



The Impact of COVID-19 on Performance Preparation in Sprint Trained Athletes

JACKIE HO

DAN TAO

RASHMI SUPRIYA

JULIEN S. BAKER

*Author affiliations can be found in the back matter of this article

RESEARCH

][ubiquity press

ABSTRACT

Background: The purpose of this paper is to describe the effects on preparation for sprinting performance in Hong Kong university-level athletes during the COVID-19 pandemic. Changes in training methods, and well-being of athletes due to COVID-19 pandemic were also investigated.

Methods: Using Google Form, the study recall period was established during the closure of sports facilities in Hong Kong (2/2020–2/2021) during the COVID-19 pandemic. Physical state preparation (PSP), Mental state preparation (MSP), Nutritional preparation (NP), and Major changes in training methods (MTM) were analyzed.

Results: The results demonstrated no significant mean difference between male and female athletes on the effects of COVID-19 regarding the PSP, MSP, NP, and MTM. However, both males and females were highly disrupted in relation to performance preparation.

Conclusions: The pandemic affected physical performance, stress, and mental state, impacted on nutritional regimes, changed training locations and recovery strategies, and lowered training quantity and quality. In addition, athletes received less coaching, and had less accessibility to training equipment. Athletes and coaches should reflect on the effects of the COVID-19 pandemic to address personal training needs, while sports professionals need to carefully prepare themselves for sprinting performance, in relation to the current COVID-19 situation.

CORRESPONDING AUTHOR:

Dan Tao

Hong Kong Baptist University,
HK

21483132@life.hkbu.edu.hk

KEYWORDS:

Physical state preparation;
Mental state preparation;
Nutritional preparation; Major
changes in training methods;
COVID-19; University athletes

TO CITE THIS ARTICLE:

Ho, J., Tao, D., Supriya, R., &
Baker, J. S. (2022). The Impact
of COVID-19 on Performance
Preparation in Sprint Trained
Athletes. *Physical Activity
and Health*, 6(1), pp. 208–218.
DOI: [https://doi.org/10.5334/
paah.196](https://doi.org/10.5334/paah.196)

1. INTRODUCTION

COVID-19 became a pandemic on the 11th of March 2020 ('Archived : WHO Timeline – COVID-19', 2020). As a result, various public health measures were enforced in different countries and had significant impacts on athletic personal well-being and sports performance. In Hong Kong, on 28 January 2020, the announcement of the closure of all public museums, public libraries, and sports centres was announced ('Leisure and Cultural Services Department', 2020). This was followed by a ban on gatherings of more than four people in a public place ('Hong Kong Government: New regulations to fight COVID-19', 2020). The restriction and relaxation of health measures had been transient for almost two years, which made it very difficult for non-elite athletes to implement and participate in regular training routines.

The aim of this study was to describe the effects on performance of Hong Kong university-level sprint trained athletes because of the COVID-19 pandemic. A second aim was to explore any major changes in the training methods in Hong Kong university-level sprint trained athletes during the pandemic. It was hypothesized that there would be no differences between male and female sprinters because of the effects of COVID-19 regarding the physical, mental, and nutritional components of sprinting performance. It was also hypothesized that there would be no differences between male and female sprinters because of the effects of COVID-19 in training methods.

2. MATERIALS AND METHODS

DEFINITION OF TERMS FOR THE PURPOSE OF THIS PAPER

Sprinting is defined as the generation of maximum velocity (Slater, Sygo and Jorgensen, 2019). Sprint performance is defined as an ability to have quick reaction times, acceleration, maximum running velocity, and the ability to sustain performance in the presence of increasing fatigue (Ross, Leveritt and Riek, 2001).

SAMPLE SELECTION

The sample selection included males and females, with age ranges between 18–28 years. A total of 32 subjects participated in this study. They were all classified as non-elite athletes who were participants in at least one of the sprint events listed: 100/200/400/4×100/4×400/100 m hurdles/110 m hurdles/400 m hurdles. Subjects were selected voluntarily from all undergraduate and sub-degree programs in Hong Kong Universities (Bachelor's degree, top-up degree, associate degree, and higher diploma). Subjects were informed of the purpose of the study, their rights to participate and freedom to withdraw from the study at any time. All participants read and signed informed consent forms prior to participation.

DATA COLLECTION PROCEDURE

Convenience sampling was used for data collection, and questionnaires were collected during 20/2/2022–9/3/2022. The questionnaire included the consent statement for participants. Google Forms send via WhatsApp groups were used as the data collection tool. The study was approved by the University's Research Ethics Committee (REC).

