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SCIENTOMETRIC ANALYSIS IN THE FIELD OF MANAGEMENT: RETURN TO WORK PROGRAMS

The topic of employee absence is an issue that so far has been studied from the perspective of costs incurred by employers. The lengthening of the average life expectancy means that in terms of the next twenty years there will be a significant extension of the period of economic activity. Therefore, Return To Work (RTW) programs in the context of employees returning after absence will play an important role in building the competitive advantage of enterprises and be an opportunity for development. The aim of this article is to present the results of a bibliometric and scientometric analysis of the issue of RTW programs. The main point of reference are journals and publications included in the Web of Science database from 1900 to 2023, with a detailed analysis of works from the last twenty years, i.e. 2000-2021. The data obtained were used to perform a scientometric analysis, specifically focusing on: the number of publications, authorship and co-authorship, the number of citations, journals, thematic categories, institutions, countries and keywords. The study included 106 publications with a citation frequency of 1,801. The subject of RTW programs is most frequently discussed by researchers from the USA, Canada and Northern European countries. Researchers from Vrije Universiteit Amsterdam, the Institute for Work Health, the University of Toronto, and VU University Medical Center have published the most in this area, constituting over 45% of publications.

Keywords: employee absence management, RTW (Return To Work) program, term sickness absence

1. INTRODUCTION

With a rapidly aging population and possible shortages among skilled professionals, it is worth investing in employees in the long term. The knowledge potential of employees usually determines the success of an organization's operations.

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Increasing life expectancy associated with the increasing curability of hitherto terminal diseases means that the population of working-age survivors of breast cancer, for example, is growing successively (Hoving et al., 2009) and they are returning to working life. Hoving (2009) reviewed the effects and specifics of intervention studies on breast cancer survivors that resulted in their return to work. However, intervention programs or those promoting effective return to work among those who have experienced absenteeism due to illness have, unfortunately, not kept pace.

What is more, retaining a satisfied employee within the organization in the long term is one of the toughest challenges for companies today. At the same time, organizations struggle with employee turnover, especially with the loss of those workers who have acquired knowledge over the years working for the organization. When these workers decide to leave, the employer faces the problem of knowledge transfer. Thus, return to work (RTW) programs are not just a benefit that only large corporations can afford (Kasdan & McLwain, 1989). Initiatives of this kind not only directly affect the positive image that the company presents of caring about the well-being of the employee, but also allow for measurable cost savings relating to absenteeism (Hogelund et al., 2009; Steenstra et al., 2006). One common problem in Western societies is lower back pain. It is also often the cause of disability or the inability to work. Since a delayed return to work results in high social costs, developing RTW programs is an important step in reducing them.

To date, RTW programs have mainly focused on infrastructural aspects, i.e., the ergonomics of the workstation or material support for the injured, but increasing public awareness of mental well-being is also gradually drawing attention to these areas of intervention in the context of return to work (Nieuwenhuijsen et al., 2014). Therefore, it has become important to develop an all-encompassing human resource management model dedicated to companies, which would even respond to those most difficult issues concerning employees returning to work after a traumatic experience. This potential program would involve the injured person (employee) himself, his immediate supervisor and a group of close associates, and would aim to provide each party with the tools to re-activate a person's work after an extremely difficult experience.

The purpose of this paper is to present the results of a scientometric and bibliometric analysis of the issue of RTW programs in selected scientific publications. The specific aim of the study was to identify the extracted publications in the Web of Science database connected to RTW programs in the context of the function and legitimacy of their implementation.

Events in recent years, such as the outbreak of the SARS-CoV-2 pandemic (Yulishevsky et al., 2022; Ternin, 2022) or the armed conflict in Ukraine, which have caused widespread destabilization, point to the need to deepen knowledge in the area of employee well-being in working conditions that have changed considerably.

The "Z" generation entering the labor market is no longer satisfied with slogans adopted as part of employer branding such as so-called Fruit Thursdays, chill rooms in offices or team-building events with an open bar. This generation of workers, brought

up with unlimited access to information, is much more conscious of their life choices and thus treat the balance between personal life and paid work as a necessary determinant of practically understood sustainable consumption, environmental and professional choices, as well the experience of life per-se (Orea-Giner & Fuste-Forne, 2023).

The concept of well-being has long been a fundamental issue in practical philosophy, usually with a focus on the analysis of what constitutes well-being as the end goal of pursuits (Engelsen, 2022). In the context of work, the concept is still unclear: only intuitively can we try to dress it up as a state understood as well-being or satisfaction in the workplace, which in itself implies its subjective nature. For the interpretation of reality carries with it an individual assessment of the situation. Apart from unquestionably pathological or socially unacceptable situations, each individual independently evaluates their state of well-being or the situation they face, whether professionally or privately. The variables that affect this assessment of the situation, and thus assessment of well-being or lack thereof in the workplace, can probably be classified into measurable ones, such as adaptation of the workplace, provision of the necessary tools, job training, to those relating to subjective assessment. For it is not the situation per se that is stressful or uncomfortable, but the individual's perception of it, made on the basis of past experiences or learned ways of coping in the face of difficulties, temperament (Kleiman et al., 2014) or current life situation (Williams & Andersen, 1997). Increasingly present in business reality, the concept of employee well-being is closely correlated with the broader sustainability of businesses (Reiman & Väyrynen, 2018).

Most of the publications which address sick leave (defined among the categories most frequently identified by the Web of Science database) were classified into areas concerning public health. In the European region, the World Health Organization's (WHO) definition of health has been adopted: "it is a state of complete physical, mental and social well-being, and not merely the absence of disease or infirmity". An important implication of this definition is that mental health is more than the absence of a mental disorder or disability.

Public health, on the other hand, is defined as "an organized social effort, carried out mainly through joint activities of public institutions, to improve, promote, protect and restore the health of the population. It includes, but is not limited to, activities such as health situation analysis, health surveillance, health promotion, prevention, control of infectious diseases, environmental protection and sanitation, preparedness for disasters and health emergencies, and occupational medicine" (World Human Organization: https://www.who.int/about/governance/constitution (accessed March 23, 2023).

The proposal to create treatment teams consisting of specialists from different areas (including psychology, management, and vocational rehabilitation) could be an important turning point in the creation and development of prevention programs (RTW programs) (McMackin et al., 2015). Also of great importance is specific procedural support for employers in areas such as managing generational diversity

among employees or supporting widely promoted *well-being* at organizational level (Oades et al., 2021).

