

# A scientific overview of the impact of COVID-19 pandemic on sports affairs: A systematic review

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Authors' contributions: A – Study design; B – Data collection; C – Statistical analysis; D – Manuscript Preparation; E – Funds Collection.

## Abstract

**Background and Study Aim** COVID-19 pandemic has impacted all spheres of human life. This study presents the impact of the COVID-19 pandemic on sports activities and the life of sportsmen. It is analysed the inter-connected themes for identifying research trends and motifs from the published studies between March 2020 to March 2021.

**Material and Methods** With the assistance of the UTM library for accessing online databases and electronic resources of Scopus, Web of Science, and ScienceDirect a rigorous search for published collecting data on the impact of COVID-19 on the sports participation and sportsmen was carried out. 650 studies retrieved from the reputable online database of Web of Science, ScienceDirect, and Scopus. 32 studies of which are matched with the criteria for analyzing through NVIVO-12 and Vos Viewer software. For selecting the articles most relevant to the objectives of this study, the principles of Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) were followed.

**Results:** The results show that the COVID-19 pandemic mostly influences making constraints on physical activities. The mental and physical life were concurrently impacted by it. Bibliometrics analysis for key-word and term co-occurrence indicates that the research trend of COVID-19 and its impact was mainly focused on COVID-19 and Mental health or physical health or economic life of the stakeholders of sports affairs.

**Conclusions:** This study has some implications for the players for maintaining a healthy life and for the authority of managing impacts, and researchers researching with new dimensions.

**Keywords:** impact of COVID-19, sports participation, sports activities, PRISMA

## Introduction

The pandemic of COVID-19 has impacted all spheres of life since its inception. The novel coronavirus disease 2019 (COVID-19) was discovered in late December 2019 in the Chinese city of Wuhan and has since spread throughout the world. Later, COVID-19 was declared a global emergency on January 30th, 2020 and a global pandemic on March 11th, 2020 by the World Health Organization (WHO). Now, COVID-19 is currently affecting more than 225 countries and territories (WHO, 2021). Due to the disease's high infectiousness, it can easily be transmitted from person to person through respiratory droplets and various contact points such as the hands, nose, and mouth (2020) [1]. Thus, social distancing has become a buzzing word in the globe right now. Many countries have put a state of lockdown avoiding person-to-person contact and any kinds of the congregation [2]. Thus, the field of sports affairs has been also suffering from this humanitarian crisis.

The COVID-19 pandemic compelled governments to take unprecedented steps to contain the disease's rapid spread, including strict lockdowns, the prohibition of all organized and social gatherings (including sporting

events), and the restriction of all non-essential travel, all of which had a direct impact on the sports industry and athletes [3]. Many countries have postponed the local professional football leagues for considering health issues after much deliberation on the transmission risk for the spectators and on-field players [2]. The consequences of COVID-19 have resulted in a decrease in income, and elite football clubs are struggling to control the pandemic's economic impact [4]. Even international sports competition such as the Union of European Football Associations (UEFA) formally decided to postpone the top tier UEFA Champions League Final and other games on March 23, 2020, until further notice; the International Olympic Committee (IOC), along with the Japanese government rescheduled the 2020 Tokyo Olympics to July 2021 keeping the name of 2020 Tokyo Olympics [2].

However, the COVID-19 pandemic has left sports stakeholders with serious uncertainty about regulatory, economic, social, and technological consequences [5]. Many scientific studies (peer-reviewed and non-peer-reviewed) have been published dealing with epidemiology, pathogenesis, complications, and treatment in the field of sports affairs [6]. Nonetheless, this study will project the impact of the COVID-19 pandemic on sports activities and the life of sportsmen by illustrating inter-connected themes for identifying research trends and motifs from the

published studies between March 2020 to March 2021.

*Objectives*

For the projection of the current status of the sports participation and activities in the published studies during the COVID-19 pandemic the following research questions were set for

1. How was the impact of the COVID-19 Pandemic on sports activities?
2. How was the impact of the COVID-19 pandemic on the life and health of sportsmen?
3. What are the inter-connected themes on the impact of the COVID-19 pandemic on the sports participation of these studies?