MEASURING INSTRUMENT

The questionnaire comprised of 4 parts. Part 1 included the acknowledgement for voluntary completion of the questionnaire, with the terms and basic information of the study provided. Part 2 included the demographic information of participants including gender, age, university name, study year, major sprint events, years of training, and injury occurrence. Measures investigated also included physical state and mental state. Part 3 included three factors used in the preparation for sprinting performance, which were, Physical state preparation (PSP) (self-developed items), Mental state preparation (MSP) (Cohen, 1983) and Nutritional preparation (NP) (Kliemann, Rebecca J Beeken, et al., 2016). Part 4 included the Major changes in training methods (MTM) (self-developed items). Note that the PSP scale consisted of two subscales, including "COVID-19 measures" and "Physical performance" subscales. All questions applied to the recall period that coincided with the closure of sport facilities in Hong Kong (2/2020–2/2021). A pilot test was conducted on the self-developed items for PSP and MTM. The

reliability of PSP consisted of two separated subscales, including the COVID-19 measures, and Physical performance. Also, the reliability of MTM were separated as they analysed different topics. Cronbach's alpha was used for testing internal consistency, and all data were analysed as quantitative interpretations of the reliability analysis, including the COVID-19 measures, physical performance, training location before closure of sport facilities, training location following closure of sport facilities, new recovery strategies, training quantity. There were no reliability tests conducted on coaching received and training equipment accessibility.

PHYSICAL STATE PREPARATION (PSP) (SELF-DEVELOPED ITEMS)

Under PSP, "COVID-19 measures" subscale required subjects to complete a set of 7 items. COVID-19 measures were a subtopic to measure the perceived extent of disruption of the pandemic on the participants. A 5-point Likert scale was used on statements, ranging from 0 = Not at all, 1 = Slightly disrupted, 2 = Moderately disrupted, 3 = Highly disrupted, 4 = Extremely disrupted. The ranking of the measures showed how subjects perceived the measures from most disruptive to least disruptive.

Under PSP, "Physical performance" subscale required subjects to complete a set of 8 items. Physical performance was a subtopic to measure the perceived extent of disruption from the COVID-19 pandemic on Physical performance of the participants. A 5-point Likert scale was used on statements, ranging from 0 = Not at all, 1 = Slightly disrupted, 2 = Moderately disrupted, 3 = Highly disrupted, 4 = Extremely disrupted. The ranking of the physical components showed how subjects perceived the physical components were being most disrupted to least disrupted.

MENTAL STATE PREPARATION (MSP)

In MSP (Cohen, 1983) subjects were required to complete a set of 10 items using the psychometric properties of a European Spanish Version of the Perceived Stress Scale (PSS-10). The PSS-10 were used to test the perceived stress levels of the subjects in the previous month corresponding to the time frame of the investigation. The questionnaire used was previously assessed to be reliable and valid (Cohen, 1983). A 5-point Likert scale was used on statements, ranging from 0 = never, 1 = almost never, 2 = sometimes, 3 = often, 4 = very often. Four positively worded items (item 4, 5, 7, 8) were reverse scored, ranging from 0 = 4, 1 = 3, 2 = 2, 3 = 1, 4 = 0. The final ratings were summed, with higher scores indicating more perceived stress. The reliability of the test was examined using Cronbach's alpha coefficients, which were 0.79. The validity of the test was also verified, with good convergent validity using the Adolescent Self-Rating Life Events Checklist (ASLEC), which is a tool demonstrating satisfactory validity and reliability, and suggested that the PSS-10 was significantly related to both the number ($r = 0.13$, $p < 0.001$) and the impact ($r = 0.23$, $p < 0.001$) of the ASLEC (Liu et al., 2020).

NUTRITIONAL PREPARATION (NP)

In NP (Kliemann, Rebecca J Beeken, et al., 2016) subjects were required to complete a set of 5 items. The five-item Self-Regulation of Eating Behaviour Questionnaire (SREBQ) which is a measure of eating self-regulatory capacity (Kliemann, Rebecca J. Beeken, et al., 2016). This measure considers the skills needed to successfully self-regulate healthy eating behaviour (Kliemann, Rebecca J. Beeken, et al., 2016). A 5-point Likert scale was used on statements with responses ranging from 1 = always, 2 = often, 3 = sometimes, 4 = rarely, 5 = never. Two items were reverse scored, ranging from 1 = 5, 2 = 4, 3 = 3, 4 = 2, 5 = 1. The final ratings were summed, with higher mean scores indicating higher eating self-regulatory capacity. The test-retest result for the SREBQ showed an intraclass correlation coefficient of 0.77 ($p < 0.05$). The Cronbach's alpha coefficient was 0.75, which outlined the reliability and validity of the test.