2. LITERATURE REVIEW

Researchers have explored the negative health effects of unemployment for decades, and the issue of sick leave in the context of return to work plans (RTW programs) is interconnected. The costs associated with absence are the easiest to measure, but a group of researchers (Rueda et al., 2012) looked at the issue from a different perspective by considering whether returning to work reverses the negative impact of not working on health. The subject of RTW programs is a relatively recent research field as the first paper in this area was published in 1989 (Kasdan & McLwain, 1989). It pointed out that the responsibility of medical professionals ends with the provision of appropriate treatment. However, the ultimate goal, from the employer's and employee's perspective, is to return to work, and return to work programs can facilitate this process. Despite a growing interest in the subject of RTW programs (Figure 1), further exploration of the issue in the context of progressive (Hogelund et al., 2009; Steenstra et al., 2006), early intervention (Bernacki et al., 2000) and the aspect of social support (Lysaght et al., 2008) reinstatement.
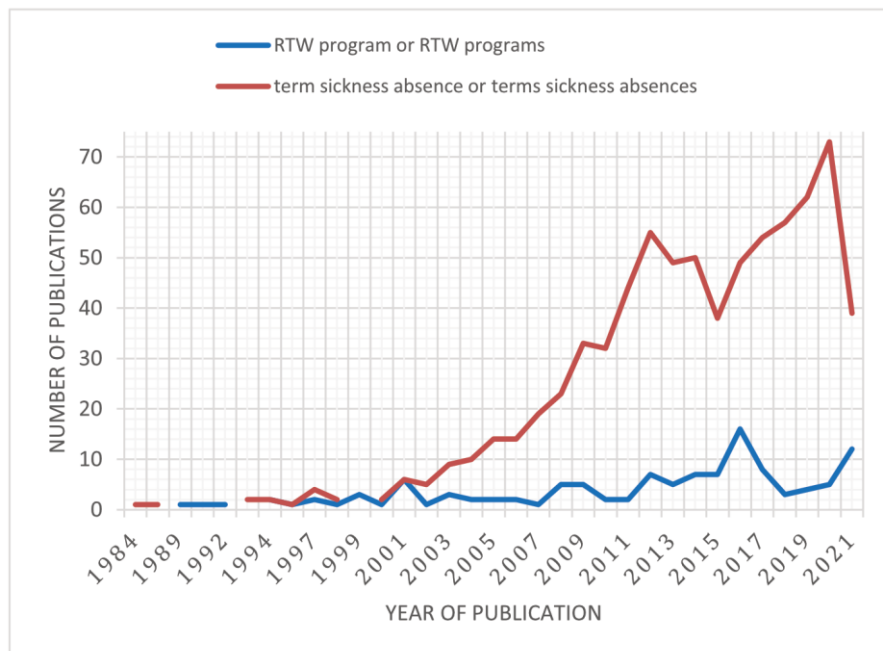

Fig. 1. Number of publications concerning RTW programs (author's own compilation based on Web of Science data, 2023)

An RTW program is a structured plan defining the requirements for an ill employee to return to the workplace. However, it is still most common in large corporations (Mattaliano, 2008), and the economic burden of the costs of sick leave and the evaluation of the benefits of reinstatement have been studied (Steenstra et al., 2006).

There are a number of structural approaches to the subject of RTW programs. Since it is difficult to judge which approach is the most effective, it makes sense to opt for an interdisciplinary approach in this research area. This is because, depending on the researcher's area of interest, resources focus either on people with musculoskeletal conditions (Barli et al., 2003), individuals with depression (Nieuwenhuijsen et al., 2014), those affected by rheumatoid arthritis (Backman, 2004), cruciate pain (Steenstra et al., 2006) or cancer (Hoving et al., 2009).

The RTW program is an approach that is not only structural, but also determined by the strength of social support (Lysaght et al., 2008). Therefore, regardless of the reason for the absence, care should be taken to involve all parties in the process, i.e.: the injured parties themselves, co-workers, supervisors, human resource managers, and possibly health and safety managers (Barli et al., 2003), too.

This study uses biblio and scientometric analysis of RTW programs to help frame the direction of future research. This analysis illustrates the successive growth of interest in qualitative research in this field (Barli et al., 2003). In the research community, structural aspects are studied using a more precise approach, such as scientometrics. The scientometric approach involves analyzing metadata collected from academic sources of knowledge: in the case of this study, the scientific information database, the Web of Science. To the best of the authors' knowledge, this article is the first such study of the Scientometrics of RTW programs.

The scientific knowledge base, the Web of Science, incorporates 68 information fields for each search, which allows a thorough analysis of the results in the context of the defined search. Search source data are defined according to the following headings: title, abstract, keywords, authors, number of citations, publisher affiliation, language and document type. This makes it possible to analyze cooperation between authors as well as dependencies in terms of bibliographic citations. It also allows you to define the level of cooperation between countries and institutions, and determine whether the chosen keywords are from a particular research area. In addition, it can be used to classify journals by identifying the most specialized ones.

The timeframe was restricted to the period 1900-2021 in the following indexes as sources of reliable knowledge: Science Citation Index Expanded (SCI-E), Social Science Citation Index (SSCI) and Emerging Sources Citation Index (ESCI). The search method used was based on keywords and confined to the term 'return to work program' along with inclusion of the plural, i.e. 'return to work programs'. Relationships in the context of the same were investigated through linkage analysis, a based on graphical imaging using the VOSviewer program (Van Eck & Waltman, 2010).

3. RESEARCH METHOD

In the present study, a bibliometric and scientometric analysis was conducted (Mongeon & Paul-Hus, 2015) using data and content from publications (Diodato & Gellaty, 2013). This process implies the use of specific phases in the work, such as formulation, identification, selection, confirmation, analysis, and synthesis (Velt et al., 2020).

The formulation phase involved posing research questions (Quinn et al., 2016) regarding the most important issues relating to RTW programs, which are presented below:

- Who is the most influential author of publications in the field in question (in terms of number of citations) and who publishes the most?
- Which countries are responsible for the largest number of publications and which institutions are most key to developing the topic?
- What is the network between researchers, including co-authorship and citations?
- Which journals publish the largest number of articles concerning RTW programs?
- What areas are RTW programs most closely associated with? (Velt et al., 2020)

Preparation of the following study, in its initial phase, firstly involved identifying keywords in the Web of Science database, within the time frame specified for the 1900-2021 interval. In addition, the search parameters ("Web of Science Index") were narrowed down to the following indexes of the Web of Science database: the Science Citation Index Expanded (SCI-E), the Social Science Citation Index (SSCI) and the Emerging Sources Citation Index (ESCI). This procedure was aimed at eliminating less relevant materials for the purpose of this study, i.e.: book abstracts and conference proceedings, leaving only peer-reviewed articles with the highest level of relevance for advancing knowledge (Velt et al., 2020). Given the research area, the mainstream search phrases "return to work program" or "return to work programs" were chosen, thereby narrowing the search category to the "Topic" in order to eliminate as many publications as possible that do not treat the issue under research. The search thus defined yielded 106 papers, published between 2000 and 2023 and cited a total of 1,801 times.

The next step involved subjecting the extracted results to consistency verification against the search term. Of the content analyzed in detail, the first ten most frequently cited articles each related to the subject of the study. These covered a wide range of topics such as the impact of depressive disorders on workers and interventions to reduce potential sick leave; return to work programs (RTW programs) for injured workers, examining their views on effective RTW strategies and barriers to the RTW process, factors facilitating the RTW process; the role and nature of social support in the workplace in the context of disability; and assessing the cost-effectiveness and usefulness of a return to work program (RTW program) for workers on sick leave due to sacroiliac pain.