**Material and Methods**

A rigorous electronic search of articles was carried out into the reputable online database of Scopus, Web of Science, and ScienceDirect through February 2021 to confirm the reliability of this study. The principles of Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) were followed to select the articles most relevant to the objectives of this study. The PRISMA model is an evidence-based set of items envisioned to prepare authors to report a wide range of systematic reviews and meta-analyses [7]. PRISMA has been successfully taken place in many earlier educational studies [8–10]. Peer-Reviewed Instructional Materials Online Database (PRIMO) was employed for searching articles published during the COVID-19 pandemic on the impact of COVID-19 on sports participation and sportsmen from March 2020 to February 2021 in the database of Scopus, Web of Science and ScienceDirect (Figure 1).

*Search methods*

With the assistance of the UTM library for accessing online databases and electronic resources of Scopus, Web of Science, and ScienceDirect a rigorous search for published collecting data on the impact of COVID-19 on the sports participation and sportsmen was carried out. The authors used the Boolean method on keywords for searching articles. The keywords were “impact of COVID-19”, “Sports Participations”, “Sports activities” and “Sportsmen” from March 2020 to March 2021. All non-English papers, studies other than sports activities, and studies are written earlier the COVID were excluded. We included all the studies that dealt with the impact of COVID-19 on sportsmen and sports participation in the world.

*Study selection*

Fig. 1 shows the PRISMA flow diagram for the search and inclusion process of this study. Researchers independently checked a list of 650 titles and/or abstracts created by automatic search and excluded 591 papers as they did not fit for answering the research questions. The other 59 abstracts were assigned for a full examination to identify the answers to the research questions. Of 59, 32 studies (n=32) were considered for this study. The consistency of the data and relevance to the questions were then checked. Some studies have been reviewed for

multiple research questions. Each article was evaluated for identifying the impact of COVID-19 on Sports participation or activities or sportsmen.

