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ORIGINAL PAPER / SPECIAL ISSUE

Impact of the COVID-19 Pandemic on German Paralympic Athletes

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Introduction

The coronavirus disease 2019 (COVID-19) is a highly transmittable viral infection caused by the virus known as the severe acute respiratory syndrome coronavirus 2 (SARS-CoV2). First identified in December 2019 in China causing clusters of respiratory illnesses, the novel coronavirus disease 2019, classified as a pandemic by the World Health Organization, has globally affected 192 countries and territories with more than 109.16 million confirmed cases and approximately 2.41 million casualties [16]. Besides staggering physical health consequences, economic, social and psychological impact of the COVID-19 pandemic is increasingly determined. The pandemic has led to unprecedented disruption to the normal way of life for people around the globe.

Whereas first efforts after COVID-19 outbreak focused on the understanding of epidemiology, clinical features, challenges of global health

care, mode of transmission, and counteract the spread of the virus, mental health concerns have quickly risen. Social distancing and self-isolation have been strongly advised or mandated in most countries aiming to contain the spread of the virus. But social isolation can have detrimental effects on physical and mental health [7,9,25].

Impact of COVID-19 on sports

Elite athletes suffer many mental health symptoms and disorders [14,21]. Besides losing their daily training routine a general uncertainty and anxiety about the future could cause or worsen some mental health symptoms. Furthermore, athletes are used to a high physical activity which to some extent was suddenly reduced or interrupted. As physical activity is regarded as having antidepressant and anxiolytic effects, this change alone could substantially worsen mental health [10,11,17].

Sport facilities, gyms and other training centers were closed due

Summary

Background: The purpose of this study was to bring the impact of the COVID-19 pandemic on competitive sports of German para-athletes into focus. We aimed to identify special aspects of disabled athletes during the pandemic, and their mental health.

Material and Methods: All German candidate athletes preparing for the Tokyo Summer Paralympic Games were asked to complete a questionnaire, which consisted of questions about sports participation, physical and mental health, and the occupational and personal impact of the COVID-19 pandemic.

Results: A total of 109 athletes (52 men, 57 women, mean age 29.2 (± 10.4) years) completed the questionnaire between May 17th and August 30th 2020. 70% of the athletes felt that organizing their training was difficult, two-thirds of the athletes trained less than before. Half of the participants worried about their own well-being, 25% about their career, only 8% about their finances.

Conclusions: The COVID-19 pandemic has a huge impact on sports of elite para athletes. Many athletes worried about the social impact and half of the respondents were of the opinion that people with disabilities were specially affected by the COVID-19 pandemic. Level of evidence: IV

Keywords

COVID-19– Pandemic– Paralympic sports– Athletes– Mental health

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Auswirkung der COVID-19-Pandemie auf deutsche paralympische Athleten

Zusammenfassung

Hintergrund: Ziel der Studie war es, Auswirkungen der COVID-19-Pandemie auf den paralympischen Leistungssport sowie die mentale Gesundheit deutscher paralympischer Athleten zu untersuchen.

Material und Methoden: Alle potentiell an den paralympischen Sommerspielen in Tokyo teilnehmenden deutschen Athleten wurden eingeladen, Fragen zur Teilnahme an Training und Wettkampf, physischer und mentaler Gesundheit und persönlichen wie auch beruflichen Auswirkungen der COVID-19-Pandemie zu beantworten.

Ergebnisse: Insgesamt füllten 109 Athleten (52 Männer, 57 Frauen, Durchschnittsalter 29,2 ($\pm 10,4$) Jahre) zwischen dem 17. Mai und dem 30. August 2020 den Fragebogen aus. 70% der Athleten gaben an, dass die Organisation ihres Trainings deutlich erschwert war, zwei Drittel der Athleten trainierte weniger als zuvor. Die Hälfte der Teilnehmer sorgten sich um ihre eigene Gesundheit, ein Viertel um ihre Karriere und 8% um ihre Finanzen.

Schlussfolgerungen: Die COVID-19-Pandemie hat deutliche Auswirkungen auf den Sport paralympischer Athleten. Viele Athleten machten sich Sorgen über die sozialen Auswirkungen und die Hälfte der Teilnehmer waren der Meinung, dass Menschen mit Behinderung besonders von den Auswirkungen der COVID-19 Pandemie betroffen sind. Evidenzebene: IV

Schlüsselwörter

COVID-19– Pandemie– Paralympischer Sport– Athleten– Mentale Gesundheit

to COVID-19 since early March 2020. On March 24, 2020, the International Olympic Committee announced that the Olympic and Paralympic Games Tokyo 2020 would be postponed to Summer 2021 [1]. For the first time in history of the modern games, the Olympic and Paralympic Games have been postponed. There are understandable uncertainties and anxieties about when competitions will be held, how to maintain physical fitness and keep the excitement level high, about competitive disadvantages due to the inability to train and general concerns about future perspectives.

