	1620	13.96	15.42	15	1	0	0	7	99
2021	176	125	540	3.06	4.32	11	0	0	0	0	125
2022	101	47	281	2.78	5.97	9	0	0	1	0	46
Total	1611	1444	29.423	308.42	287.05	362	8	26	70	240	1100

Studies published by JTT have received significant attention. For example, in the study by Smith et al. (2020), such steps as strategies to be taken for regular use of telehealth in emergencies such as the COVID-19 pandemic, financial regulations, training of health staff and strong accreditation of institutions were mentioned. Similarly, the study by Scott Kruse et al. (2016) evaluated the obstacles to its widespread use of telemedicine around the world and concluded that the biggest obstacle to its widespread use is caused by its technological capacity. Other top studies in JTT include Richard Wootton's (2012) research on the value of telemedicine in the management of 5 common chronic diseases (heart failure, asthma, diabetes, chronic obstructive pulmonary disease, hypertension). The study suggests that there are no major differences in the value of telemedicine intervention between the disease types. What is more, Smith et al.'s (2020) study is at the top of the list in terms of both the field-weighted citation impact (FWCI) (73.55) and the average cites per year (242.33).

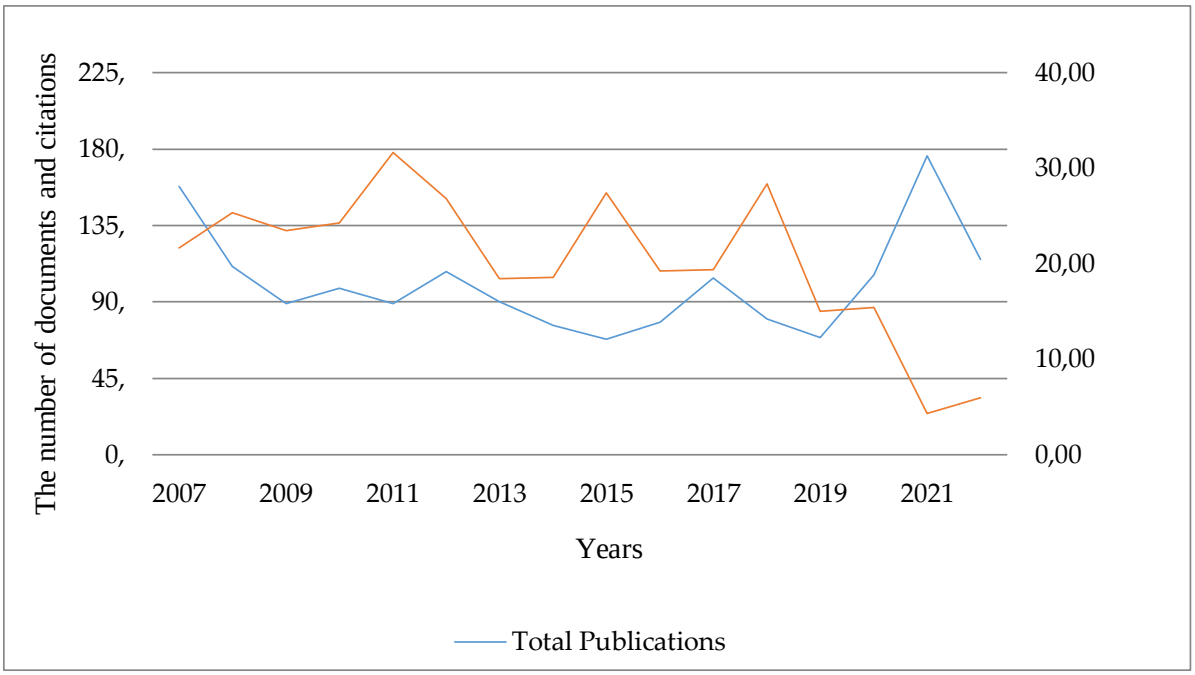

Figure 1: Citation and publication trends in the JTT between 2007 and 2022.

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The articles listed in Table 2 focus on trend topics such as telemedicine, telehealth, mobile health, e-consults, mobile phone apps for health **behaviour** change, tele-monitoring, remote appointment reminder system, telerehabilitation, tele-psychiatry. This has made the publications in JTT come to the fore when relevant topics are researched.

Table 3 provides information about the total publications, total citations, average citations per publication and h-indexes of the most popular authors in JTT. The author who has the most publications in terms of contributing to the journal between 2007 and 2022 is Anthony C. Smith with 69 studies, who is affiliated with the University of Queensland, and Richard Wootton, affiliated with Collegium Telemedicus, comes in second place with 43 studies. Figure 2 shows the linkages and co-authorship between the authors.

