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REVİEW ARTICLE

Stress Level Instrument in Disabled Athletes: A Bibliography Analysis in Database Scopus, Pubmed, and Crossref 2018-2024

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Abstract

The study of theoretical analysis of stress measurement instruments in athletes with disabilities has high urgency in the context of sports science and practice. Athletes with disabilities face unique challenges that are different from non-disabled athletes, both physically, psychologically, and socially. This study chose the Scopus, PubMed, dan Crossref database (the leading databases in the world) as the research sample and data source to be used in bibliometric analysis, covering the spectrum of publications from 2018 to 2024. Through this meticulous process, a subset was screened until finally 552 papers were selected, representing the pinnacle of rigorous research methodology and the basis for subsequent analysis and interpretation. To explore and identify key thematic areas as well as emerging topics using keyword co-emergence analysis. To support the process of visualization and analysis of the data obtained, the Vosviewer application is used. The findings in bibiometric analysis showed that these five clusters, namely: (1) athlete; (2) disability; (3) instrument; (4) patient; (5) stress level. One of them is the keyword "stress level" found in cluster 5. If the keyword is focused on networking, connections will appear on other keywords across the cluster. It can be seen that there is no connection to the keyword "athletes of disability", so this is a novelty and even a new finding in research in the present and the years to come.

Keywords
Instrument of stress level, Disability, Athlete

INTRODUCTION

Athletes with disabilities are such an important part of the sports world that often don't get enough attention. Despite their exceptional ability and potential, disabled athletes often face a variety of challenges that are different from those of non-disabled athletes (Yazicioglu et al., 2012). One of the main challenges faced by athletes with disabilities is high levels of stress that can affect their performance in competition and can also negatively impact the mental and physical well-being of athletes, and can hinder their ability to reach their maximum potential in sport (Belinchón-deMiguel et al., 2019). Therefore, it is important to have an instrument that can measure stress levels in disabled athletes so as to provide the right support to improve their performance.

Athletes with disabilities often face stigma and discrimination, and have physical or mental

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limitations that can affect their performance. In addition, they also have to face pressure from themselves and from others to prove their abilities. In dealing with stress, athletes with disabilities need to have a strong and confident mentality. They also need to have good enough support from the coaching team, family, and friends. In addition, it is important for athletes with disabilities to have effective coping strategies, such as meditation, visualization, or relaxation exercises.

Stress according Kupriianov & Zhdanov (2014) is a common problem that occurs in the lives of all humans and is a physical reaction to life problems experienced and if the function of body organs is disrupted called distress. The rules are confusing, for example, we don't know when this pandemic ends, when children can reunite with their friends and practice again, instead there are friends who have left and haven't, so they get bored. This long period of time eventually causes discomfort that makes children feel uncomfortable and become stressed.

The study of theoretical analysis of stress measurement instruments in athletes with disabilities has high urgency in the context of sports science and practice. Athletes with disabilities face unique challenges that are different from non-disabled athletes, both physically, psychologically, and socially (Mira et al., 2023; Ramsden et al., 2023). Accurate and reliable measurement of stress levels is essential to understand the psychological burden they are experiencing, as well as to design effective interventions to support their mental health and performance. Without the right instruments, there is a risk of underdiagnosis or misdiagnosis of stress problems in this group, which can ultimately hinder their performance and well-being. Today, there are a variety of instruments to measure stress levels, but most are designed for the general population or non-disabled athletes. These instruments may not be entirely relevant or valid when applied to athletes with disabilities, given the differences in experience and conditions they face. For example, stress experienced by athletes with physical disabilities may have different characteristics compared to stress in athletes without disabilities, both in terms of the source of stress and its physiological and psychological manifestations (Dehghansai et al., 2021; Stults-Kolehmainen & Sinha, 2014). This poses a significant gap in research and practice, where there is an urgent need to develop or adapt instruments capable of accurately measuring stress levels in disabled athletes.