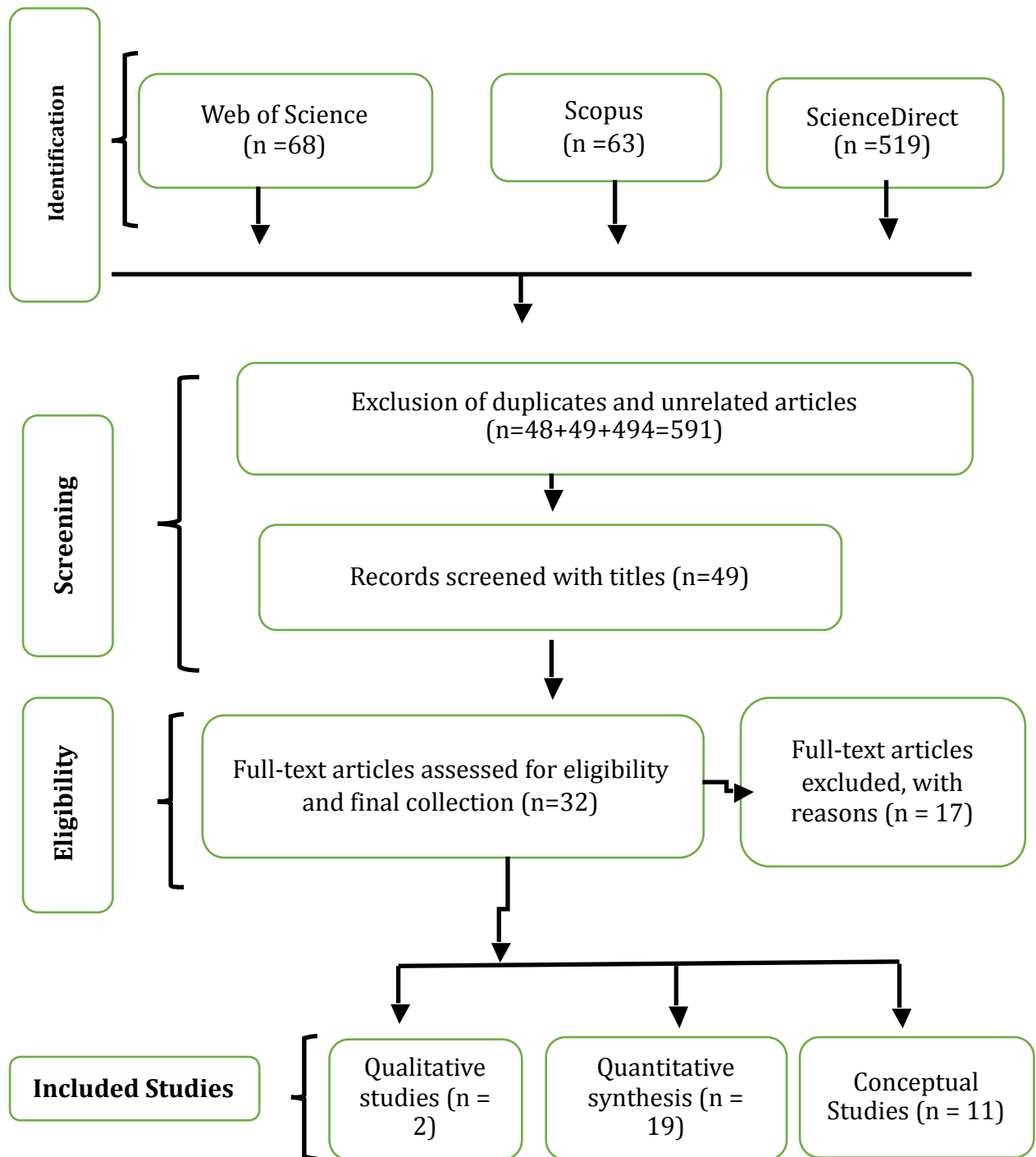
**Results**

*Demography of the articles*

All the selected articles were published in 25 different journals presented in the table 1. The highest number of articles came into this study from “International Journal of Environmental Research and Public Health” (n=4) followed by “Apunts Sports Medicine” (n=3). These articles dealt with different sports namely football, cycling, handball, soccer, etc. presented in the figure 2. These articles presented the perceptions of players, trainers, and referees. Most of the articles dealt with overall sports (n=11).

**Table 1.** List of journals of the studies

Journal's Name	Number of matching items
Apunts Sports Medicine	3
Arthroscopy, Sports Medicine, and Rehabilitation,	1
Asia-Pacific Journal of Sports Medicine, Arthroscopy, Rehabilitation and Technology	1
Early Human Development	1
European Journal of Preventive Cardiology	1
EUROPEAN SOCIETIES	1
Frontiers in Psychiatry	1
Health Prob Civil.	1
International Journal of Environmental Research and Public Health	4
International Journal of Sport and Exercise Psychology	1
JACC: Cardiovascular Imaging	1
Journal of Interprofessional Care	1
Journal of Pediatric Nursing	1
Journal of Physical Education and Sport	1
Journal of Science and Medicine in Sport	2
Managing Sport and Leisure	1
Mayo Clinic Proceedings: Innovations, Quality & Outcomes	1
Public Health	1
Retos	1
Sensors	1
Sports	1
Soccer & Society	1
Solitons and Fractals	1
Technological Forecasting & Social Change	2
The Physician and Sports medicine	1
<b>Total</b>	<b>32</b>