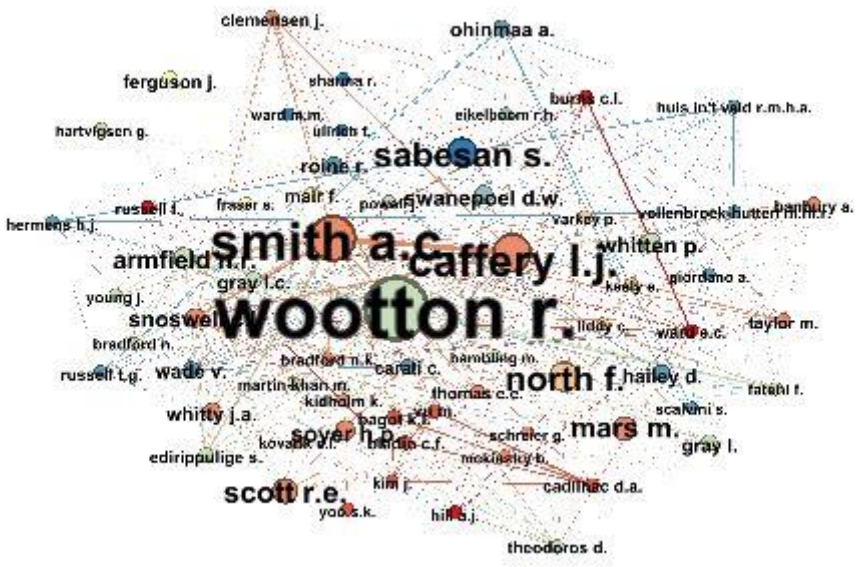

Figure 2. Co-authorship of JTT authors between 2007 and 2022

According to the total number of citations, Anthony C. Smith from the University of Queensland is the first with 1864 citations, followed by Liam J. Caffery, working for the same university, with 1333 citations. In addition to the citations, the authors who contributed most to JTT between 2007 and 2022 are categorized in Table 3. Christopher F Bladin from the University of Melbourne, whose 56 articles have been cited at least 56 times, ranks first in the h-index category. Hermie J. Hermens from the University of Twente reaches second with an h-index of 53. In addition the table also reveals that Jane Clemensen from the University of Southern Denmark tops the list with 146.33 citations in the average citations per publication category, followed by Centaine L Snoswell from The University of Queensland with 67.30 citations.

Furthermore, the affiliated institutions of the most popular JTT authors between 2007 and 2022 were also examined. The University of Queensland contributes to JTT with 177 publications by 14 different authors and is at the top of the list. The University Hospital of North Norway, on the other hand, ranks second with 21 publications by 2 different authors. Moreover, while the total number of citations of the authors in the University of Queensland was 4011 between the years mentioned, 807 citations were made with 12 publications from 2 different authors from the University of Southern Denmark and rise to the **second** place in terms of the number of citations. The study of Anthony C. Smith et al. (2020) has been cited 727 times in Scopus. Additionally, JTT has received a significant attention from authors in Europe, America and Australia. The presence of multinational authors is a factor that makes this journal one of the leading journals in its field.

Table 2: The most cited articles were published in the JTT between 2007 and 2022

	Total citations	Title	Authors	Year	Average citation per year	Field-weighted citation impact
1	727	'Telehealth for global emergencies: Implications for coronavirus disease 2019 (covid-19)'	Smith, A.C., Thomas, E., Snoswell, C.L, Haydon, H., Mehrotra, A., et all	2020	242.33	73,55
2	516	'Evaluating barriers to adopting telemedicine worldwide: A systematic review'	Scott Kruse, C., Karem, P., Shifflett, K., Vegi, L., Ravi, K., Brooks, M.	2016	103.2	12.25
3	333	'Twenty years of telemedicine in chronic disease management- an evidence synthesis'	Wootton, R.	2012b	30.27	6,01
4	298	'Determinants of successful telemedicine implementations: A literature study'	Broens, T.H.F., Huis in't Veld , R.M.H.A., Vollenbroek-Hutten,MR. et all	2007	18.62	5,51
5	255	'A systematic review of the benefits of home telecare for frail elderly people and those with long-term conditions'	Barlow, J., Singh , D., Bayer , S.	2007	15.93	4,12
6	254	'Smartphone applications for pain management'	Rosser, B.A., Eccleston, C.	2011	21.16	4,26

7	234	'Home telehealth for chronic obstructive pulmonary disease: a systematic review and meta-analysis'	Polisena, J., Tran, K., Cimon, K., Hutton, B., McGill, S., Palmer, K., Scott, R.E.	2010a	18	8,02
8	227	'Electronic consultations (e-consults) to improve access to specialty care: A systematic review and narrative synthesis'	Vimalananda, V.G., Gupte, G., Seraj, S.M., Orlander, J., Berlowitz, D., Fincke, B.G., Simon, S.R.	2015	28.37	6,67
9	210	'A systematic review of telehealth tools and interventions to support family caregivers'	Chi, N., Demiris, G.	2015	26.25	6,2
10	186	'A review of the use of mobile phone text messaging in clinical and healthy behaviour interventions'	Wei, J., Hollin, I., Kachnowski, S.	2011	15.5	4.26
11	168	'Evaluating mobile phone applications for health behaviour change: A systematic review'	Mckay, F.H., Cheng,C., Wright, A., Shill, J., Stephens, H., Uccellini, M.	2018	33.6	4,58
12	165	'Home telemonitoring for congestive heart failure: a systematic review and meta-analysis'	Polisena, J., Tran, K., Cimon, K., Hutton, B., McGill, S., Palmer, K., Scott, R.E.	2010b	12.69	6.24
13	162	'Use of telephone and SMS reminders to improve attendance at hospital appointments: a systematic review'	Hasvold, P.E., Wootton, R.	2011	13.5	2.7
14	162	'Telerehabilitation in stroke care – a systematic review'	Johansson, T., Wild, C.	2011b	13.5	2.16
15	163	'A randomized trial of telepsychiatry for post-traumatic stress disorder'	Frueh,B.C., Monnier , J., Yim , E.	2007	10.18	2.61
16	153	'SMS for disease control in developing countries: a systematic review of mobile health applications'	Déglise, C., Suggs, L.S., Odermatt, P.	2012	13.90	2.85
17	147	'Home-based telehealth: a review and meta-analysis'	Dellifraine, J.L., Dansky, K.H.	2008	9.8	2.11