In addition, theoretical understanding of stress in athletes with disabilities is still relatively limited. Most of the existing literature focuses more on the general population or athletes without disabilities, so the theoretical concepts developed may not be fully applicable or need to be adapted for the context of disability. This gap points to the need for more in-depth research to develop theoretical models that can comprehensively explain stress dynamics in athletes with disabilities. Without a solid theoretical foundation, attempts to create effective measurement instruments will face difficulties in ensuring their validity and reliability. Finally, the importance of this study is also supported by significant practical implications. By having valid and reliable stress measurement instruments, coaches, sports psychologists and relevant professionals can more effectively monitor the mental state of disabled athletes and provide the necessary support. This not only contributes to the improvement of athletes' performance, but also to their overall quality of life. Conversely, without the right instruments, the interventions provided may be inappropriate or less effective, potentially exacerbating stressful conditions and hindering the athlete's development. Thus, research in this field is not only an academic contribution, but also has a real impact in supporting the success and well-being of disabled athletes.

MATERIALS AND METHODS

This study chose the Scopus, PubMed, dan Crossref database (the leading databases in the world) as the research sample and data source to be used in bibliometric analysis. To approach the implementation actions of the Helsinki Statement framework, one of the key activities that build capacity is to build research capacity. It states, important efforts are applied to multi-skills as well as easy access to quality data and technical assistance in various sectors (WHO, 2014).

The sources and samples used to conduct this bibliometric analysis study include a comprehensive selection of databases, including Scopus, PubMed, and Crossref. The data acquisition process begins on March 14, 2024, using carefully selected keywords embedded in the title and abstract, with a particular focus on the

theme *"Stress level instruments, athletes, disabilities"*. The goal is to compile a rich and diverse data set that represents the scientific contributions in this domain.

The researchers' painstaking efforts resulted in a substantial corpus consisting of a total of five thousand three hundred and thirty-six papers (5336 papers), derived from various repositories. Among them, Scopus donated 1225 papers, PubMed donated 1017 papers, and Crossref contributed 3094 papers, covering the spectrum of publications from 2018 to 2024. The next phases of the analysis involve careful research to ensure the integrity and reliability of the data. This includes rigorous checks for duplication and assessment of conformity between the content of each paper and the specified keywords. Through this meticulous process, a subset was screened until finally 552 papers were selected, representing the pinnacle of rigorous research methodology and the basis for subsequent analysis and interpretation.

Research Design

To get article metadata, researchers searched for keywords on the Scopus, PubMed, and Crossref databases that included searches for Titles and Abstracts related to "Stress Level Instruments in Athletes with Disabilities". There are 552 publications indexed in the Scopus, PubMed, and Crossref databases. The tracing procedure is presented in Figure 1. This study used bibliometric analysis using publication mapping and keyword emergence analysis, which is a type of shared word analysis (Kaparthi, 2005). The researchers mapped search results based on Harzing's Publish or Perish followed by input on the VOSviewer app. Next, researchers conduct a keyword co-occurrence analysis to determine publication trends, and trace the main themes or topics that appear in the publication. At the stage of presenting data, researchers visualize with the help of the VOSviewer application. The app was developed by affiliated researchers at Leiden University (van Eck & Waltman, 2010). Researchers use several parameters in VOSviewer in obtaining article metadata, including 1) Type of analysis (Co-occurrence analysis), 2) Unit of analysis (All keywords), 3) Calculation method (Full counting), and 4) Minimum number of author documents (10 documents).