A thematic analysis was carried out based on the research questions posed, using appropriate scientific and technical tools on the data collected. The following were taken into account: number of publications, citations, authors, categories, institutions, countries and keywords. The results obtained were used to conduct a scientometric mapping analysis. As a result, detailed visualizations of the key links with their co-occurrence and co-correlation frequencies were produced using VOSviewer 1.6.16 (Van Eck & Waltman, 2010; Velt et al., 2020).

4. RESULTS

This chapter presents and discusses the results obtained in the scientific and technical study of the issue of RTW programs, using data downloaded from the Web of Science database and using VOSviewer software.

Publications and citations relating to RTW programs in Web of Science database

At the outset, the number of articles on the issue of the RTW program (including the plural) that were published between 1900 and 2022 was determined. 118 publications were identified in the aforementioned time frame. The first material in this area was by Kasadan and McLwain dated 1989, published in Occupational Medicine-State of the Art Reviews, which is currently not pioneering scientific work in the field.
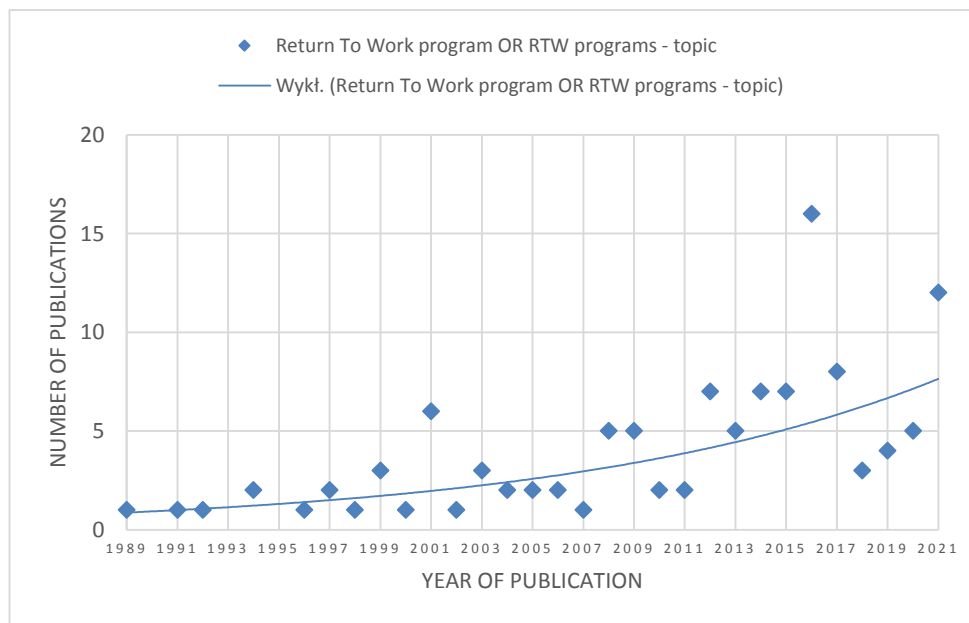

Fig. 2. Number of publications on RTW programs between 1900 and 2021 (authors' own compilation based on Web of Science data, 2023)

The most influential authors (taking into account the number of citations and publications per se), journals and articles were identified. Published papers were cited a total of 1953 times. The exponential growth illustrates the rapidly growing interest in the topic and illustrates the growing importance of the issue of RTW programs in the last two decades.

Figure 2 illustrates the low level of interest in the topic between 1989 and 2021. A clear increase occurred in 2001, when the number of publications totaled 6. To date, the maximum level of publications was reached in 2016, with as many as 16 publications. 57% of all publications in the field were published in the last six years, which shows a strong interest in the subject of RTW programs.

The graph presented in Figure 3 shows the number of citations relating to the issue of RTW programs in the years indicated. As in the case of the number of publications, there was an upward trend in citations. In the indicated term, the most citations occurred in 2021 (194), which significantly exceeded the average number of citations of 16.54.
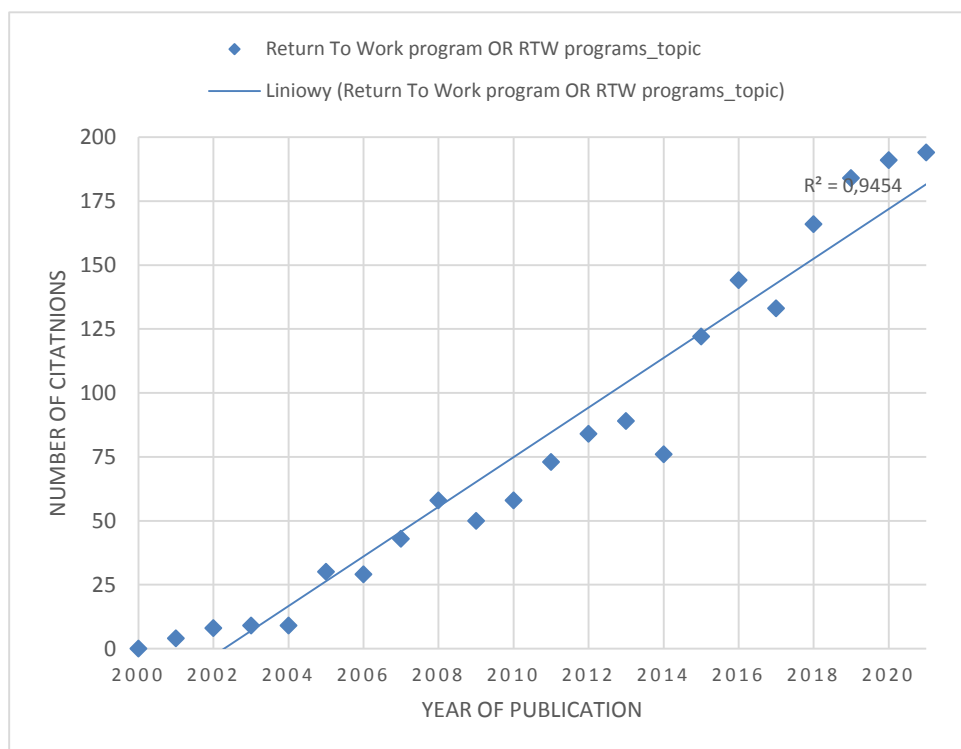

Fig. 3. Number of citations from 2000 to 2021 (authors' own compilation based on Web of Science data, 2023)

Table 1. Citation structure of RTW program

Number of Citations	Number of Papers	% of Papers
Over 180	1	0.94%
100-150	3	2.83%
50-100	4	3.77%
10-50	32	30.19%
Up to 10	43	40.57%
Zero	23	21.70%
TOTAL	106	100%

Source: authors' own compilation based on Web of Science, 2023.

Table 1 shows the citation index of articles (for the years 2000-2021), which were cited a total of 1754 times. Only one article with more than 180 citations was identified, accounting for 0.94% of the published works. As for the number of citations in the 100-150 range, a slight increase could be observed, as there were three publications accounting for 2.83% of the total. Four publications, accounting for 3.77% of the total, were classified in the 50-100 range. Many more, as many as thirty-two papers, were entered into the 10-50 range, accounting for 30.19% of the published articles. The most numerous subgroup contained forty-three publications, representing a percentage of as much as 40.57% of the cited articles in the range of up to 10. A group of twenty-three bibliographic items, representing 21.70% of the total collection, was also identified but these were not cited at all.