18	140	'Systematic review of studies of the cost-effectiveness of telemedicine and telecare. Changes in the economic evidence over twenty years'	Mistry, H.,	2012	12.72	3.76
19	127	'Current status and future perspectives in telecare for elderly people suffering from chronic diseases'	Botsis, T., Hartvigsen, G.	2008	8.46	3.58
20	125	'Evaluation of a mobile phone telemonitoring system for glycaemic control in patients with diabetes'	Istepanian, R.S.H., Zitouni, K., Harry, D., Moutosammy, N., Sungoor, A., Tang, B., Earle, K.A.	2009	8.92	2.66
21	126	'Mobile communication using a mobile phone with a glucometer for glucose control in Type 2 patients with diabetes: as effective as an Internet-based glucose monitoring system'	Cho, J.H., Lee, H.C., Lim, D.C., Kwon, H.S., Yoon, K.H.	2009	9	3.73
22	125	'Mobile phone short message service messaging for behaviour modification in a community-based weight control programme in Korea'	Joo , N.S., Kim, B.T.	2007	7.81	2.17
23	126	'Tailored mobile phone text messages as an adjunct to obesity treatment for adolescents'	Woolford, S.J., Clark, S.J., Strecher,V.J., Resnicow, K.	2010	9.69	3.9
24	116	'A randomized controlled trial of home telerehabilitation for post-knee arthroplasty'	Tousignant, M., Moffet,H., Boissy, P.,Corriveau, H., Cabana, F., Marquis, F.	2011	9.66	2.07
25	118	'Physical rehabilitation using telemedicine'	Russell, T.G.,	2007	7.37	1.01

Table 4 lists the countries where the best JTT authors worked between 2007 and 2022. America (the US) is the leading country in the categories of total publications (495) and the total citations (9625). Australia and the United Kingdom (the UK) are ranked second and third, respectively. European countries are mostly in the top 10. The most popular country per capita is Canada (29.28). It was followed by the UK (26.88) and the US (14.91). When citations per

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capita are examined, it can be seen that Botswana (84.68), Netherlands (66.9) and Finland (65.51) have interesting results. However, the number of publication is more prominent than per capita citations in the journal, and most of the publications in the journal have been by researchers in the United States. Moreover, the country with the highest h-index is again the USA (41). In Figure 3, the bibliometric coupling of the countries prepared with the Gephi technique is given.

Table 3: The top ranked authors in the JTT

R	Name	Affiliation	Country	Total Publications	Total Citations	Average citations per publication	h-index
1	Smith A.C.	The University of Queensland	Australia	69	1864	27.01	35
2	Wootton R.	University Hospital of North Norway	Norway	43	1165	27.09	46
3	Caffery L.J.	The University of Queensland	Australia	34	1333	39.20	22
4	Armfield N.R.	Princess Alexandra Hospital	Australia	27	563	20.85	23
5	Edirippulige S.	The University of Queensland	Australia	25	471	18.84	18
6	Gray L.C.	The University of Queensland	Australia	21	344	16.38	34
7	Snoswell C.L.	The University of Queensland	Australia	13	875	67.30	12
8	Russell T.	The University of Queensland,	Australia	12	241	20.08	38
9	Fatehi F.	The University of Queensland	Australia	12	231	19.25	15
10	Wade V.	The University of Adelaide	Australia	12	204	17	17
11	Scott R.E.	University of Calgary	South Africa	11	482	43.81	11
12	Ward E.C.	The University of Queensland,	Australia	11	209	19	32
13	Martin-Khan M.	The University of Queensland,	Australia	11	180	16.36	18
14	Vollenbroek-Hutten M.M.R.	Universiteit Twente	Netherlands	10	555	55.5	34
15	Russell T.G.	The University of Queensland	Australia	10	315	31.5	38
16	Hailey D.M.	University of Wollongong	Australia	10	195	19.5	32
17	Hermens H.J.	University of Twente	The Netherlands	9	475	52.77	53
18	Burns C.L.	Royal Brisbane and Women's Hospital	Australia	9	111	12.33	12
19	Ferguson J.	Aberdeen Royal Infirmary	United Kingdom	9	98	10.88	16