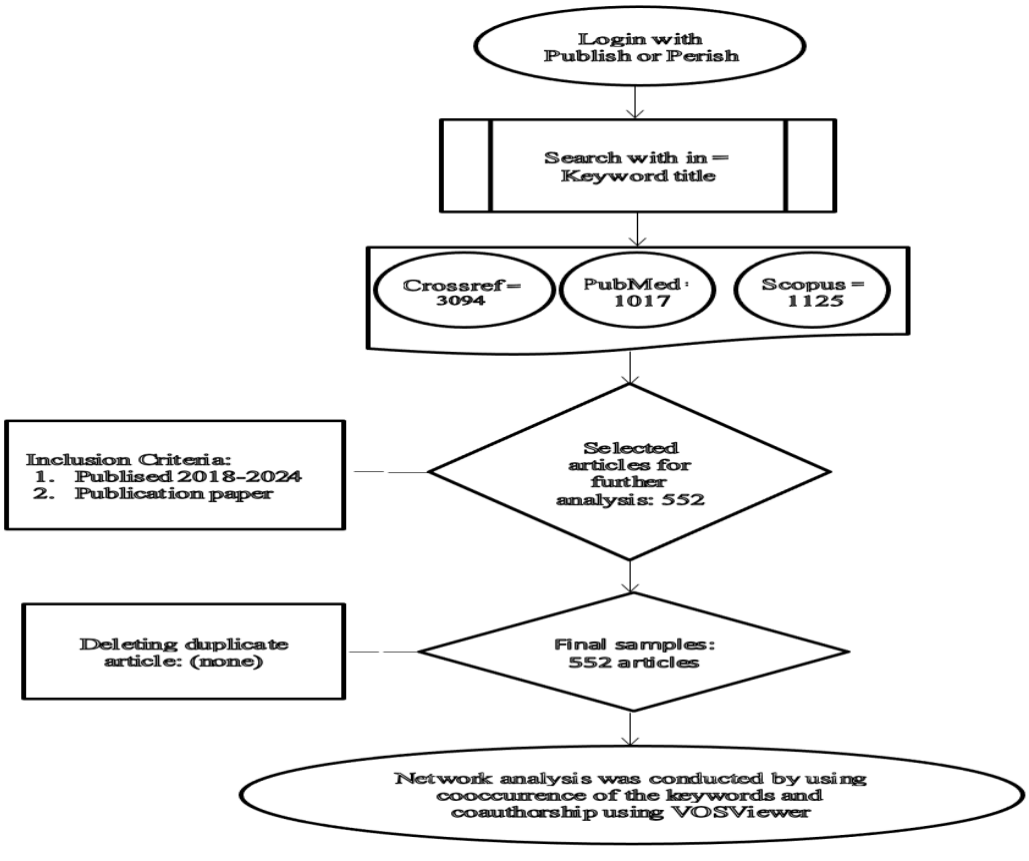


Figure 1. Search design of article metadata

RESULTS

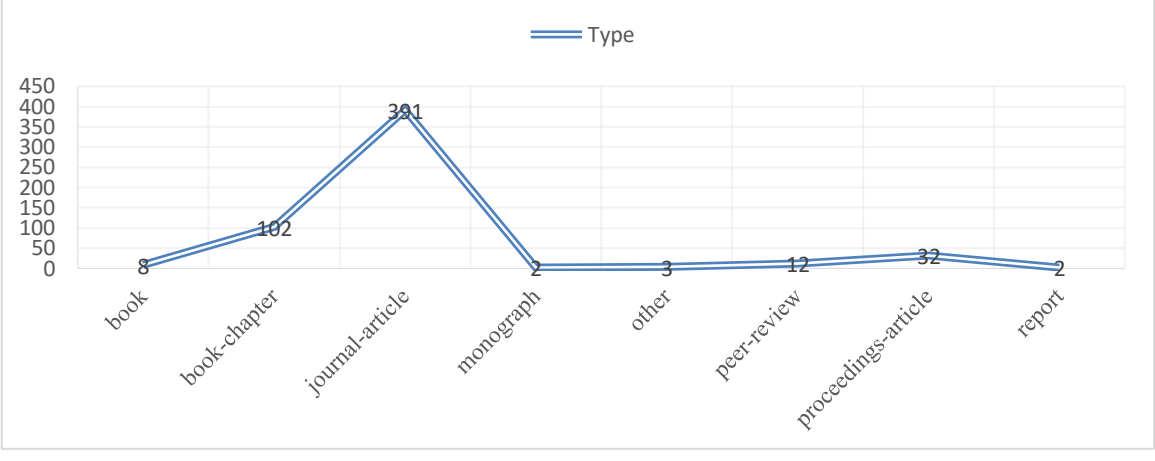
Stress Level Instrument in Athletes with Disabilities reviewed by Publication Map

The search for the publication of articles with the title "Stress Level Instruments in Disabled Athletes" and using the keywords "Stress level instruments, athletes, disabilities" published in the period 2018-2024 (for 6 years) has been carried out carefully. In 2018-2019 with the discovery of one hundred and sixty-three (163) publications of journal articles. There was an increase in 2020-2021 of 32 articles with a total of 195 journal articles. From 2022-2023, there has been a decrease in the use of around 33 articles with a total of 162 journal articles published. Currently in 2024 with a total of 27 journal article publications. The dynamics of changes (year range) in the number of publications can be seen in Figure 2.