MAJOR CHANGES IN TRAINING METHODS (SELF-DEVELOPED ITEMS)

In this part, subjects were required to complete five different sets of subtopics. The first subtopic assesses the change of subject's training location before and after the closure of sport facilities. Multiple choices were provided based on the available training locations at that time. The second subtopic asks if subjects used any new recovery strategies or none during the pandemic. Multiple choices were provided, and subjects were allowed to include other new recovery strategies not listed. The third subtopic assesses the training quantity of subjects, which included three

components (average intensity of training during the closure of sports facilities, average training time per week during the closure of sports facilities, average training time per session during the closure of sports facilities). The mentioned components have the same single-choice answer, choosing from “Higher than before” or “Lower than before” or “Same as before”. The final ratings were summed, and the mean score showed the change of training quantity compared to pre-COVID-19. The fourth subtopic assessed the amount of coaching received. Single-choice answer was required, choosing from “More than before” or “Less than before” or “Not at all”. The final ratings were summed, and the mean score showed the change of amount of coaching received compared to pre-COVID-19. The last subtopic asks the subjects’ accessibility to training equipment during the pandemic. Single-choice answer was required, choosing from “More than before” or “Less than before” or “Not at all”. The final ratings were summed, and the mean score showed the accessibility to the training equipment compared to pre-COVID-19.

3. RESULTS

Recorded data was analysed using the Statistical Package for Social Sciences (SPSS). In all tests, $p < 0.05$ was considered statistically significant using two-tailed analysis. The reliability of PSP consists of two separated parts, including the COVID-19 measures, and Physical performance. For the COVID-19 measures, the internal consistency was 0.672 which was considered reliable (Table 1). For Physical performance, the internal consistency was 0.877 which was also considered reliable (Table 1). The reliability of MTM were separated as they analysed different topics. The Cronbach’s Alpha coefficient of training location before closure of sport facilities was 0.550 which was considered quite reliable (Table 1). Training location following closure of sport facilities was 0.410 which was also considered reliable (Table 1). New recovery strategies were 0.515 which was considered reliable. Training quantity was 1.000 which was very reliable (Table 1).

CRONBACH’S ALPHA SCORE	LEVEL OF RELIABILITY
0.0–0.20	Less Reliable
>0.20–0.40	Rather Reliable
>0.40–0.60	Quite Reliable
>0.60–0.80	Reliable
>0.80–1.00	Very Reliable

Table 1 Cronbach’s Alpha Level of Reliability.^a

^a From Ahdika’s Cronbach alpha level of reliability.¹

A total of 32 questionnaires were collected and included consent statements. Participants included 17 male (53.1%) and 15 female (46.9%) university level sprint athletes, received from 6 universities. The Mean years of training was 8.5 (Minimum 1 year, Maximum 14 years). The time to recovery after injuries included a Minimum of 3 days to a Maximum of 1 year. One participant who responded to the questionnaire had still not recovered. The detail of demographic information is outlined in Table 2.

DEMOGRAPHIC ITEMS	CLASSIFICATION	FREQUENCY	PERCENTAGE (%)
Gender	Male	17	53.1
	Female	15	46.9
Age	20	8	25
	21	8	25
	22	8	25
	23	3	9.4
	24	2	6.3
	25	2	6.3
	28	1	3.1
University	HKBU	11	34.4
	CUHK	5	15.6
	EdUHK	7	21.9
	CityU	3	9.4

Table 2 Demographic Information of Participants.

Abbreviations: HKBU, Hong Kong Baptist University; CUHK, The Chinese University of Hong Kong; EduHK, The Education University of Hong Kong; CityU, City University of Hong Kong; PolyU, The Hong Kong Polytechnic University; VTC, Vocational Training Council.

DEMOGRAPHIC ITEMS	CLASSIFICATION	FREQUENCY	PERCENTAGE (%)
	PolyU	4	12.5
	VTC	2	6.3
Study year	1	3	9.4
	2	8	25.0
	3	6	18.8
	4	11	34.4
	5	4	12.5
Major sprint events	100 m	11	34.4
	200 m	8	25.0
	400 m	13	40.6
	4 × 100 m	0	0
	4 × 400 m	4	12.5
	100 mH	4	12.5
	110 mH	3	9.4
	400 mH	6	18.8
Injury rate	Yes	11	34.4
	No	21	65.6

RANKING OF COVID-19 MEASURES BETWEEN MALE AND FEMALE PARTICIPANTS

COVID-19 measures were used to measure the perceived extent of disruption of the pandemic on the participants. The ranking order was in descending order in accordance to the *U* level of each subscale and is presented in Table 3.

COMPONENTS	RANK ORDER	MANN-WHITNEY U (<i>U</i>)	ASYMPTOTIC SIGNIFICANCE (<i>p</i>)
3.1.3 Closure of sport facilities	1	121.0	0.627
3.1.4 No dine-in at restaurant after 6 pm	2	108.0	0.441
3.1.1 Mandatory face mask policy	3	105.0	0.369
3.1.2 Social distancing policy	4	102.0	0.284
3.1.6 Vaccination	5	96.5	0.217
3.1.7 Quarantine	6	91.5	0.152
3.1.5 Mandatory COVID-19 test	7	79.0	0.049*

Table 3 Rank order, Mann-Whitney U, Asymptotic significance of the COVID-19 Measures of All participants. * $p < 0.05$ (2-tailed).