20	North F.	Mayo Clinic	United States	9	90	10	13
21	Kovarik C.L.	Penn Medicine	United States	8	220	27.5	30
22	Theodoros D.	The University of Queensland	Australia	8	161	20.12	34
23	Mars M.	College of Health Sciences	South Africa	8	139	17.37	25
24	Cadilhac D.A.	Monash University	Australia	8	95	11.87	33
25	Mair F.	Aberdeen Royal Infirmary	United Kingdom	8	71	8.87	5
26	Huis İn't Veld R.M.H.A.	OCON	Netherlands	7	433	61.85	10
27	Kim J.	Center for Pharmacoepidemiology and Treatment Science	United States	7	110	15.71	6
28	Bradford N.K.	Queensland University of Technology	Australia	7	84	12	21
29	Taylor M.	The University of Queensland	Australia	7	83	11.85	9
30	Clemensen J.	University of Southern Denmark	Denmark	6	878	146.33	15
31	Brownsell S.	University of Sheffield	United Kingdom	6	178	29.66	16
32	Whitten P.	University of Georgia	United States	6	175	29.16	28
33	Banbury A.	The University of Queensland	Australia	6	156	26	10
34	Mckinstry B.	Edinburgh Medical School	United Kingdom	6	148	24.66	40
35	Scalvini S.	Istituti Clinici Scientifici Maugeri Spa – Società benefit,	Italy	6	142	23.66	30
36	Vu M.	Epworth Hospital	Australia	6	77	12.83	9
37	Bagot K.L.	Monash University	Australia	6	62	10.33	14
38	Bladin C.F.	University of Melbourne	Australia	6	62	10.33	56
39	Fraser S.	Aberdeen Royal Infirmary	United Kingdom	6	59	9.83	6
40	Kidholm K.	University of Southern Denmark	Denmark	6	59	9.83	21

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Table 4: The most popular countries in the JTT

R	Country	Total Publications	Total Citations	Total Publications / Total Citations	Population	Total Publications/ Population	Total Citations/ Population	h-index
1	United States	495	9625	19.44	331893	14.91	29	41
2	Australia	309	6413	20.75	25739	12	24.91	38
3	United Kingdom	181	3633	20.07	67326	26.88	53.93	31
4	Canada	112	2117	18.90	38246	29.28	55.35	23
5	Norway	51	1541	30.21	5408	9.43	28.49	18
6	Denmark	46	1447	31.45	5856	7.85	24.7	15
7	Netherlands	64	1173	18.32	17533	3.65	66.9	20
8	Italy	66	1171	17.74	59066	1.11	19.82	17
9	Spain	44	968	22	47326	0.92	20.43	18
10	Germany	62	770	12.41	83129	0.74	9.26	17
11	South Korea	33	762	23.09	51744	0.63	14.72	15
12	Sweden	30	606	20.2	10415	2.88	58.18	17
13	South Africa	27	535	19.81	60042	0.00	8.91	15
14	China	31	525	16.93	1412360	0.44	0.37	15
15	India	18	522	29	1393409	0.01	0.37	10
16	Belgium	22	422	19.18	11587	1.89	3.64	10
17	Brazil	35	402	11.48	213993	0.16	1.87	11
18	Austria	11	392	35.63	8956	1.22	4.37	9
19	Iran	26	369	14.19	85028	0.30	0.43	11
20	Finland	18	363	20.16	5541	3.24	65.51	11
21	Switzerland	18	328	18.22	8697	2.06	37.71	9
22	Japan	24	264	11	125681	0.19	2.10	9
23	France	26	242	9.30	67499	0.38	3.58	11
24	Hong Kong	9	219	24.33	7413	1.21	29.54	7
25	Botswana	6	203	33.83	2397	2.5	84.68	6

26	Singapore	17	164	9.64	5453	3.11	30.07	5
27	New Zealand	13	150	11.53	5122	2.53	0.02	6
28	Malaysia	9	140	15.55	32776	0.27	29.28	6
29	Thailand	7	139	19.85	69950	0.10	1.98	4
30	Saudi Arabia	6	127	21.16	35340	0.16	3.59	5