Source: Research data taken from pubmed database by publish or perish

Figure 2. Productivity of the publication of scientific papers entitled "Stress Level Instruments in Athletes with Disabilities" in 2018-2024.

From the recorded publications, there are several types / research designs from 1000 publications on Stress Level Instruments in Athletes with Disabilities in Scopus, PubMed, and Crossref databases. The majority of article types are "journal-article", i.e. 391 publication articles. There is a "book" of about 8 publication articles. "Book chapter" there are 102 articles, "monograph" there are 2 articles, "other" there are 3 articles about the design of this study. Furthermore, about 12 articles use the "peer-review" type, 329 articles use "proceedings article". The last, is with the type of "report" a number of 2 publication articles. More details can be seen in more detail as in Figure 3.

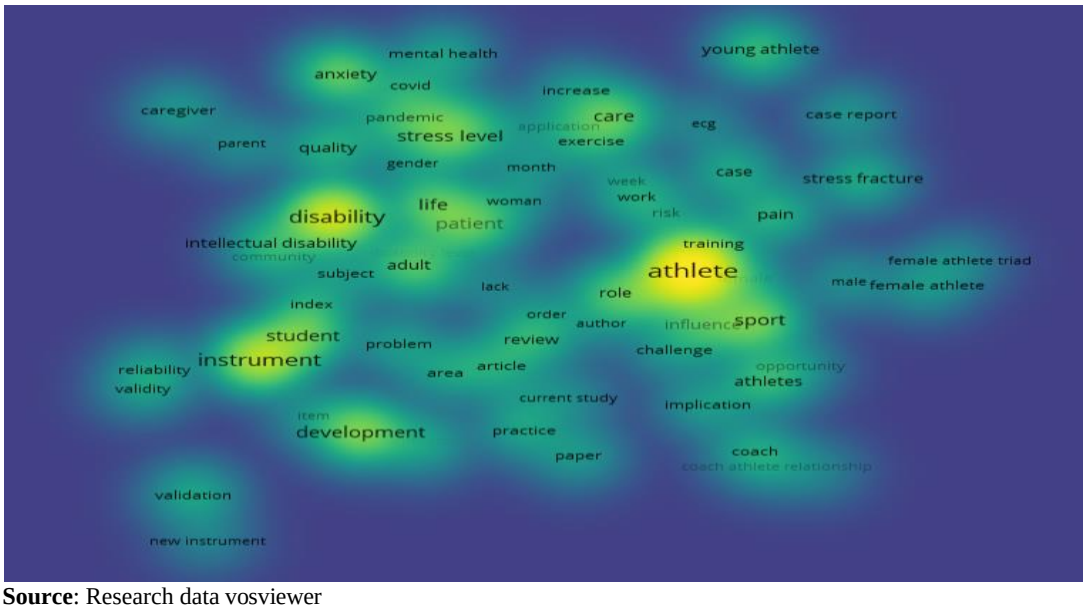


Source: Research data taken from pubmed database by publish or perish

Figure 3. Jenis/desain penelitian berjudul “Instrumen Tingkat Stress Pada Atlet Disabilitas” pada tahun 2018-2024.