One of the indicators used in bibliometric analysis is the Hirsch index (the so-called h-index), which indicates that there are such publications, h, whose number of citations, c, is not less than h. This depends on two parameters: the number of publications and their citations. It is used to evaluate authors of scientific papers and journals (Osinski, 2012). In the study for the selected 106 publications (between 2000 and 2021), the indicated h-index was 23. This means that 23 papers were cited more than 23 times, and thus had the greatest impact on the research area (Steward et al., 2019).

The table below (Table 2) lists the most frequently cited articles on the issue of RTW programs. Of these papers, the most frequently cited – 183 times – is the publication by Nieuwenhuijsen, Faber et al. (Nieuwenhuijsen et al., 2014). It focuses on interventions to improve return to work in people with depression and was published in the Cochrane Database of Systematic Reviews (Q1). In it, the authors evaluated the effectiveness of interventions aimed at reducing work disability in workers with depressive disorders.

Table 2. The most cited papers on the issue of RTW programs

Ran-king	Author	Title	Year	Journal	Number of Cita-tions
1	2	3	4	5	6
1	Nieuwenhuijsen, Karen; Faber, Babs; Verbeek, Jos H.; Neumeyer-Gromen, Angela; Hees, Hiske L.; Verhoeven, Arco C.; van der Feltz-Cornelis, Chris-tina M.; Bultmann, Ute	Interventions to improve return to work in depressed people	2014	COCHRANE DATABASE OF SYSTEMATIC REVIEWS	183
2	Baril, R.; Clarke, J.; Friesen, M.; Stock, S.; Cole, D.	Management of return-to-work pro-grams for workers with musculoskeletal disorders: a qualita-tive study in three Canadian provinces	2003	SOCIAL SCIENCE & MEDICINE	130
3	Marhold, C.; Linton, S.J.; Melin, L,,	A cognitive-behavioral return-to-work program: ef-fects on pain patients with a history of long-term versus short-term sick leave	2001	PAIN	112
4	Rueda, Sergio; Chambers, Lori; Wilson, Mike; Mustard, Cameron; Rourke, Sean B.; Bay-oumi, Ahmed; Raboud, Janet; Lavis, John	Association of Re-turning to Work With Better Health in Working-Aged Adults: A Systematic Review.	2012	AMERICAN JOURNAL OF PUBLIC HEALTH	109
5	Lysaght, Rosemary M.; Larmour-Trode, Sherrey	An exploration of social support as a factor in the return-to-work process	2008	WORK-A JOURNAL OF PREVENTION ASSESSMENT & REHABILITA-TION	85
6	Hoving, J.L.; Broekhuizen, M.L.A.; Frings-Dresen, M.H.W.	Return to work of breast cancer survi-vors: a systematic review of interven-tion studies	2009	BMC CANCER	84
7	Steenstra, Ivan A.; Anema, Johannes R.; Van Tulder, Maurits W.; Bongers, Paulien M.; de Vet, Henrica C.W.; van Mechelen, Willem	Economic evaluation of a multi-stage return-to-work pro-gram for workers on sick-leave due to low back pain	2006	JOURNAL OF OCCUPATIO-NAL REHABILITA-TION	75

Table 2 – continue

1	2	3	4	5	6
8	Backman, C.L.	Employment and work disability in rheumatoid arthritis	2004	CURRENT OPINION IN RHEUMATO-LOGY	62
9	Hogelund, Jan; Holm, Anders; McIntosh, James	Does graded return-to-work improve sick-listed workers' chance of returning to regular working hours?	2010	JOURNAL OF HEALTH ECONOMICS	45
10	Bernacki, E.J.; Guidera, J.A.; Schaefer, J.A.; Tsai, S.	A facilitated early return to work pro-gram at a large urban medical center	2000	JOURNAL OF OCCUPATIO-NAL AND ENVIRON-MENTAL MEDICINE	43

Source: authors' own compilation based on Web of Science data, 2023.

This item accounted for 0.94% of all citations (1754). Other papers listed in Table 2 also address the issue of RTW programs in the context of managing return to work programs for workers with musculoskeletal disorders (Barli et al., 2003), diversifying according to duration of sickness absence in the context of early rehabilitation aimed at return to work (Marhold et al., 2001), and looking at the role of social support in the workplace in the context of disability and the determinants of successful return to work (Lysaght et al., 2008). The indicated items closely relate to the issue of RTW programs and represent a significant percentage of the listed publications extracted from the Web of Science database. An article that is particularly worth looking at in terms of reemployment in the context of increasing rates of successful cancer treatment and return to work activity is the publication by Hoving and co-authors (Hoving et al., 2009), published in BMC Cancer (Q2). It was cited 84 times, which is 21% of all the citations. The authors analyzed the effects and characteristics of intervention programs on breast cancer survivors who were returning to work. The intervention programs focused on improving physical, mental, and social recovery. The results confirmed the lack of a methodologically sound correlation of intervention activities in breast cancer survivors with the ability to return to work. It is noteworthy, however, that the rate of the successful treatment of early-diagnosed cancers has improved significantly over the past three decades; in contrast, efforts to stimulate re-employment or return to organization interventions for those affected by such conditions have not kept pace. The first author of this article, Nieuwenhuijsen, also stands out in terms of his h-index, which in this case was as high as 34.

Considering the first publication of an article on the issue of RTW programs (1989), it can be noted that this is a very new and growing area of interest for researchers. It is worth mentioning that the most relevant items (in terms of the number of citations) were created after 2000, and only the last decade has seen a linear increase in interest in the topic from the point of view of the rise in citations relating to RTW programs (86% of all citations appeared between 2010 and 2021). One of the rationales for a research initiative relating to RTW programs is the lack of clearly defined collaboration between authors in the field.

Principal investigators and authors of RTW program publications

According to an analysis of the Web of Science database, work published on the issue of RTW programs between 2000 and 2021 was written by 396 authors, whose research and interpretations can be found in 106 publications. Table 3 shows the 10 authors who were the most productive according to the number of publications. The summary in Table 3 includes the number of publications and the average number of citations per article, the percentage of all articles and the h-index, as well as the number of all the publications and the number of all the citations representing the author's own evaluation.