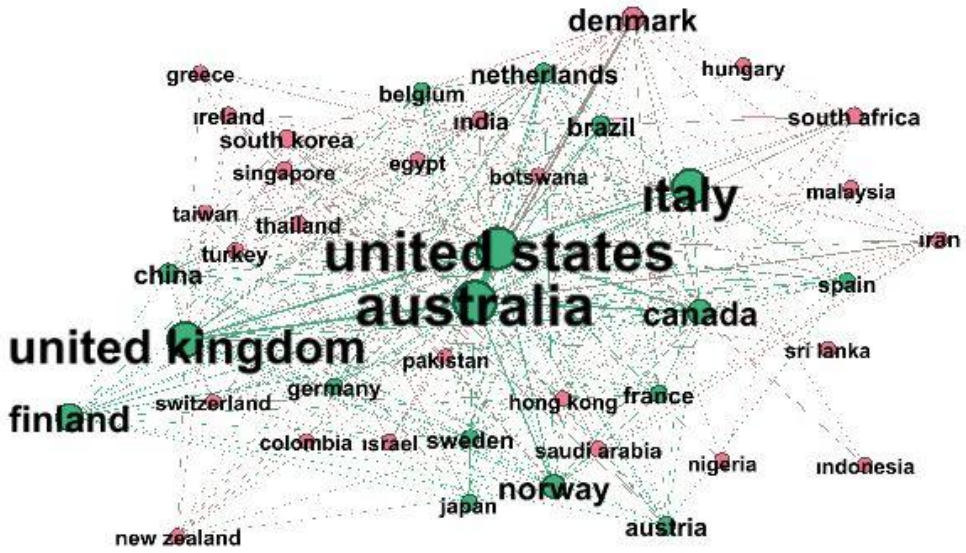

Figure 3: Bibliographic coupling of countries that publish in the JTT

Table 5 shows the most common author keyword occurrences in JTT between 2007 and 2022. The most popular keywords used in the journal in the given year or in certain time periods and their links are presented. Many topics such as telemedicine, telehealth, remote consultation, e-health, telerehabilitation, telecare, and COVID-19 have a significant place in the general publication flow of the journal. In particular, topics such as telemedicine, telehealth and remote consultation are still in the front burner. While topics such as tele-monitoring, mobile health, home telecare, systematic review, teleconsulting climb to the top, topics such as online health, tele-education are out of trend. Furthermore, studies on obesity have started to become a trend topic. In Figure 4, the bibliometric coupling due to the co-occurrences of author keywords of the documents published in JTT in 2007–2022 is shown.

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Table 5: Most common author keyword occurrences in the JTT

Global				2007-2015			2016-2022		
Rank	**Keyword**	**Occurrences**	**Co-occurrences**	**Keyword**	**Occurrences**	**Co-occurrences**	**Keyword**	**Occurrences**	**Co-occurrences**
1	telemedicine	333	627	telehealth	15	16	telemedicine	321	600
2	telehealth	329	699	telemedicine	12	13	telehealth	314	663
3	remote consultation	70	191	remote consultation	8	14	remote consultation	62	172
4	e-health	49	137	telecare	6	9	telerehabilitation	45	90
5	telerehabilitation	48	96	teleconsulting	6	10	e-health	44	124
6	telecare	43	122	e-health	5	4	covıd-19	39	115
7	covıd-19	39	116				telecare	37	103
8	home telecare	32	98				home telecare	30	93
9	teleconsulting	32	93				systematic review	26	70
10	systematic review	26	70				teleconsulting	26	78
11	teledermatology	26	61				teledermatology	25	59
12	heart failure	23	44				heart failure	23	44
13	meta-analysis	20	48				meta-analysis	19	46
14	cost-effectiveness	19	49				mhealth	19	44
15	mhealth	19	44				mobile health	18	39
16	rural	19	46				rural	18	45
17	stroke	19	48				telemonitoring	18	35
18	telepsychiatry	19	49				cost-effectiveness	17	45

19	mobile health	18	39				telepsychiatry	17	42
20	telemonitoring	18	35				primary care	16	34
21	cost analysis	17	42				stroke	16	41
22	primary care	16	34				cost analysis	15	38
23	pandemic	15	57				pandemic	15	57
24	smartphone	15	30				smartphone	15	30
25	telecardiology	15	36				diabetes	14	31
26	diabetes	14	31				depression	13	32
27	depression	13	32				e-health	13	27
28	e-health	13	27				tele-ophthalmology	13	24
29	online health	13	39				telecardiology	13	31
30	tele-education	13	36				obesity	12	21

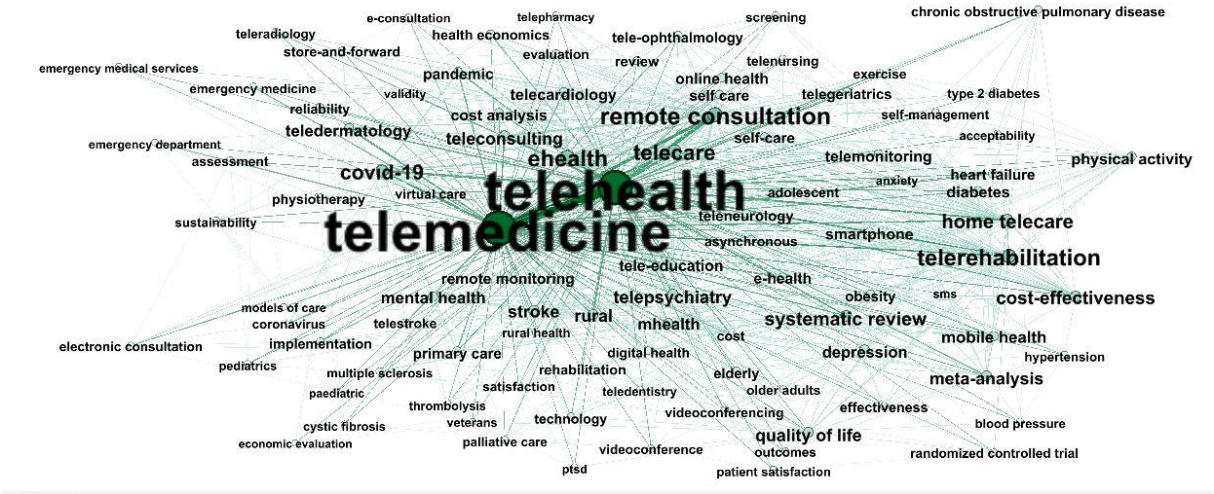

Figure 4: Co-occurrence of author keywords of documents published in the JTT, 2007–2022