Stress Level Instrument in Athletes with Disabilities as a Thematic Cluster

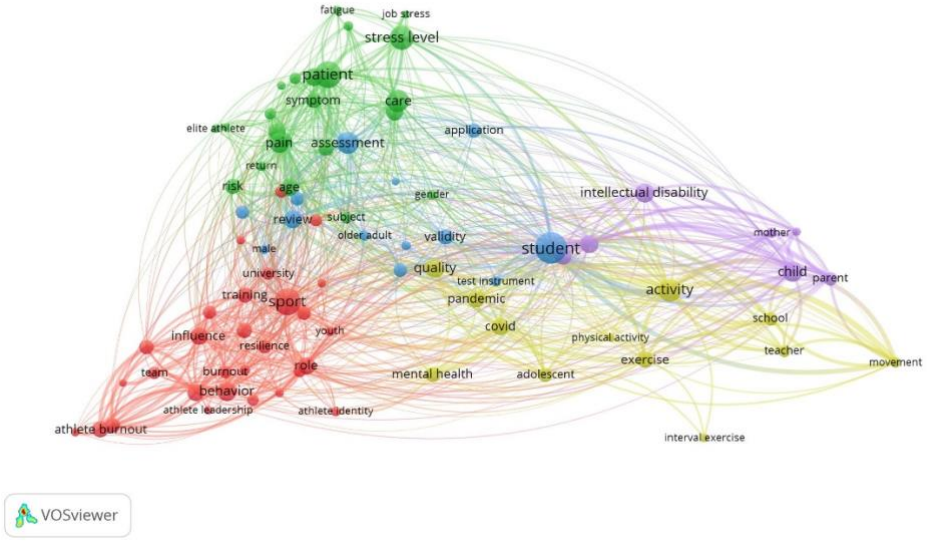
The results of data visualization using VOSviewer involve the analysis of keywords that appear predominantly from search keywords, especially in the context of "Stress Level Instrument in Disabled Athletes". VOSviewer's analysis focused on the dense keyword density visualization part, and its presentation is presented in Figure 4.



Source: Research data vosviewer

Figure 4. The item density visualization of high keywords

From the results of the co-occurrence analysis, it can be observed that the keywords seen as high frequency will form a thematic cluster in the field of Physical Education that is adapted to ASD. The groups are shown in detail as shown in Figure 5.



Source: Research Data Vosview

Figure 5. High-frequency keyword emergence network in "Instrumen tingkat stres, Disabilitas, dan Atlet"

The analysis output keywords can be seen that have been grouped based on their relevance, this is presented in Figure 5. The relationship between keywords will be higher (closer) if followed by the proximity of these keywords. The line that appears between the keywords is a manifestation of a higher (closer) correlation. Then the circle on the keyword that is getting bigger, refers to the meaning that the keyword appears bigger in the publication.

The visualization in Figure 5 can be identified into 5 thematic clusters. These five clusters are in Table 1, namely: (1) athlete; (2) disability; (3) intrument; (4) patient; (5) stress level. Bolded keywords are those with the highest numberof occurrence frequencies.

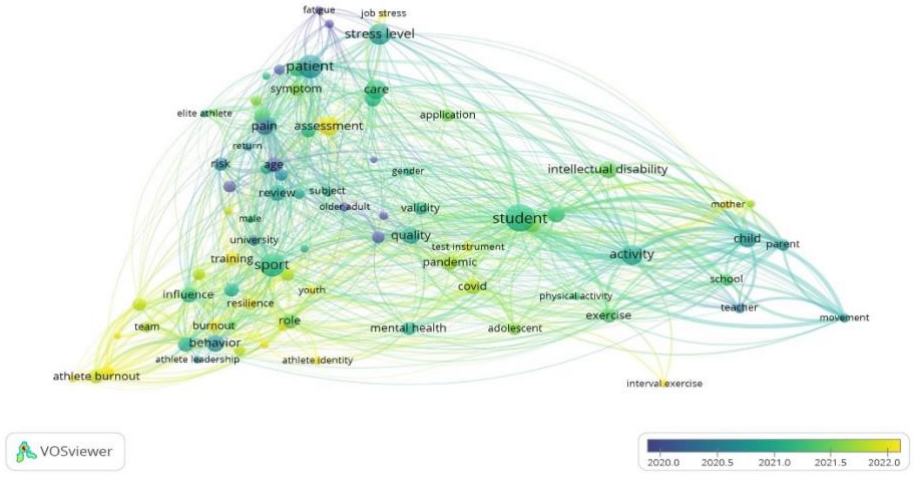
Table 1. Kelompok kata kunci frekuensi tinggi yang terkait dengan publikasi Instrumen tingkat stres, Disabilitas, dan Atlet