COVID-19 and disability

While in the meantime there is a lot of research done on the economic, social and psychosocial effects of the COVID-19 pandemic, research on the impact of the COVID-19 pandemic on disabled people is rare. People with different types of disabilities are facing some unique issues, for example blind people who are reliant on their sense of touch increasing their vulnerability to virus transmission in public places or who are reliant on assistance which makes social distancing impossible [15]. Deaf people cannot lip-read when people wear face masks. Chronic conditions or medication can increase the risk of an infection.

The purpose of this study was to investigate the impact of the COVID-19 pandemic on competitive sports of para-athletes. We aimed to gain an overview of the current situation of paralympic athletes including their physical health, current training and physical activity, special aspects of disabled athletes during the COVID-19 pandemic, and their mental health.

Material and Methods

The present study was conducted as an online survey via AthleteMonitoring, an online athlete managing system (FitStats Technologies Inc., Moncton, Canada). We identified all candidate athletes preparing for the 2020 Tokyo Summer Paralympic Games through the German National Paralympic Program and asked them to complete the questionnaire. To gain information about the sporting activity and the occupational and personal impact of the COVID-19 pandemic the questionnaire was provided once in May 2020 and in July 2020, respectively.

We provided our athletes with detailed information about the proposed study. We obtained written informed consent from all athletes, and from parents of those under the age of 18 years (inclusion criteria > 16 years). All athletes were provided external help (e.g. relatives, coach, project coordinator) to complete the form, if needed. All athlete-information was treated with strict confidence, data was pseudonymized in the database. The study followed guidelines of the Declaration of Helsinki and Tokyo for humans, and has been conducted after obtaining approval from the local University's Ethics Committee (approval 254/18) according to international standards. This study was performed in cooperation with the department of sports medicine at the University of Tübingen. Burgstahler et al. provided a part of the questionnaire including questions about prior SARS-CoV2-infections, occurrence of symptoms of a potential infection, and the training environment.

The questionnaire consisted of questions about demographic information (state, professional or amateur status, member of national

team), sports participation, training volume, questions concerning prior SARS-CoV2-infection or symptoms of an infection, quarantine, impact of COVID-19 on training volume, and access to training venues. Furthermore, we particularly focused on sorrows and anxiety in conjunction with the COVID-19 pandemic. Further questions aimed at occupational, financial and the social situation, special aspects of disabled people during the pandemic, and the impact of COVID-19 on our relationships and our society. The athletes' demographic information (age, gender, sports, and impairment) was obtained from the registry of the German National Paralympic Committee.

Statistical Analysis

All data have been pseudonymized, entered into an EXCEL-database (Microsoft Excel 2020, Windows, USA) and checked for plausibility. Statistical analysis was performed using the software package SPSS (version 27; SPSS, Chicago, USA). Demographic data of participating athletes are presented as mean with corresponding standard deviation for continuous variables, and with frequencies and proportions for categorical data. Data were compared using t-test, Mann–Whitney U and Wilcoxon signed rank tests. Correlations were determined by calculating the Pearson coefficient for normally distributed values. A p value < 0.05 was considered to indicate statistical significance. Although alpha error inflation is to be expected because of multiple

testing, correction for alpha level was waived because of the exploratory nature of the study.

Results

We identified all candidate athletes preparing for the 2020 Tokyo Summer Paralympic Games. A total of 298 athletes were contacted from the German National Paralympic Committee to participate in a weekly health monitoring system in 2019 using a weekly online questionnaire via the online platform AthleteMonitoring. The pilot study and methodology for data collection has been described in detail [4,5]. A total of 109 athletes (out of 298 (37%)) participate in the weekly health monitoring system. All of these 109 athletes (response rate 100%) took part in the herein described study, completing a COVID-19 questionnaire via the online platform AthleteMonitoring between May 17th and August 30th 2020. 60 athletes completed the questionnaire in May 2020, according to 55%. 49 athletes completed the questionnaire in July and the beginning of August 2020 (45%), due to a later recruitment. 109 athletes (52 men, 57 women) (Table 1) with an average age of 29.2 (± 10.4) years represented five impairment groups (visual impairment, spinal cord injury, limb deficiency, cerebral palsy/upper motor neuron deficiency and others). The most strongly represented groups were limb deficiency ($n = 33$ (30.3%)), cerebral palsy/upper motor neuron

deficiency $n = 29$ (26.6%), paraplegia ($n = 21$ (19.3%)), and visual impairment ($n = 7$ (6.4%)). 22 different sports were represented (Table 2). The groups with most participants were paracycling ($n = 18$), wheelchair basketball (women $n = 16$; men $n = 15$), athletics ($n = 10$) and swimming ($n = 7$). 8 athletes partake in winter sports (Nordic ski $n = 6$; para ski alpin $n = 1$; wheelchair curling $n = 1$). 93% ($n = 101$) of the athletes are member of a federal team, whereas only 26 (24%) athletes are professionals. 97 athletes (89%) are member of a national team.