3. DISCUSSION AND CONCLUSION

This study focuses on approximately the last **15–16** years of JTT, which has a 27-year history and offers a bibliometric perspective on the journal's trends over the years by using the Scopus database and various bibliometric indicators. Moreover, the publications, authors, citations, institutions, countries and current issues of the journal were examined with

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bibliometric analysis. Although there was a partial decrease in the total number of publications between 2012 and 2016, high trend was noticed in the average citations per cited publication cited up to 2021. A significant increase was observed in the number of publications of JTT, especially as of 2020. 2021 was a very active year, particularly with respect to the number of publications. Nevertheless, it is not surprising that 2007 ranks first in terms of the number of citations. Past publications have been cited more. The United States is the leading country with being the most popular country. However, the University of Queensland in Australia stands out as the leading institution.

Various topics such as heart failure, adolescent, patient satisfaction, tele-education, tele-nursing, tele-pharmacy, selfcare, sms, hypertension, health economics, videoconference, physiotherapy have been discussed in the journal from the past to the present, but recently, topics such as telehealth, telemedicine, telerehabilitation, remote consultation, e-health, COVID-19, telecare, home telecare and teleconsulting have created more study areas. JTT guides new researchers by presenting trending topics and fields of study, especially in the field of telemedicine.

This study provides remarkable information about JTT, which sets the direction in the field of telemedicine. However, there are some limitations. First, bibliometric analyses are not as comprehensive as detailed research and systematic readings, which is a point that should be noted, especially when examining trending topics. In spite of this setback, bibliometric studies increase the attention and due diligence in the literature review.

Bibliometric analysis is renowned for providing a comprehensive summary of intellectual interest, defining its boundaries, and suggesting trending topics for future research with less subjective bias (Khanra et al., 2020). There has been great interest in presenting a bibliometric perspective to the journal to identify the leading trends in recent years (Shukla et al., 2020).

Even though they show the course of the journal over the years, bibliometric studies do not clearly emphasise the image and reputation of the journal when conducting journal-oriented research. However, they provide up-to-date and valuable information on the journal's position in the field.

Along with providing an evaluation of JTT from different perspectives, this study serves as a guide especially for doctoral students and academics who want to study in the field of telemedicine. Because such studies may be necessary to collaborate with the best authors in the field of telemedicine, to know about unexplored or under-researched topics, or to follow trends in the field of telemedicine.

REFERENCES

Askari, A., Khodaie, M. & Bahaadinbeigy, K. (2014). The 60 most highly cited articles published in the Journal of Telemedicine and Telecare and Telemedicine Journal and E-health. *Journal of telemedicine and telecare,* 20 (1), 35–43. https://doi.org/10.1177/1357633X13519899

Barlow, J., Singh, D., Bayer, S., et al. (2007). A systematic review of the benefits of home telecare for frail elderly people and those with long-term conditions. *Journal of telemedicine and telecare*, 13 (4), 172–179. https://doi.org/10.1258/135763307780908058

Bazm, S., Kalantar, S.M. & Mirzaei, M. (2016). Bibliometric mapping and clustering analysis of Iranian papers on reproductive medicine in Scopus database (2010-2014). *International journal of reproductive biomedicine*, 14 (6), 371–382.

Broens, T.H.F., Huis in't Veld, R.M.H.A., Vollenbroek-Hutten, M.M.R., et al. (2007). Determinants of successful telemedicine implementations: A literature study. *Journal of Telemedicine and Telecare*, 13 (6), 303-309. https://doi.org/10.1258/135763307781644951

Botsis, T. & Hartvigsen, G. (2008). Current status and future perspectives in telecare for elderly people suffering from chronic diseases. *Journal of telemedicine and telecare*, 14 (4), 195–203. https://doi.org/10.1258/jtt.2008.070905

Chi, N.C. & Demiris, G. (2015). A systematic review of telehealth tools and interventions to support family caregivers. *Journal of telemedicine and telecare,* 21 (1), 37–44. https://doi.org/10.1177/1357633X14562734

Cho, J.H., Lee, H.C., Lim, D.J., et al. (2009). Mobile communication using a mobile phone with a glucometer for glucose control in Type 2 patients with diabetes: As effective as an Internet-based glucose monitoring system. *Journal of telemedicine and telecare*, 15 (2), 77–82. https://doi.org/10.1258/jtt.2008.080412

Cozzens, S.E. (1989). What do citations count? The rhetoric-first model. *Scientometrics*, 15, 437–447. https://doi.org/10.1007/BF02017064

Déglise, C., Suggs, L.S. & Odermatt, P. (2012). SMS for disease control in developing countries: A systematic review of mobile health applications. *Journal of telemedicine and telecare*, 18 (5), 273–281. https://doi.org/10.1258/jtt.2012.110810

Dellifraine, J.L. & Dansky, K.H. (2008). Home-based telehealth: A review and meta-analysis. *Journal of telemedicine and telecare*, 14 (2), 62–66. https://doi.org/10.1258/jtt.2007.070709