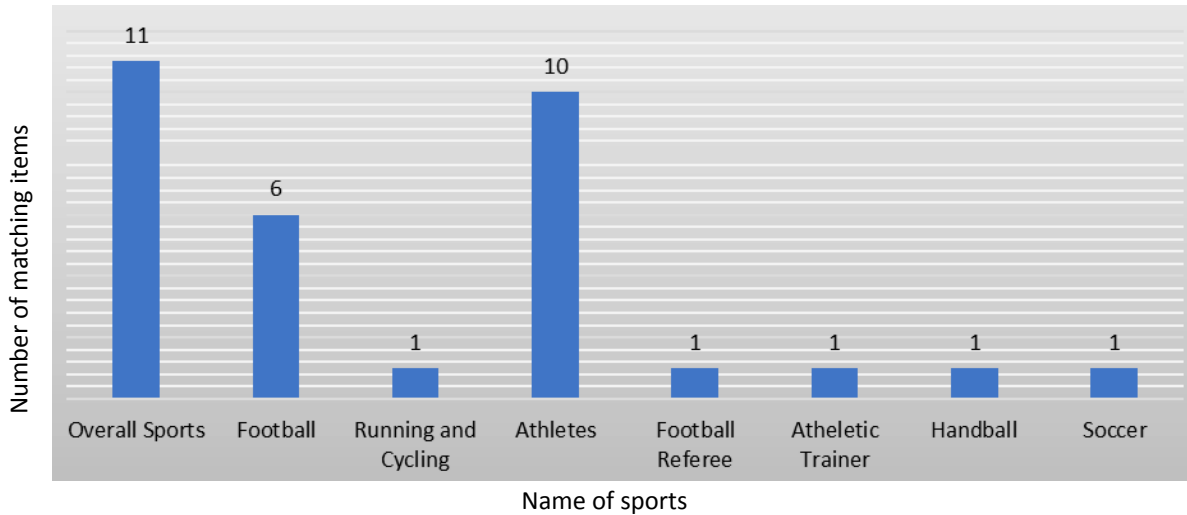
**Figure 1.** PRISMA model for selecting articles for this study

*RQ-1: The impact of COVID-19 Pandemic on sports activities*

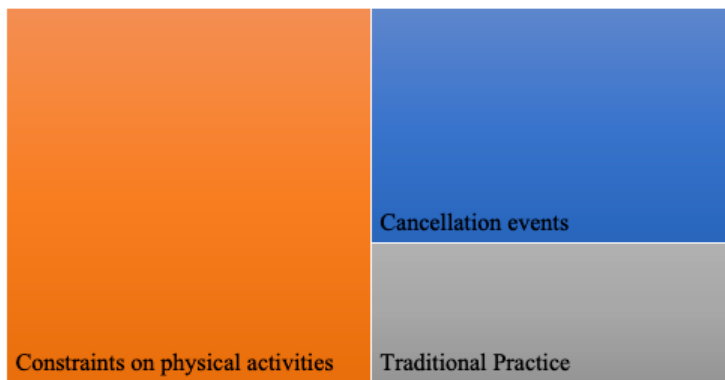
In response to research question no.1, the themes related to the impact of the COVID-19 pandemic on sports activities were constraints on physical activities, cancellation events, and traditional practice presented in the figure 3. The findings show that the highest number of the studies dealt with the impact of COVID-19 on the constraints of physical activities in sports affairs.

The impact of the COVID-19 pandemic had severely on the physical activities, training, and practice of all the staff related to the sports sector. For the youth sports

field, COVID-19 poses an unparalleled challenge. The public health initiatives aimed at slowing the spread of this highly contagious disease and mitigating its main consequences on abrupt interruptions on sports programs worldwide. [11,12]. These types of constraints influenced individuals' personal and social lifestyles. For millions of citizens, involuntary inactivity became a reality during the Covid-19 pandemic, as prevention and containment measures included the closure of sports and entertainment facilities. Individuals who discontinued or significantly decreased their sport and traditional practices during the pandemic record a significant reduction in well-being



**Figure 2.** Name of sports in these studies



**Figure 3.** Impacts on sports activities in these studies

relative to pre-pandemic levels. Individuals who decreased their physical activity due to social pressures showed the greatest decrease in well-being [13,14]. The other study held in Spain and Portugal found that the effect of the COVID-19 pandemic had on physical activity on people involved in cycling who participate in sporting events in the natural environment [15]. Due to home confinement, as well as training and sport competitions cancellations, the prolonged inactivity impact, and lack of in-person interactions among teammates-coaches, had negatively affected athletes [16].