COVID-19 symptoms

In our cohort only one athlete had a positive SARS-CoV2-test, 14 athletes (12.8%) were tested negative. 94 athletes (86.2%) indicated not to have been infected as far as they can judge. Nevertheless, athletes indicated potential COVID-19 symptoms since February 2020 like cold (15.6%), cough (10.1%), sore throat (16.5%), fever (7.3%), taste loss (1.8%), dyspnoea (3.7%), and other symptoms like dizziness (8.3%) or extrasystoles (1.8%). Most of the athletes suffering from symptoms had symptoms for only 1–2 days (11%) or 3–5 days (6.4%). About five percent had symptoms for more than one week. Two athletes had an inpatient treatment shorter than 7 days. 33% of the athletes suffering from symptoms did not interrupt their training, anyhow 10.1% paused their training for more than one week, 6.4% for 3–5 days. Five athletes had contact with

Table 1. Athlete Collective.

Athletes n	w	m	Mean age \pm SD	Professionals	Member of a National Team	Disciplines
109	57	52	29.2 \pm 10.4	26 (24%)	97 (89%)	22

Note. w = women, m = men, SD = standard deviation.

Table 2. Para Sport Disciplines.

Team Sports	Individual Sports
Para ice hockey	Alpine skiing
Wheelchair curling	Cross-country skiing
Wheelchair basketball	Wheelchair fencing
Wheelchair rugby	Swimming
Sitting volleyball	Equestrian
Goalball	Athletics
Football 5-a-side	Rowing
	Table tennis
	Shooting Para sport
	Cycling
	Wheelchair tennis
	Canoe
	Judo
	Boccia
	Triathlon

Note. Winter sports above, summer sports below.

at least one positively tested person in their tight circle (incl. team, trainer, caregiver).

Impact of COVID-19

36% of the athletes stated that organizing their training was very difficult, 34% found it hard, whereas only 21% had no difficulties to organize their training. Therefore, 67% of the athletes trained less after February 2020 than before, 15% had no change in their training volume, and 9% trained more than before. Training intensity showed similar values. 22% of the athletes were in quarantine; 13.8% of the athletes were self-imposed in quarantine, 6.4% because of a stay in regions at risk, one athlete was tested positively and one athlete had contact to a positively tested person. 35% of the athletes worried about their health, 37% about sports in general, 25% about their career, only 8% about finances. Half of the participants worried at least sometimes about their own well-being, even more than 60% were

concerned about their loved ones' health. 35% of the athletes stated to be concerned (sometimes, often or very often) about their occupational situation, 23% were concerned about their financial situation. A greater percentage of athletes worried about the social impact of the COVID-19 pandemic. 56% of them stated to worry about their social contacts, 50.5% about the social cohesion of our society. There were no statistical differences between team and individual athletes, the impairment groups or men and

women concerning anxiety about the COVID-19 pandemic. Younger athletes were significantly more concerned about their health than older athletes ($p = 0.04$). Table 3 shows the sorrows associated with the COVID-19 pandemic (Table 3). With 7 questions, different aspects of concerns about the effects of COVID-19 were captured. Since the individual questions are correlated with each other, it was examined whether a common latent construct is captured with these questions. If a scale would be defined across all seven items, this would have a Cronbach's Alpha of .799, which indicates a good internal consistency. All questions fit the scale well. Cronbach's Alpha cannot be improved by omitting individual items.

Almost half of the respondents (48%) are of the opinion that people with disabilities are affected differently in this special situation of the COVID-19 pandemic in comparison to able bodied people. 25 athletes referred to a special risk for people with disabilities because of several pre-existing medical conditions or illnesses. 16 athletes mentioned difficulties to reach or use training venues or training per se due to social distancing and contact prevention. At least seven athletes reported on sorrows and problems

Table 3. Sorrows due to COVID-19 Pandemic.

Sorrows about ...	Minimum	Maximum	Mean	SD
Health	0	6	2.15	1.387
Health of loved-ones	0	6	2.61	1.387
Occupational situation	0	5	1.74	1.647
Financial situation	0	6	1.56	1.512
Social contacts	0	6	2.55	1.500
Cohesion of our society	0	6	2.47	1.602
Social relationships	0	6	2.46	1.537

Note. SD = standard deviation.

concerning their maintenance and care. Others mentioned difficulties to manage their everyday life since they lost their daily routines.