Table 3. The most productive authors on the issue of RTW programs

Ranking	Authors	Institution	Total papers concerning RTW program / programs	% of 106 [%]	Citations concerning RTW program / programs	% of 1801	Citation per paper	% of all citations	H-Index of author	Total papers by the author	Total citations by the author
1	Anema JR	University of Amsterdam	13	12.264	256	1.7	19.7	1.8	39	232	4493
2	Van Mechelen W	Vrije Universiteit Amsterdam	9	8.491	209	1.4	23.2	1.2	85	449	21104
3	Van Der Beek AJ	Vrije Universiteit Amsterdam	6	5.660	104	0.7	17.3	0.8	57	447	9127
4	Lammerts L	Vrije Universiteit Amsterdam	5	4.717	41	0.3	8.2	0.7	5	6	56
5	Schaafsma FG	Vrije Universiteit Amsterdam	5	4.717	41	0.3	8.2	0.7	16	65	641
6	Hogg-johnson S	Ontario Tech Univ	4	3.774	36	0.2	9.0	0.5	41	202	4187
7	Vermeulen SJ	Leiden University	4	3.774	86	0.6	21.5	0.5	31	77	3424
8	Aust B	University of Copenhagen	3	2.830	83	0.5	27.7	0.4	19	52	1102
9	Bjorner JB	QualityMetr Inc LLC	3	2.830	83	0.5	27.7	0.4	57	297	11250
10	Coutu MF	University of Sherbrooke	3	2.830	9	0.1	3.0	0.4	3	14	32

Source: authors' own compilation based on Web of Science data, 2023.

Table 4. The most influential authors on the issue of RTW programs

Ranking	Authors	Institution	Total papers concerning RTW program / programs	% of 106 [%].	Citations concerning RTW program / programs	% of 1809	Citations per paper	% of all citations	H-Index of author	Total papers by author	Total citations by author
1	Anema JR	University of Amsterdam	13	12.264	256	1.7	19.7	1.8	39	233	4495
2	Nieu-wenhuijsen K	University of Amsterdam	3.0	2.830	224.0	1.4	74.7	0.4	11	20	509
3	Bultmann U	University of Groningen	2.0	1.887	210.0				47	297	6426
4	Van Meche-len W	Vrije Universiteit Amsterdam	9	8.491	209	1.4	23.2	1.2	85	449	21148
5	Faber B	AMC UMCG UWV VUMC	1.0	0.943	186.0	1.2	186.0	0.1	5	2	197
6	Hees HL	University of Amsterdam	1.0	0.943	186.0	1.2	186.0	0.1	12	16	431
7	Neumeyer-gromen A	Robert Koch Institute	1.0	0.943	186.0	1.2	186.0	0.1	6	15	476
8	Van Der Feltz-cornelis CM	University of York – UK	1.0	0.943	186.0	1.2	186.0	0.1	36	170	3860
9	Verbeek JH	University of Amsterdam	1.0	0.943	186.0	1.2	186.0	0.1	18	76	1329
10	Verhoeven AC	Radboud University Nijmegen	1.0	0.943	186.0	1.2	186.0	0.1	21	52	2607

Source: authors' own compilation based on Web of Science data, 2023.

Division due to the productivity indicated, is not the only aspect by which the influence of scientists on the issue can be considered. Attention should also be paid to the influence of a given author on the development of the issue per se. Table 4 shows the 10 most influential researchers by number of citations. Their citations accounted for 89% of all the citations analyzed, but it is worth noting that only two of the authors can also be found in the table on productivity (Table 3). This means that the relationship between the most productive and influential authors is practically nonexistent or negligible. From the point of view of the issue in question, this is a great loss for the expansion of the field and points to an area worth supplementing with a complementary approach to the issue.

It appears that most of the authors represented institutions in Northern European countries. This indicates an increased interest in the subject matter there, and at the same time exposes a new area of comparative research in scientific research units in other parts of Europe.

The next step of the analysis was to define the co-authorship network. Appropriately configured data collected from the Web of Science database was entered into the VOSviewer program. The analysis was performed by limiting the number of authors to co-authors by restricting the minimum number of links to 2 and to co-authors only, and the results are shown in Figure 4. The result was 66 authors assigned to 17 clusters that were not related to each other. This shows that the research area relating to RTW programs is so new that there are many unrelated views on the topic, and these are being developed by narrow groups of researchers.
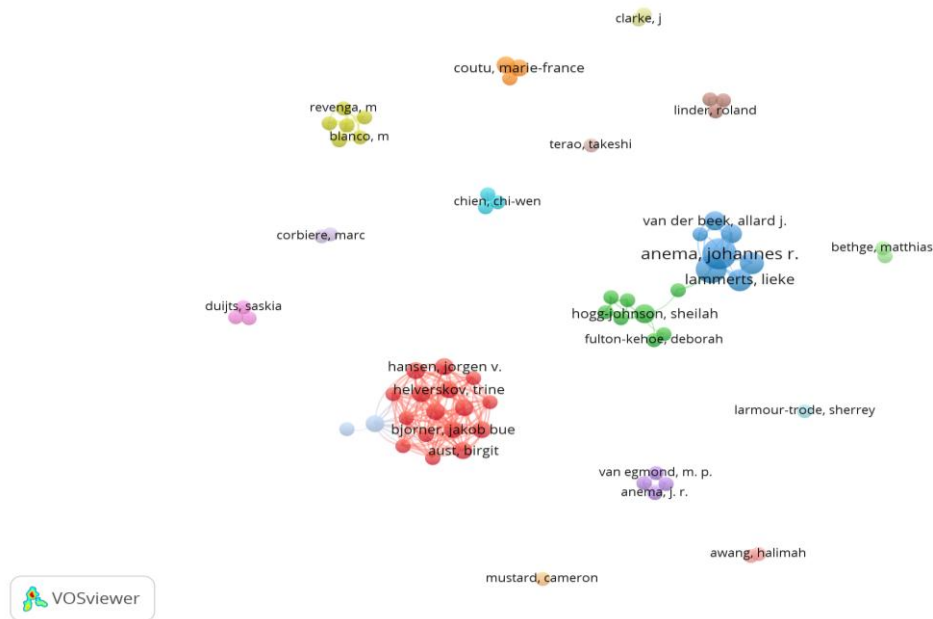

Fig. 4. Network of relationships between collaborating authors researching RTW programs (a)
(authors' own compilation based on Web of Science data, 2023)