However, for these constraints, athletes in different sports were suffering a lot such as they were fully leveraging their knowledge, skills, and abilities [17] that negatively impacted competitive sport [18]. Moreover, using a mandatory mask and staying at home apart from home had the physiological impact of the hypercapnia hypoxia generated by the masks during aerobic sports practice [19] and brought a change into sports and exercise behavior [14]. Again, the COVID-19 isolation period caused reductions in training volume and intensity and decreased sleep quality of the sports staff [20]. Besides, because of constraints on sports participation like European football competition, millions of employees and people who are emotionally attached to the sport suffered

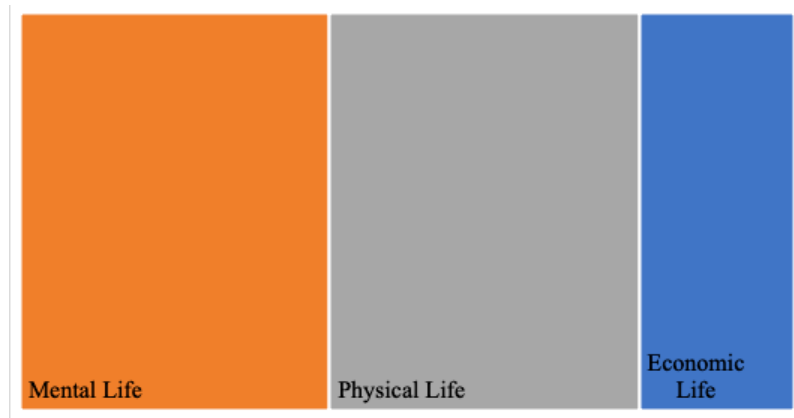
a lot in terms of economic, social, and technological implications [5]. Thus, constraints on sports activities impacted physically, psychologically, and emotionally on the people in Australian society [21].

*RQ-2 the impact of COVID-19 pandemic on the life and health of sportsmen*

For answering research question no-2 the themes related to the life of sportsmen were physical health, mental health, and economics presented in the figure 4. The findings show that COVID-19 impacted the physical and mental life of sportsmen equally. The findings are discussed in the following:

*Physical Health*

The COVID-19 pandemic foremostly impacted the physical health of the people who were involved in the sports as the virus transmitted through human contacts. The study showed that the sportsmen who tested positive had suffered different types of physical health issues like ST depression, T-wave inversion, ST-T changes, and presence of QRS. Loss of smell, loss of taste, headache, and sore throat [22]. Apart from that, the complications of coronavirus disease-2019 (COVID-19) associated with subclinical cardiac pathologies such as myocarditis, pericarditis, and right ventricular dysfunction in the absence of substantial clinical symptoms are concerning



**Figure 4.** Impacts on the life of sportsmen

[23]. As a result of public health policies aimed at slowing the spread of this highly infectious disease and mitigating primary effects, the use of masks results in athletes experiencing hypoxic and hypercapnic breathing, as demonstrated by increased effort during exercise [19]. Moreover, wearing a facemask had significantly elevated heart rate and perceived exertion that increased the physiological burden of the body [2]. Thus, COVID-19 had physical consequences that impacted the safe RTS and general health of athletes [6]. Despite this, there is still no answer about the players who are affected by COVID-19 will endure any long-term effects on their health or game performance [24].

#### *Economic Life*

COVID-19 pandemic creates a world of lost opportunities and uncertain financial and sporting futures that impacted athletes and the sports industry (Pillay et al., 2020). In the sports, we observed the suspension, postponement, or cancellation of the most important international level competitions [25]. Concerning the cancellation and postponement of such events created a communicable pandemic that negatively influenced the economic life of sportsmen [26]. Consequently, the global spectator market fell from US\$144.2 billion in 2019 to US\$139.5 billion in 2020. According to KPMG, the total value of sponsorship across 'big five leagues (Bundesliga in Germany, La Liga in Spain, Premier League in England, Ligue 1 in France and Serie A in Italy) in 2020 is more than €3.3 billion (US\$3.8 billion). It is worth noting that front-of-shirt sponsorship represents nearly a third of this figure. [27]. The actions initiated by governments to minimize person-to-person contact have also severely affected professional football clubs (PFCs) in the season 2019/20. During the pandemic, the fragility of PFCs due to their financial structure and underdeveloped managerial and entrepreneurial strategies to cope with the crisis [4]. Thus, the Covid-19 pandemic brought a change in the economic life of stakeholders of the different games.