Donthu, N., Kumar, S., Mukherjee, D., et al. (2021). How to conduct a bibliometric analysis: An overview and guidelines. *Journal of Business Research,* 133, 285-296. https://doi.org/10.1016/j.jbusres.2021.04.070

Frueh, B.C., Monnier, J., Yim, E., et al. (2007). A randomized trial of telepsychiatry for post-traumatic stress disorder. *Journal of telemedicine and telecare*, 13 (3), 142–147. https://doi.org/10.1258/135763307780677604

Gaviria-Marin, M., Merigó, J.M. & Baier-Fuentes, H. (2019). Knowledge management: A global examination based on bibliometric analysis. *Technological Forecasting and Social Change,*140, 194-220. https://doi.org/10.1016/j.techfore.2018.07.006

Guo, Y., Hao, Z., Zhao, S., et al. (2020). Artificial intelligence in health care: Bibliometric analysis. *J Med Internet Res,* 22 (7), e18228. doi:10.2196/18228

Gutiérrez-Salcedo, M., Martínez, M.Á., Moral-Munoz, J.A. et al. (2018). Some bibliometric procedures for analyzing and evaluating research fields. *Appl Intell,* 48, 1275–1287. https://doi.org/10.1007/s10489-017-1105-y

Hasvold, P.E. & Wootton, R. (2011). Use of telephone and SMS reminders to improve attendance at hospital appointments: A systematic review. *Journal of telemedicine and telecare*, 17 (7), 358–364. https://doi.org/10.1258/jtt.2011.110707

Istepanian, R.S., Zitouni, K., Harry, D., et al. (2009). Evaluation of a mobile phone telemonitoring system for glycaemic control in patients with diabetes. *Journal of telemedicine and telecare*, 15 (3), 125–128. https://doi.org/10.1258/jtt.2009.003006

Johansson, T. & Wild, C. (2011). Telerehabilitation in stroke care--a systematic review. *Journal of telemedicine and telecare*, 17 (1), 1–6. https://doi.org/10.1258/jtt.2010.100105

Joo, N.S. & Kim, B.T. (2007). Mobile phone short message service messaging for behaviour modification in a community-based weight control programme in Korea. *Journal of telemedicine and telecare*, 13 (8), 416–420. https://doi.org/10.1258/135763307783064331

Khanra, S., Dhir, A. & Mäntymäki, M. (2020). Big data analytics and enterprises: A bibliometric synthesis of the literature, *Enterprise Information Systems,* 14(6), 737-768, https://doi.org/10.1080/17517575.2020.1734241

Kissi, J., Dai, B., Dogbe, C.S., et al. (2020). Predictive factors of physicians' satisfaction with telemedicine services acceptance. *Health Informatics Journal*, 1866–1880. https://doi.org/10.1177/1460458219892162

Kumar, A., Sinha, S., Jameel, J., et al. (2022). Telemedicine trends in orthopaedics and trauma during the COVID-19 pandemic: A bibliometric analysis and review. *Journal of Taibah University Medical Sciences,* 17 (2), 203-213. https://doi.org/10.1016/j.jtumed.2021.09.003.

Leena, H. & Gochhait, S. (2020). A bibliometric analysis of telemedicine : Remote healthcare delivery over the years. *Eur. J. Mol. Clin. Med.,* 7 (6), 2577–2584.

Liao, H., Tang, M., Luo, L., et al. (2018). A Bibliometric analysis and visualization of medical big data research. *Sustainability*, 10 (1), 166. https://doi.org/10.3390/su10010166

Luciano, E., Mahmood, M.A. & Mansouri Rad, P. (2020). Telemedicine adoption issues in the United States and Brazil: Perception of healthcare professionals. *Health Informatics Journal*, 2344–2361. https://doi.org/10.1177/1460458220902957

McKay, F.H., Cheng, C., Wright, A., et al. (2018). Evaluating mobile phone applications for health behaviour change: A systematic review. *Journal of telemedicine and telecare,* 24 (1), 22–30. https://doi.org/10.1177/1357633X16673538

Miner, H., Fatehi, A., Ring, D., et al. (2021). Clinician telemedicine perceptions during the COVID-19 pandemic. *Telemed. e-Health,* 1–48. https://doi.org/10.1089/tmj.2020.0295

Mistry, H. (2012). Systematic review of studies of the cost-effectiveness of telemedicine and telecare. Changes in the economic evidence over twenty years. *Journal of telemedicine and telecare*, 18 (1), 1–6. https://doi.org/10.1258/jtt.2011.110505

Moral-Muñoz, J.A., Herrera-Viedma, E., Santisteban-Espejo, A., et al. (2020). Software tools for conducting bibliometric analysis in science: An up-to-date review. *Profesional De La información,* 29 (1). https://doi.org/10.3145/epi.2020.ene.03

Nuari, NA. (2022). Telehealth and telemedicine applications in the management of diabetes mellitus during pandemic covid 19: Bibliometric analysis. *International Journal of Health Science*, 2(3), 169-176. https://doi.org/10.55606/ijhs.v2i3.593