The largest group identified showed links involving four authors (Figure 5). The greater the number of joint publications, the larger the area of the circle with the name assigned to it. In addition, diversification also exists at the level of clusters grouped by color. The most productive researcher in the context of co-authorship was Johannes Anema, which was consistent with the data presented in Table 4. It is worth noting that the authors Lammerts Lieke, Schaafsma Frederieke G, van Mechelen Willem and Anema Johannes R collaborated on the publication "Execution of a participatory supportive return to work program within the Dutch social security sector: a qualitative evaluation of stakeholder's perceptions" (Lammerts et al., 2016). Considering the publications concerning RTW programs, this one was produced with the collaboration of the authors with the strongest correlation in this field of research.
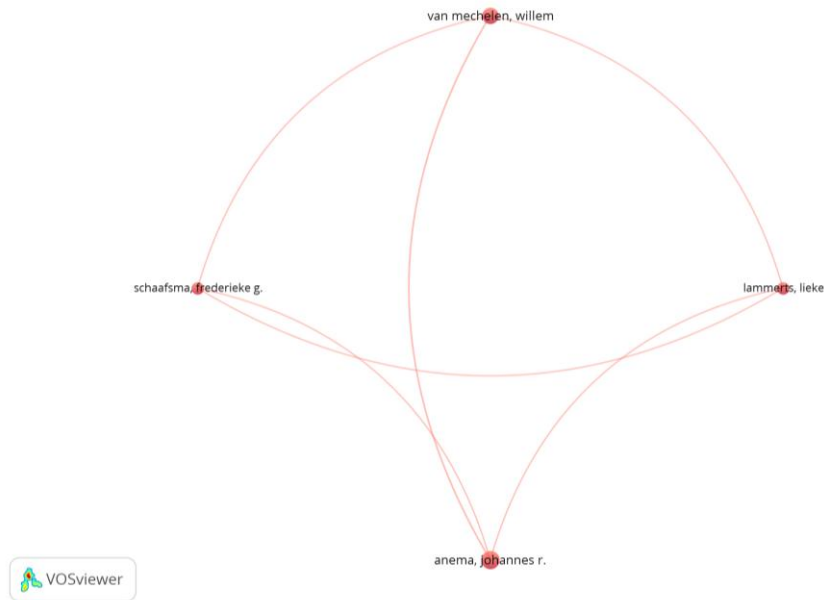
Fig. 5. Network of relationships between cooperating authors researching RTW programs (b) (authors' own compilation based on Web of Science data, 2023)
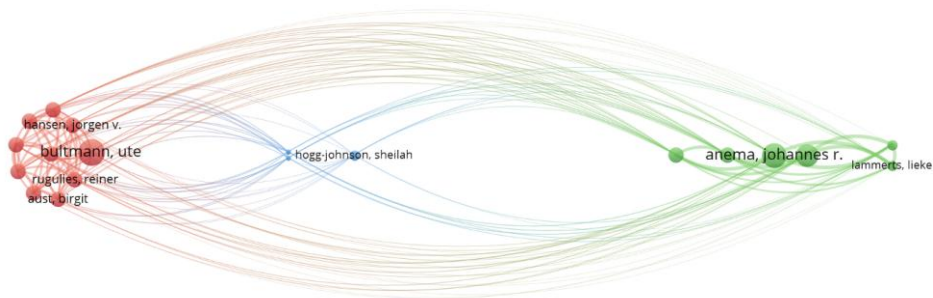

Fig. 6. Graph of common bibliography for the most cited publications on RTW programs (authors' own compilation based on Web of Science data, 2023)

The next step in the development of the study is the visualization shown in Figure 6, representing networks of links due to citations between authors. The correct reading of the graph is related to the dot next to the author's name, since it is the number of citations that affects its color. The citation frequency of a given author determines the color of the cluster, and thus the circle with the assigned researcher's name.

Table 5. Bibliography clusters for the most cited publications regarding RTW programs

Cluster 1 (19 items)	Cluster 2 (6 items)	Cluster (3 items)
Aust, Birgit	Anea, Johannes R.	Coutu, Marie-France
Bjorner, Jakob Bue	Lammerts, Lieke	Durand, Marie-Jose
Bultmann, Ute	Schafsma, Frederieke G.	Hogg-Johnson, Sheilah
Hansen, Jorge V.	Van Der Beek, Allard J.	
Helverskov, Trine	Van Mechelen, Willem	
Nielsen, May Britt D.	Vermeulen, Sylvia J.	
Orbaek, Palle		
Poulsen, Otto M.		
Rugulies, Reiner		
Winzor, Glen		

Source: authors' own compilation based on Web of Science data, 2023.

From the network of reciprocal citations of authors, illustrated in Figure, 3, clusters of different colors were distinguished. This illustrates the connections between authors, shown in Table 5. The authors with the strongest influence on the development of the issue (number of citations) can be located in clusters: 2 (marked in green) and 1 (marked in red), which is the same as the most productive authors (due to the number of publications).

Hierarchy of the importance of journals in which results on RTW programs are published

106 articles (for the period 2000-2023) published in 66 journals were selected from the Web of Science database. Table 6 shows the list of 10 journals with the highest number of published articles on the issue in question (106 publications accounting for as much as 47.7% of all papers). At the same time, it is worth mentioning that 51 journals published only 1 article, which is almost equivalent to those published in the top 10 most published journals, as much as 47% of all papers. This has a significant impact on the average citation index per publication, which in this case is 12.08, representing 662 citations. For the prepared statement, the average H-index is 3.

The largest number of papers was published by Work: A Journal of Prevention Assessment & Rehabilitation (8 papers, accounting for almost 8.5% of the total). In addition, it is worth noting that the journal Annals of the Rheumatic diseases, which published 3 papers in the study area, had the highest Impact Factor (17.075), which determines the most influential journals (Osinski, 2012).

Table 6. Scientific journals with the highest number of publications on RTW programs

Ranking	Publication Title	Papers concerning RTW program / programs	% of 106 [%]	H-Index	Average number of citations per paper	Total number of citations concerning RTW program / programs	Impact Factor of the Journal in the last 5 years	Quartile in the category
1	WORK: A JOURNAL OF PREVENTION ASSESSMENT REHABILITATION	8	7.547	4	15.5	124	1.801	Q4
2	JOURNAL OF OCCUPATIONAL REHABILITATION	7	6.604	5	24.43	171	3.399	Q1
3	SCANDINAVIAN JOURNAL OF WORK ENVIRONMENT HEALTH	6	5.660	5	21.83	131	5.308	Q1
4	BMC MUSCULOSKELETAL DISORDERS	5	4.717	5	24.2	121	2.996	Q3
5	BMC PUBLIC HEALTH	5	4.717	5	7.8	39	4.003	Q2
6	DISABILITY AND REHABILITATION	4	3.774	3	7.5	30	3.298	Q1
7	AMERICAN JOURNAL OF INDUSTRIAL MEDICINE	3	2.830	2	7	21	2.347	Q3
8	ANNALS OF THE RHEUMATIC DISEASES	3	2.830	0	0	0	17.075	Q1
9	ARCHIVES OF PHYSICAL MEDICINE AND REHABILITATION	2	1.887	1	12.5	25	4.489	Q1
10	ASIA PACIFIC PSYCHIATRIST	2	1.887	0	0	0	2.364	Q3

Source: authors' own compilation based on Web of Science data, 2023.

Web of Science database categories in which publications on RTW programs appear

The 106 articles identified in the Web of Science database were divided into 41 groups. Table 7 indicates the 10 most frequently assigned categories, to which more than 65% of the publications were assigned.

Table 7. The most relevant Web of Science categories for publications
on RTW programs

Ranking	Web of Science Categories	Papers concerning RTW program / programs	% of 106 [%]	H-Index	Average number of citations per paper	Total number of citations concerning RTW program / programs	Number of papers cited
1	Public Environmental Occupational Health	37	34.906	12	17.95	664	598
2	Rehabilitation	23	21.698	9	12.43	286	262
3	Rheumatology	10	9.434	6	18.3	183	180
4	Health Care Sciences Services	7	6.604	3	11.14	78	77
5	Psychiatrists	7	6.604	1	0.57	4	4
6	Social Issues	7	6.604	5	24.29	170	152
7	Health Policy Services	6	5.660	3	11.17	67	58
8	Orthopedics	6	5.660	6	25.17	151	148
9	Clinical Neurology	5	4.717	3	32	160	160
10	Ergonomics	5	4.717	3	12.2	61	61

Source: authors' own compilation based on Web of Science data, 2023.