#### *Mental Health*

During the COVID-19 pandemic, isolation and quarantine restricted the population's physical and social behaviors, which led to an increased incidence of mental

illness. Depression and anxiety are the most common mental illnesses [28] that resulted in fragile and decreased sleep quality [20]. This mental health distortion did not deviate in terms of athlete's gender [16,29] Studies showed that the impact of pandemic brought insane into the mental health of an individual [30]. The prolonged inactivity and lack of interactions among teammates-coaches impacted negatively on the mental health of players [16].

#### *For research question-3*

For the answering research question, no-3 researchers analyzed the selected studies with VOS VIEWERS software for finding out the inter-connected themes of these studies in terms of keyword co-occurrence and term co-occurrence. The results are discussed in the following:

#### *Key-words co-occurrence*

The result from the keyword occurrence is presented in the figure 5 and table 2. For the result of keyword co-occurrence researchers used the full counting method. For presenting inter-connected themes by keywords, the researchers selected the minimum number of occurrences of a keyword was 3. And off 122 keywords 12 were interconnected showed in the table 2. The most occurred keyword was COVID-19 appeared 18 times linked with 30 studies. And least key words those appeared 3 times with the different link strength were depression, football, and physical activity. Both networking map and table showed that the most interconnected keywords of these studies were COVID-19, Pandemic, sports medicine, exercise, immunity, etc. indicated that the COVID-19 pandemic has influenced negatively on the sports participation or activities as well as the life and health of sportsmen.

#### *Term co-occurrence*

Another type of analysis with VOS viewer software namely term co-occurrence conducted for finding inter-connected themes of the studies on the impact of COVID-19 pandemic on sports participation and the life and health of sportsmen presented in figure 6 and Table 3. The result of term-occurrence shows the frequent terms or texts that appeared in the title and abstract of these studies ignoring structured abstract labels and copyright statements following the full counting method. Researchers selected 10 as the minimum number of

occurrences of a term in the title and abstract. Of 1256 terms 24 meet the threshold. Of 24 terms, 14 were selected to present in this study that covered 60% of terms of these studies showed in the table. The most frequent terms were covid, athlete, sport, and player whereas the most relevant terms were depression, participants, crisis, and anxiety. The most frequent and relevant terms indicated that the COVID-19 pandemic had a negative impact on sports participation and the life and health of sportsmen like other sectors e.g., economy, education, medicine, tourism, etc. of the human being.

**Table 2.** The most frequent keywords of these studies

Keywords	Occurrence
COVID-19	18
Pandemic	9
Coronavirus	6
Exercise	5
Sports Medicine	4
Athletes	4
Immunity	3
Infection	3
Anxiety	3
Depression	3
Football	3
Physical Activity	3

As far as the knowledge of researchers, there was a lack of review studies on the impact of COVID-19 on sports participation and the life and health of sportsmen, this study has the limitations to compare the results with

the previous literature.