Cluster	Number of keywords (items)	Keywords
Cluster 1/Disorder/ Red Athlete	19	(1) athlete (2) athelete burnout (3) athletes (4) author (5) Challenge (6) coach (7) coach athlete relationship (8) current study (9) experience (10) implication (11) importance (12) influence (13) opportunity (14) participation (15) practice (16) risk (17) role (28) sport (19) training
Cluster 2/service/green Disability	18	(1) adolescent (2) anxiety (3) caregiver (4) child (5) comparison (6) covid (7) depression (8) disability (9) exercise (10) gender (11) life (12) mental health (13) pandemic (14) parent (15) physical activity (16) quality (17) significant difference (18) woman
Cluster 3/quality/blue Instrument	18	(1) adult (2) article (3) community (4) development (5) evalution (6) index (7) instrument (8) intellectual disability (9) item (10) new instrument (11) order (12) part (13) reliability (14) student (15) subject (16) systematic review (17) validation (18) validity
Cluster 4/student/yellow patient	14	(1) case (2) case report (3) disability level (4) female (5) female athele (6) female athele triad (7) male (8) month (9) pain (10) patient (11) posttaraumatic stress disorder (12) review (13) stress fracture (14) week
Cluster 5/intervention/purple Stress Level	6	(1) application (2) ecg (3) incrase (4) nature (5) stress level (6) work

Source: Research Data Vosviewer

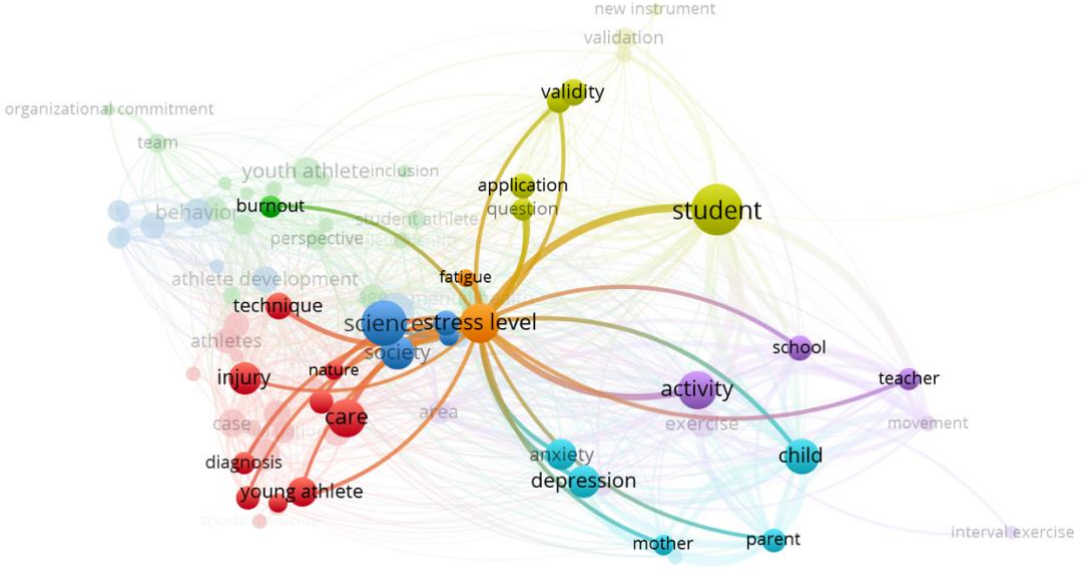
Emerging Topic: Stress Level Instruments in Athletes with Disabilities

The output of data analysis using Vosviewer as shown in Figure 6 can be visualized with at least three colors. The colors include yellow, green, and blue. These visualizations show different meanings according to the color. Blue indicates the period of the beginning of the year of publication. Furthermore, the visualization of the transition from green to yellow gives meaning to the last year of publication. Overlay visualization means the dominance of "old" to "latest" publication update keywords, whose "latest" trends (2022-present) are visualized in yellow (dominant on the left side of the map, but Some appear on the middle side, on the top side, and on the right side of the map). The publication of the novelty "medium" (in 2021) is dominant on the right side of the map and the others are scattered on the left, middle, and top sides of the map with visualizations in green. While classifying keywords with the average "old" published year (2020 and below) visualized in dark blue. More detail is seen in Figure 6 and Figure 7.