The majority of the publications on RTW programs, defined among the categories most frequently identified by the Web of Science, were classified into the areas of public health, rehabilitation and rheumatology. The public/institutional/ organizational health category also had the highest h-index (12), number of citations (17.95 per paper) and links to other publications. This illustrates the issue's strong connection to the field of public health and employee well-being. Nearly 20% of the articles were classified into the areas of rehabilitation or rheumatology. These categories are also characterized by high indicators: h (9 and 6), the number of citations as well as the number of references to other studies. The highest average number of citations (25.17) is for the eighth most frequently defined category: orthopedics.

Main sources of data analysis – institutions

Articles by representatives of 214 units were considered for this study. Table 8 shows the 10 most frequently appearing institutions. The results indicated that some of the most prominent institutions are Dutch and Canadian units, in order: Vrije Universiteit Amsterdam, Institute for Work Health, University of Toronto, and VU University Medical Center. It is representatives of these universities who have published the most papers (12, 7, 5, 6, respectively). However, it is the affilia-

tion of the ACADEMIC MEDICAL CENTER AMSTERDAM from position 8 in the table that seems to be the most influential, taking into account the number of average citations (79.5 per paper).

Table 8. Major institutional affiliations of authors publishing on RTW programs

Ranking	Affiliations	Countries	Papers concerning RTW program / programs	% of 106 [%]	H-Index	Average number per paper	Total number of citations concerning RTW program / programs	Number of papers cited
1	VRIJE UNIVERSITEIT AMSTERDAM	NETHERLANDS	15	14.151	12	17.95	664	598
2	INSTITUTE FOR WORK HEALTH	CANADA	10	9.434	7	30.98	309	284
3	UNIVERSITY OF TORONTO	CANADA	8	7.547	5	26.25	210	206
4	VU UNIVERSITY MEDICAL CENTER	NETHERLANDS	8	7.547	6	12.88	103	83
5	UNIVERSITY OF GRONINGEN	NETHERLANDS	6	5.660	6	51.5	309	277
6	AMC UMCG UWV VUMC	NETHERLANDS	5	4.717	5	10.6	53	46
7	UNIVERSITE DE MONTREAL	CANADA	5	4.717	3	7.4	37	36
8	ACADEMIC MEDICAL CENTER AMSTERDAM	NETHERLANDS	4	3.774	4	79.5	318	300
9	MONASH UNIVERSITY	AUSTRALIA	4	3.774	3	11	44	43
10	NETHERLANDS CANCER INSTITUTE	NETHERLANDS	4	3.774	3	6	24	24
11	VRIJE UNIVERSITEIT AMSTERDAM	NETHERLANDS	15	14.151	12	17.95	664	598

Source: authors' own compilation based on Web of Science data, 2023.

The bibliometric analysis performed shows the network of interdependence of the institutions in the context of citations occurring between them. In this case, 32 institutions were grouped by the VOSviewer software into 5 clusters, assuming that they were cited at least twice (minimum number of repetitions 2). The resulting

visualization shows the network of links between the most frequently cited entities. Table 9 shows a summary of the 5 clusters, extracted for the map shown in Figure 7. It is worth noting that cluster 5 includes one of the most important universities mentioned when describing Table 8: VRIJE UNIVERSITEIT AMSTERDAM.

Table 9. Inter-institutional citation clusters

Cluster 1 (10 items)	Cluster 2 (6 items)	Cluster 3 (6 items)	Cluster 4 (5 items)	Cluster 5 (3 items)
Harborview Injury Prevent & Res Ctr.	Limestone Hlth Consultants Inc	Charles le Moyne Saguenay lac st Jean Res Ctr Hlt	Bispebjerg Hosp	Amc Umcg Uwv Vumc
Inst Work & Hlth	Monash Univ	Oita Univ	Concordia Univ	Netherlands Canc Inst
Mcmaster Univ	Queens Univ	Univ Amsterdam	Natl Res Ctr Working Environm	Res Ctr Insurance Med Amc Umcg Uwv v Vumc
Tno work & employment	Univ Manitoba	Univ Groningen	Univ Copenhagen	Vrije Univ Amsterdam
Univ Hlth Network	Univ Queensland	Univ Lubeck	Univ Texas	Vrije Univ Amsterdam Med Ctr
Univ Laval	Univ Teknol Mara	Univ Sherbrooke		
Univ Montreal				
Univ Toronto				
Univ Washington				
Vu Univ				

Source: authors' own compilation based on Web of Science data, 2023.

Fig. 7. Visualization of the most cited institutions
(authors' own compilation based on Web of Science data. 2023)

Figure 7 shows five clusters divided by color. Based on the size of the clusters (connections), the largest cluster includes 10 institutions (red), and the top units are the Institute for Work & Health (10 publications, citation count 310) and the Uni-

versity of Toronto in Canada (8 publications, citation count 211). The second cluster lists 6 institutions highlighted in green, and the leading institution is the

Limestone Healthcare Consultants, despite contributing to only two papers, but with a citation level of 95. Cluster 3 includes 6 organizations, where the leader (blue color) is the Canadian hospital, Charles Le Moyne (2 publications). Clusters 4 and 5 (colors: yellow and purple) include 5 and 4 positions, respectively. It seems worth noting that Dutch institutions seem to be leading the way: Bispebjerg Hospital, Amc Umcg Uwv Vumc or Netherlands Cancer Institute. What seems surprising is the appearance of an institution from the United States, the University of Texas with 2 publications. Canada and the Netherlands are definitely the pioneers in this area.

Main sources of data analysis – countries

The demographic analysis shows that 26 countries have published at least 1 article on RTW programs. The 10 most productive countries are shown in Table 10, but it should be noted that in some cases, there are publications that are attributed to more than one location due to collaboration. Canada (27 publications), the U.S. (26 publications) and the Netherlands (23 publications) top the ranking. From this list, one could conclude that the US and Canada are the pioneers of work in the field concerning RTW programs, but it is the Netherlands that has the highest h-index, at 13, and the highest citation average (29.09 per paper); with a similar number of publications to the leaders in the first two positions of the list.

Table 10. Countries associated with RTW program publications

Ranking	Countries	Papers concerning RTW program / programs	% of 106 [%]	H-Index	Average number of citations per paper	Total number of citations concerning RTW program / programs	Number of papers cited
1	Canada	27	25.472	11	26.44	714	661
2	USA	26	24.528	9	8.81	229	219
3	Netherlands	23	21.698	13	29.09	669	567
4	Germany	9	8.491	4	27	243	236
5	Australia	5	4.717	3	9.4	47	46
6	Denmark	5	4.717	4	25.4	127	105
7	Norway	5	4.717	4	15.4	77	71
8	Japan	4	3.774	1	0.75	3	3
9	Malaysia	4	3.774	3	5.25	21	20
10	England	3	2.830	3	17.33	21	20

Source: authors' own compilation based on Web of Science data, 2023.