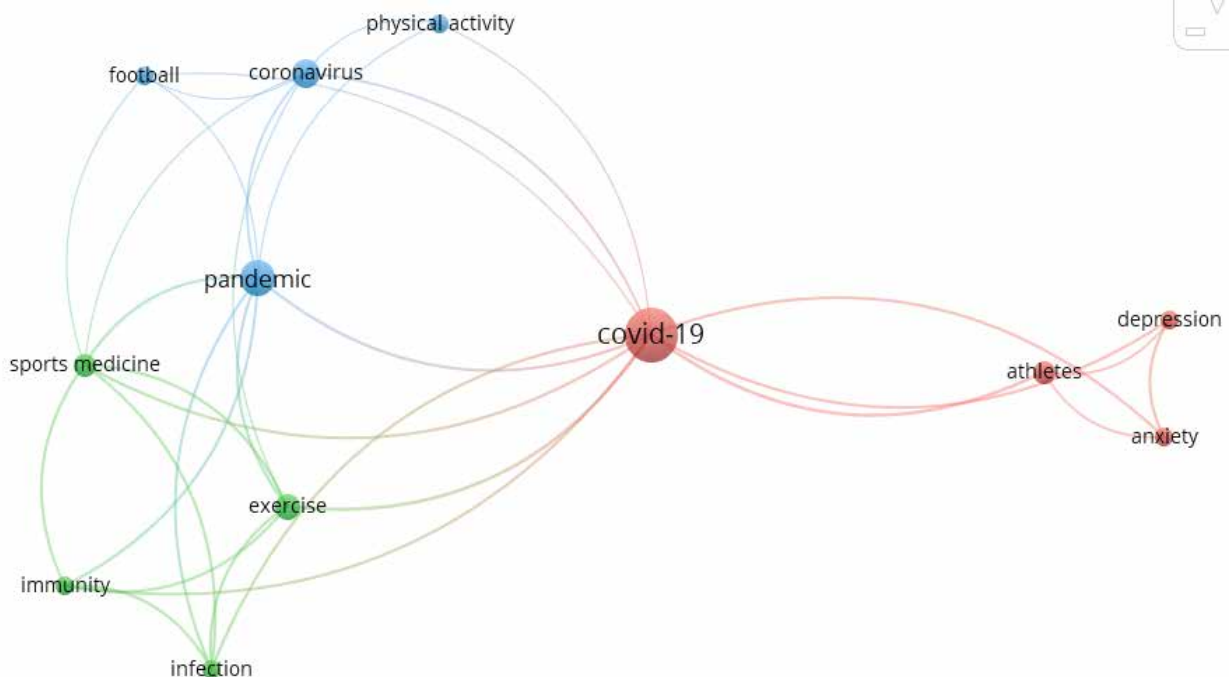
**Table 3.** The most frequent and relevant terms in the title and abstract

Terms	Frequency
COVID	116
Athlete	84
Sport	81
Player	31
Risk	23
Exercise	21
Facemask	18
Crisis	15
Anxiety	14
Heart rate	14
Social distancing	14
Depression	13
RPE	12
Participant	11

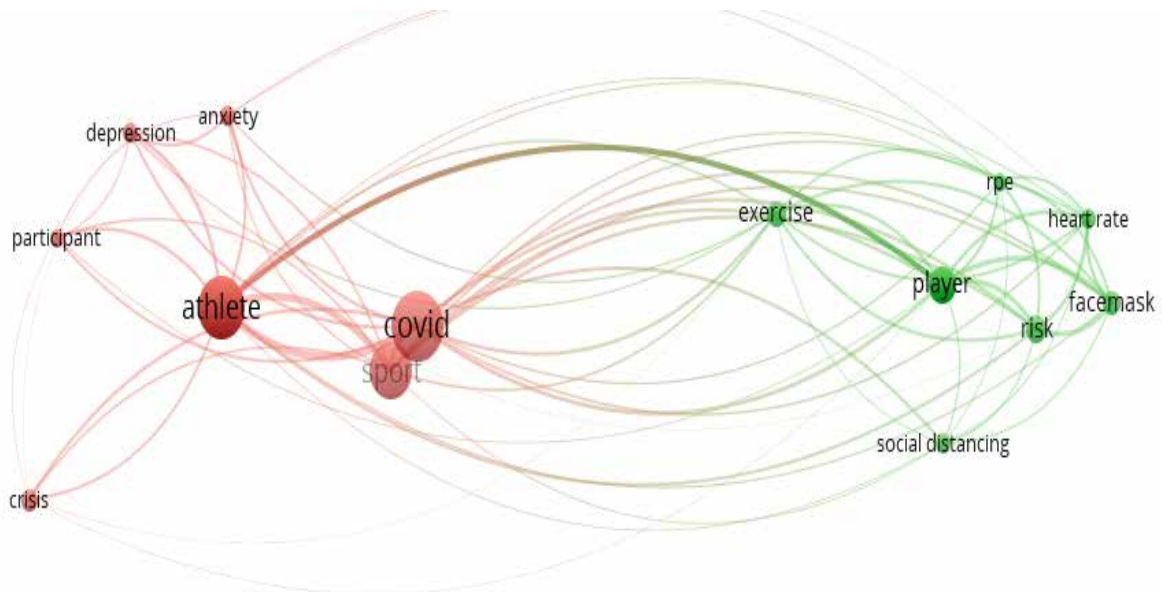
**Discussion**

This study explores the impact of the COVID-19 pandemic on sports activities, life and health of sportsmen. The impact on physical activities were cancellation events, and traditional sports practice. The findings show that the impact had severely on the physical activities, training, and practice of all the staff related to the sports sector. On the other hand, the COVID-19 pandemic negatively influenced on sportsmen’s physical health, mental health, and economics.