Peng, C., He, M., Cutrona, S.L., et al. (2020). Theme trends and knowledge structure on mobile health apps: Bibliometric analysis. *JMIR Mhealth Uhealth,* 8(7), e18212. https://doi.org/10.2196/18212

Polisena, J., Tran, K., Cimon, K., et al. (2010a). Home telehealth for chronic obstructive pulmonary disease: a systematic review and meta-analysis. *Journal of telemedicine and telecare*, 16 (3), 120–127. https://doi.org/10.1258/jtt.2009.090812

Polisena, J., Tran, K., Cimon, K., et al. (2010b). Home telemonitoring for congestive heart failure: A systematic review and meta-analysis. *Journal of telemedicine and telecare,* 16 (2), 68–76. https://doi.org/10.1258/jtt.2009.090406

Rosser, B.A. & Eccleston, C. (2011). Smartphone applications for pain management. *Journal of Telemedicine and Telecare*, 17 (6), 308-312. https://doi.org/10.1258/jtt.2011.101102

Russell, T.G. (2007). Physical rehabilitation using telemedicine. *Journal of telemedicine and telecare*, 13 (5), 217–220. https://doi.org/10.1258/135763307781458886

Samadbeik, M., Bastani, P., Fatehi, F. (2022). Bibliometric analysis of COVID-19 publications shows the importance of telemedicine and equitable access to the internet during the pandemic and beyond. *Health Inf. Libr. J.*, 12465. https://doi.org/10.1111/hir.12465

Scott Kruse, C., Karem, P., Shifflett, K., et al. (2018). Evaluating barriers to adopting telemedicine worldwide: A systematic review. *Journal of telemedicine and telecare,* 24 (1), 4–12. https://doi.org/10.1177/1357633X16674087

Sikandar, H., Vaicondam, Y., Parveen, S., et al. (2021). Bibliometric analysis of telemedicine and e-health literatüre. *Int. J. Online Biomed. Eng.,* 17(12), 52–69. https://doi.org/10.3991/ijoe.v17i12.25483

Smith, A., Thomas, E., Snoswell, C., et al. (2020). Telehealth for global emergencies: Implications for coronavirus disease 2019 (COVID-19). *J Telemed Telecare,* 20, 1357633X2091656. https://doi.org/10.1177/1357633x20916567

Snoswell, C.L., Chelberg, G., De Guzman, K.R., et al. (2021). The clinical effectiveness of telehealth: A systematic review of meta-analyses from 2010 to 2019. *Journal of Telemedicine and Telecare*, 1-16. https://doi.org/10.1177/1357633X211022907

Sreenivasan, A. & Suresh, M. (2022). Future of healthcare start-ups in the era of digitalization: Bibliometric analysis. *International Journal of Industrial Engineering and Operations Management,* 4(1/2), 1-18. https://doi.org/10.1108/IJIEOM-10-2022-0046

Shukla, N., Merigó, J.M., Lammers, T., et al. (2020). Half a century of computer methods and programs in biomedicine: A bibliometric analysis from 1970 to 2017. *Computer Methods and Programs in Biomedicine,* 183, 105075, https://doi.org/10.1016/j.cmpb.2019.105075.

Şenel, E. & Demir, E. (2015). A global productivity and bibliometric analysis of telemedicine and teledermatology publication trends during 1980–2013. *Dermatologica Sinica*, 33 (1), 16-20. https://doi.org/10.1016/j.dsi.2014.10.003.

Tousignant, M., Moffet, H., Boissy, P., et al. (2011). A randomized controlled trial of home telerehabilitation for post-knee arthroplasty. *Journal of telemedicine and telecare*, 17 (4), 195–198. https://doi.org/10.1258/jtt.2010.100602

Vimalananda, V.G., Gupte, G., Seraj, S.M., et al. (2015). Electronic consultations (e-consults) to improve access to specialty care: A systematic review and narrative synthesis. *Journal of telemedicine and telecare*, 21 (6), 323–330. https://doi.org/10.1177/1357633X15582108

Yang, Y.T., Iqbal, U., Ching, J.H.Y., et al. (2015). Trends in the growth of literature of telemedicine: A bibliometric analysis. *Computer Methods and Programs in Biomedicine* 2015. https://doi.org/10.1016/j.cmpb.2015.09.008

Yeung, A.W.K., Kulnik, S.T., Parvanov, E.D., et al. (2022). Research on digital technology use in cardiology: Bibliometric analysis. *J Med Internet Res*, 24(5), e36086. doi: 10.2196/36086

Wei, J., Hollin, I. & Kachnowski, S. (2011). A review of the use of mobile phone text messaging in clinical and healthy behaviour interventions. *Journal of telemedicine and telecare,* 17 (1), 41–48. https://doi.org/10.1258/jtt.2010.100322

Woolford, S.J., Clark, S.J., Strecher, V.J., et al. (2010). Tailored mobile phone text messages as an adjunct to obesity treatment for adolescents. *Journal of telemedicine and telecare*, 16 (8), 458–461. https://doi.org/10.1258/jtt.2010.100207

Wootton, R. (2012). Twenty years of telemedicine in chronic disease management--an evidence synthesis. *Journal of telemedicine and telecare*, 18 (4), 211–220. https://doi.org/10.1258/jtt.2012.120219