Discussion

The aim of the present study was to examine the impact of the COVID-19 pandemic on competitive sports of para-athletes. The main findings of the present study were that due to the COVID-19 pandemic athletes mainly worried about their health, their social contacts, and the social cohesion of our society. The athletes had less concerns about their finances and sponsorships. Almost half of the respondents are of the opinion that people with disabilities are affected differently in this special situation of the COVID-19 pandemic in comparison to able bodied people.

Whereas only one athlete in our cohort was tested positively on SARS-CoV2, typical symptoms of a potential COVID-19 infection were stated quite often, assuming a higher estimated number of unreported cases. Although the athletes in our cohort were concerned about their health, quite some of them did not adapt their training volume when having symptoms of a potential COVID-19 infection. Beside the fact that athletes do not belong to the risk group for severe COVID-19, numerous individuals and occasionally entire sports teams have been affected by COVID-19 infections [3,20]. Since many individuals have only mild or no symptoms despite being infected, the question arises of to what extent a SARS-CoV-2 infection can affect eligibility for sport, particularly the point of return to training or competition [19]. Schellhorn et al. pointed out that a potential risk of a myocardial involvement cannot be excluded

even in asymptomatic athletes [23]. Taken a special risk for people with disabilities because of several pre-existing medical conditions or illnesses into consideration, particular awareness should be paid to the smallest indication of physical problems.

Since the onset of the COVID-19 pandemic individual as well as team sport athletes had to face challenges from social isolation, interruption of their training routine, unconventional and/or limited access to training venues or training partners. Teammates were suddenly isolated from others and were in some extent no longer able to participate in training or sport activities. Graupensberger et al. could show that student-athletes who received more social support and reported more connectedness with teammates reported better mental health and well-being [13]. Our data showed a trend that team athletes were less concerned during the COVID-19 pandemic than individual athletes. One can assume that commutation and communication between teammates via social media or the like during lockdown phases might be beneficial for mental health. Rohr et al. identified 13 studies, in which quarantine measures were consistently associated with negative psychosocial outcomes, including depressive symptoms, anxiety, anger, stress, posttraumatic stress, social isolation, loneliness and stigmatization [22]. Over the last years, a number of consensus statements on athlete mental health have been published, urging for improvement of the psychological safety of athletes in all phases of the Olympic and Paralympic quadrennial [12,14,18,21,27]. Although comparative data before the pandemic is missing, mental health in our cohort seemed to be on a reasonable

level. Since the whole scale of possible answers was used, we can assume that there are several athletes suffering from the pandemic whereas others cope quite well.

Jalali et al. reported on restricted transportation access of many disabled people in Iran e.g. to get to rehabilitation and treatment facilities, and on the vulnerability to virus transmission in public places [6,15]. This is in line with our results, as athletes from our cohort referred to a special risk for people with disabilities because of several pre-existing medical conditions or illnesses. Being reliant on personal assistance rose concerns of getting infected and emphasized sorrows and problems concerning their maintenance and care. Adapting to changing training conditions or adapting their sport specific training might pose a challenge for disabled athletes.

People with disabilities and their households often have lower incomes and savings, weaker social networks and fewer assets [2,8]. In a survey from Strava (a platform for athletes and the world's biggest sports community) and Stanford University (United States) conducted in August 2020, 71% of the included 131 professional endurance athletes (44% runners, 39% cyclists, 11% triathletes, 6% others) worried about receiving financial compensation for their athletic activities during COVID-19 restrictions. Before COVID-19 restrictions, 3.9% of athletes reported feeling down or depressed more than half the days in a week compared to 22.5% during COVID-19 restrictions, a 5.8fold increase [26]. It is remarkable that in our cohort athletes less worried about their financial or occupational situation or the loss of sponsors. However, those sorrows should appropriately set into context with the time of

data acquisition. Acquisition of data in our study was in May and July 2020 when the infection rate of COVID-19 in Germany was relatively low, and the Olympic and Paralympic Games were already postponed. In May and July 2020 financial support from the national sports fund and/or sponsors was often already assured or contracts were extended till the Games in 2021.

Although we have to assume that disabled athletes have to overcome further obstacles in their everyday life and their life as a high performance athlete, perpetuating their training routine although some athletes have lost their sporting short- or midterm goal, might help to face the uncertainty and anxiety the pandemic had arisen. Senisik et al. could show, that the positive effects of sport, which was done until the lockdown period, on mental health continued [24].

This study shows that the COVID-19 pandemic has a huge impact on the sports of elite para athletes. Future studies should emphasize on longitudinally psychosocial and physical health challenges amid the COVID-19 pandemic.

Conflict of Interest

The authors declare that they have no conflict of interest to disclose.

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