For pointing out the research trends from the existing



**Figure 5.** Network mapping on the key-word co-occurrence of these studies



**Figure 6.** Network mapping of the most frequent terms in the title and abstract

literature, the result show that researches in the field sport science conducted to investigate sports' staffs' depression, crisis, and anxiety and physical activity. Most of the studies held concerning with football game. Moreover, most of the studies dealt with pandemic, sports medicine, exercise, immunity, etc. indicated that the COVID-19 pandemic has influenced negatively on the sports participation or activities as well as the life and health of sportsmen.

The results of this review study are distinguished from the other past review studies during COVID-19 pandemic on sports science. For example, this review paper dealt with team activity during pandemic [18]. The other study highlights potential strategies and approaches that may be used by strength (Power Lifting and Weightlifting) athletes during the current global crisis [31]. Another study reviews the mental health consequences of COVID-19, especially for depression and anxiety [28]. Thus, the findings of this study are clearly distinct from that of other studies on the impact of COVID-19 pandemic on sports and sportsmen.

### Conclusions

This review study overviews scientifically 32 studies of 650 studies retrieved from the reputable online database of Web of Science, ScienceDirect, and Scopus 32 studies and found that the COVID-19 pandemic mostly influences making constraints on physical activities. The mental and physical life were concurrently impacted by it. Bibliometrics analysis indicates that the research trend of COVID-19 and its impact was mainly focused on COVID-19 and Mental health or physical health or economic life of the stakeholders of sports affairs. This study has insights for the players for maintaining a healthy life and for the authority of managing impacts, and researchers researching with new dimensions.

### Recommendations

Recommendations from the studies are for athletes, researchers, and authorities of sports affairs. For athletes, studies suggest that players need to do regular exercise for keeping up physical and mental health such as anxiety and depression [28,32] Intensive and frequent physical activity facilitates psychological factors that encourage the wellbeing of individuals [26]. Maintaining good health and working out or being involved in daily sports seems to provide protection against mental illness [29,30]. Moreover, players could utilize the times of lockdown for one's recovery from injury, as well as setting targets to improve one's strength [31]. MAMIMCA – Multiple Assessment Multiple Importance Multiple Criteria Analysis – was adopted to choose the most suitable football club to sponsor [27]. For sports authority, set a guideline regarding personal engagement in activities, quality social dynamics, and appropriate settings and organizational structures for the resumption of sports [11,16,21,33], reducing the number of days within the matches [34]. Arranging Training for referees as well as players during the quarantine period [25,35,36]. Peña et al., 2020 pointed out the following principles for the stakeholders of sports affairs for maintaining sound health [18]:

1. In addition to the normal daily health and wellness checks of the athletes, which includes routine temperature checks, alcohol-based hand gel, and facility and accommodation facilities are maintained.
2. Provide training masks to athletes, technicians, media and event managers, as well as patients, and others with contagious diseases suitable signage are maintained in all the dressing rooms, and training equipment are also used.
3. Expanding on the basics of the subject: To be clear, a facility is supposed to be completely disinfected and

disinfected between practices and competitions and support personnel only if the fait legally or socially obligated.

4. These bans were placed in place to protect the general public's health and the safety of all from unsafe products such as water bottles and cups to ensure no one's disposable or reusable hygiene is put at risk.
5. Providing filtering and medical facilities that could assess the likelihood of cervical cancer being present

in women in the group in the queue for the test of cases, for referral.

The findings of this study would pave the way for new dimensions and insights for conducting research expanding existing knowledge by future researchers.

### Conflicts of Interest

The authors declare no conflict of interest.

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