Source: Research Data Vosviewer

Figure 6. Average year of publication with high-frequency keywords in the publication "Stress Level Instrument in Disabled Athletes"



Source: Research Data Vosviewer

Figure 7. Analyze the keyword connection "Stress Level"

DISCUSSION

The stress level instrument in disabled athletes is a measurement tool specifically designed to evaluate the level of stress experienced by athletes with physical or mental limitations. Stress in the world of sports can arise from a variety of factors, including competition demands, intense training, and expectations from coaches and yourself (Endo et al., 2023). For athletes with disabilities, these factors are often compounded by additional challenges associated with their disability, such as accessibility, social stigma, and special adjustment needs. Therefore, it is important to have the right instruments to measure and manage this stress effectively. This instrument usually covers various aspects that affect stress levels, such as physical, emotional, and environmental factors. For example, a rating scale might include questions about how athletes feel about their performance, interactions with teams and coaches, and how they cope with the day-to-day stresses associated with training and competition. The emotional aspect may include an assessment of

feelings of anxiety, depression, or self-confidence (Esatbeyoğlu & Campbell, 2018; Trigueros et al., 2019). In addition, environmental factors such as support from family, access to adequate training facilities, and inclusion policies within the team are also very relevant.

The methodology of developing this instrument must go through several important stages, starting from the initial data collection through interviews or surveys of disabled athletes, coaches, and sports psychologists (Esatbeyoğlu & Campbell, 2018; Martin, 2005). The data is then analyzed to identify key indicators of stress and developed into valid and reliable question items. After that, instrument trials were carried out on a small sample of disabled athletes to ensure that the instrument could measure stress levels accurately and consistently. Adjustments and refinements are made based on the results of trials before the instrument is applied more widely.

The application of this stress level instrument has several important benefits. First, by identifying the source and level of stress experienced by athletes, coaches and team managers can design more effective intervention programs to help reduce stress. For example, if stress stems from an inability to manage time between exercise and education, then a time management or tutoring program can be implemented. Secondly, these instruments also assist in continuous monitoring, so that changes in stress levels can be detected and treated proactively.

In addition, the use of this instrument can also raise awareness of the importance of mental health among athletes with disabilities. Many athletes may feel reluctant to express their feelings of stress for fear of being perceived as weak or incompetent. With systematic and structured instruments, it ishoped that it can create a culture where talking about mental health becomes more accepted and supported (Committee on Psychological Testing, 2015; Krishnamurthy et al., 2022). It can also help reduce the stigma often attached to mental health issues.

However, there are some challenges in the application of this instrument. One is to ensure that the instrument is truly inclusive and takes into account different types of disabilities. For example, athletes with hearing loss may need instruments adapted to visual or cue formats. Likewise, athletes with cognitive limitations may require simpler, easier-to-understand instruments. Therefore, instrument development must take into account the diversity of disabilities and ensure that all athletes can participate in a fair and meaningful way.

Based on the bibliographic findings (see Table 7), one of them is the keyword "stress level" contained in cluster 5. If this keyword is brought closer to crusor, connections will appear on other keywords across the cluster. It can be seen that there is no connection to the keyword "athletes of disability", so this is a novelty and even a new finding in research in the present and future years on instrument stress levels, especially in athletes with disabilities.

Finally, the stress level instrument in disabled athletes is a very important tool in supporting their mental and emotional well-being. With these tools, we can not only help athletes better manage stress, but also promote a more inclusive and supportive sporting environment. It is important to continue to develop and refine these instruments to remain relevant and effective in addressing the challenges faced by disabled athletes in the future.

Conclusion

The findings in bibiometric analysis showed that these five clusters, namely: (1) athlete; (2) disability; (3) instrument; (4) patient; (5) stress level. One of them is the keyword "stress level" found in cluster 5. If the keyword is focused on networking, connections will appear on other keywords across the cluster. It can be seen that there is no connection to the keyword "athletes of disability", so this is a novelty and even a new finding in research in the present and the years to come.

Declaration of Conflicting Interests

All authors declare no conflicts of interest in this research.

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Ethics Statement

This research has passed the ethical clearance test with the field of social humanities research. The ethics commission for the social humanities sector of BRIN, Indonesia stated that the research had met the existing requirements and conditions, supported by the ethics clearance letter Number: 764/KE.01/SK/12/2023. Furthermore, the publication of this paper is one part of the research stages of the approved whole research.

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Author Contributions

Conceptualization and Methodology of the Study, EB, DTPP, MA and RH; Data Collection, EB, DTPP, MA, RH and EM; Data Analysis and Interpretation, MA, RH and EM; Drafting the Article, EB, DTPP, MA, RH and EM. All authors have read and approved the final version of the manuscript.

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