Table 11. Clusters of co-authorship between countries

Cluster 1 (4 items) red	Cluster 2 (4 items) green	Cluster 3 (4 items) blue	Cluster 4 (4 items) yellow
Denmark	England	Canada	Australia
Netherlands	Germany	China	Malaysia
Norway	New Zealand	USA	
Sweden	Switzerland		

Source: authors' own compilation based on Web of Science data, 2023.

Figure 8 shows the bibliometric analysis of the links occurring between countries. In creating the visualization, the minimum number of repetitions was restricted to 2 (the creation of at least two publications together). Such an assumption was met by only 16 of the 26 countries, forming 4 separate clusters.

In the red cluster, with the highest number of citations, the Netherlands (673) and Denmark (129) can be distinguished. Germany (243) appeared in cluster 2. Another significant result can be observed: Canada (717) appeared in cluster 3 and also had the highest number of publications (27).

Fig. 8. Co-authorship between countries
(authors' own compilation based on Web of Science data, 2023)

On the basis of the network presented, it is important to note the emergence of places with the potential to develop the issue of RTW programs, such as Australia and Malaysia (cluster 4).

Bibliometric keyword analysis

The results of the keyword analysis for the selected 106 (based on the Web of Science database) publications are shown in Figure 9. The database of 550 keywords was limited to 40, appearing no less than 5 times, forming 4 clusters.

Based on the keyword analysis, according to the defined parameters, 4 clusters were identified with a minimum of 5 items in each cluster (Table 12). The relevant term for the issue, i.e. "return-to-work program" is located in cluster 1 (red). The term "health" in cluster 2 (green), as well as "disability" in cluster 4 (blue), occur consecutively: 18 and 25 times indicates a strong intermingling of themes.
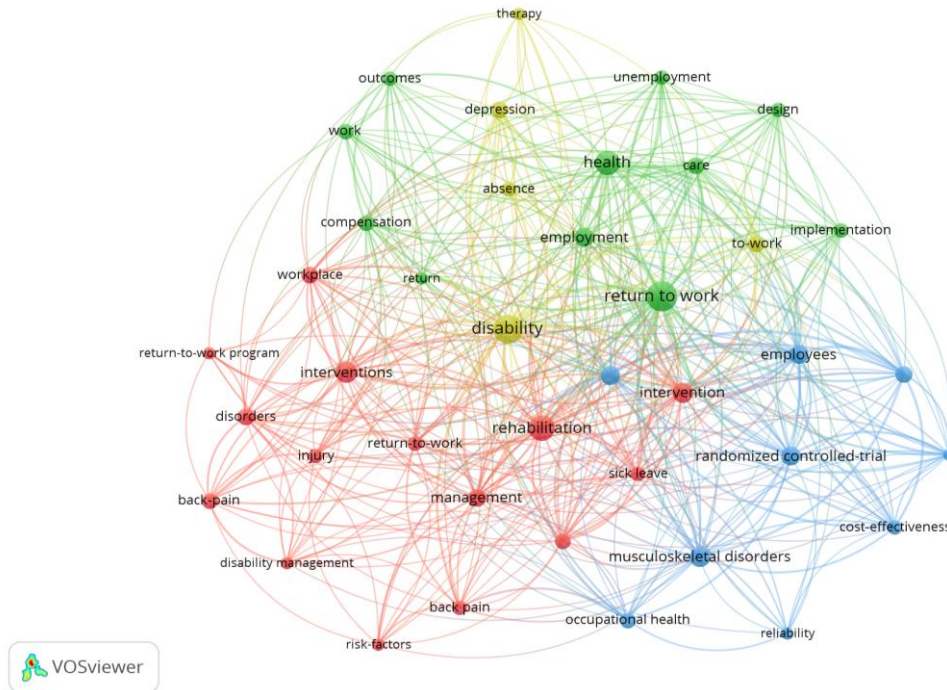
Fig. 9. Scientometric visualization of research concerning the issue of RTW programs
(authors' own compilation based on Web of Science data, 2023)

Table 12. Co-occurrence clusters in keyword usage

Cluster 1 (15 items) red	Cluster 2 (11 items) green	Cluster 3 (9 items) blue	Cluster 4 (5 items) yellow
Back pain	Care	Cost-effectiveness	Absence
Back-pain	Compensation	Employees	Depression
Disability management	Design	Low-back-pain	Disability
Disorders	Employment management	Musculoskeletal disorders	Therapy
Injury	Health	Occupational health	To-work
Intervention	Implementation	Randomized controlled trial	
Interventions	Outcomes	Randomized controlled-trial	
Management	Return	Reliability	
Rehabilitation	Return to work	Workplace intervention	
Return-to-work	Unemployment		
Return-to-work program	Work		
Risk-factors			
Sick leave			
Sickness absence			
Workplace			

Source: authors' own compilation based on Web of Science data, 2023.

Researchers have explored the negative health effects of unemployment for decades, and the issue of sickness absence in the context of return to work plans (RTW program) is interconnected. The costs associated with absence are the easiest to measure, but a group of researchers (Rueda et al., 2012) looked at the issue from a different perspective by considering whether returning to work reverses the nega.

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ANALIZA SCIENTOMETRYCZNA W OBSZARZE ZARZĄDZANIA: PROGRAM RETURN TO WORK

Streszczenie

Temat nieobecności pracowników to zagadnienie dotychczas badane z perspektywy kosztów ponoszonych przez pracodawców. Wydłużająca się przeciętna długość życia sprawia, że w perspektywie najbliższych dwudziestu kilku lat nastąpi znaczące wydłużenie się okresu aktywności zawodowej. Zatem program RTW w kontekście pracowników wracających po nieobecności będzie odgrywać ważną rolę w budowaniu przewagi konkurencyjnej przedsiębiorstw oraz będzie szansą na rozwój. Celem niniejszego artykułu jest przedstawienie wyników analizy bibliometrycznej oraz scientometrycznej zagadnienia dotyczącego programu RTW. Głównym punktem odniesienia są czasopisma i publikacje zamieszczone w bazie Web of Science w latach 1900-2023, szczegółowej analizie poddano zaś prace z ostatniego dwudziestolecia, tj. lata 2000-2021. Pozyskane dane posłużyły wykonaniu analizy scientometrycznej, a w szczególności: liczby publikacji, autorstwa i współautorstwa, liczby cytowań, czasopism, kategorii tematycznych, instytucji, krajów oraz słów kluczowych. W badaniach pod uwagę wzięto 106 publikacji, których częstotliwość cytowania to 1801 razy. Program RTW to zagadnienie najczęściej poruszane przez badaczy z USA, Kanady i krajów Europy Północnej. Najwięcej w tym obszarze publikują pracownicy naukowi Vrije Univesitet Amsterdam, Institute for Work Health, University of Toronto, VU University Medical Center, które stanowią ponad 45% publikacji w tym obszarze.

Słowa kluczowe: zarządzanie nieobecnościami pracowników, program RTW (Return To Work), terminowa absencja chorobowa, analiza naukometryczna