RANKING OF PHYSICAL PERFORMANCE BETWEEN MALE AND FEMALE PARTICIPANTS

Physical performance was used to measure the perceived extent of disruption from the COVID-19 pandemic on Physical performance of the participants. The order of ranking was in descending order according to the *U* level of each subscale and is presented in Table 4.

COMPONENTS	RANK ORDER	MANN-WHITNEY U (<i>U</i>)	ASYMPTOTIC SIGNIFICANCE (<i>p</i>)
3.1.14 Reaction time	1	127.5	1.000
3.1.9 Anaerobic capacity	2	127.0	0.983
3.1.11 Muscular endurance	3	120.0	0.761
3.1.10 Muscular strength	4	115.5	0.606
3.1.12 Muscular power	5	107.5	0.388
3.1.15 Flexibility	6		
3.1.13 Maximum sprint speed	7	98.0	0.176
3.1.8 Cardiovascular endurance	8	89.5	0.124

Table 4 Rank order, Mann-Whitney U, Asymptotic significance of the Physical Performance of All participants.

MANN-WHITNEY U TEST OF COVID-19 MEASURES IN MALE AND FEMALE PARTICIPANTS

U-level and mean rank was shown, there was no significant mean rank difference ($U = 88.5, p = 0.138$) between males ($Mr = 18.79$) and females ($Mr = 13.90$), which means the null hypothesis can be accepted.

MANN-WHITNEY U TEST OF PHYSICAL PERFORMANCE IN MALE AND FEMALE PARTICIPANTS

U-level and mean rank was shown, there was no significant mean rank difference ($U = 125.5, p = 0.940$) between male ($Mr = 16.62$) and female ($Mr = 16.37$), which means that the null hypothesis can be accepted.

MANN-WHITNEY U TEST OF MSP IN MALE AND FEMALE

There was no significant mean rank difference ($U = 109.0, p = 0.482$) between male ($Mr = 15.41$) and females ($Mr = 17.73$), which indicates that the null hypothesis can be accepted. Higher scores indicate more perceived stress, and since it is not a diagnostic instrument, there are no cut-offs. The mean and standard deviation of Male ($M = 18, SD = 3.43$) and females ($M = 19, SD = 3.42$) were calculated. Norms were compared with the total score (by age) for a sample of 2,000 community-based respondents in the US less than 25 years old ($M = 16.78, SD = 6.86$) and 25–34 years old ($mean = 17.46, SD = 7.31$) (*‘Perceived Stress Scale (PSS-10)’, 1988*). Each gender was higher than the norm of both age groups, while males had a slightly higher mean than female.

MANN-WHITNEY U TEST OF NP IN MALES AND FEMALES

With higher mean scores indicating higher levels of eating self-regulatory capacity, there were no significant mean rank differences ($U = 93.0, p = 0.188$) between male ($Mr = 14.47$) and female ($Mr = 18.80$), which means the null hypothesis can be accepted. The mean and standard deviation of males ($M = 3.2, SD = 0.74$) and females ($M = 3.45, SD = 0.44$) were calculated. The total mean score was divided into 3 classes, “Low level of eating self-regulatory skills” ($M < 2.8$), “Medium level of eating self-regulatory skills” ($M = 2.8–3.6$), “High level of eating self-regulatory skills” (*Guzek, Skolmowska and Głbska, 2022*). Each gender falls into the “Medium level of eating self-regulatory skills” classification. While females had a slightly higher mean than male.

COMPARISON OF TRAINING LOCATION BEFORE AND AFTER CLOSURE OF SPORT FACILITIES BETWEEN MALES AND FEMALES

Participants could choose one or more options in the multiple-choice question in [Tables 5 and 6](#). The options not chosen by participants are not shown in the tables.

COMPONENTS	MALE		FEMALE	
	COUNT	% WITHIN GENDER	COUNT	% WITHIN GENDER
Sport ground	16	94.1	15	100
Gym facility	16	94.1	15	100
Outdoor jogging tracks/Fitness trails	3	17.6	0	0
Home	3	17.6	0	0
Cycling track	1	5.9	0	0

Table 5 Count and % Within Gender of Training Location Before Closure of Sport Facilities of Male and Female.

COMPONENTS	MALE		FEMALE	
	COUNT	% WITHIN GENDER	COUNT	% WITHIN GENDER
Home	13	75.5	15	100
Streets	13	76.5	11	73.3
Outdoor jogging tracks/Fitness trails	7	41.2	1	6.7
Cycling track	7	41.2	2	13.3
Hills	4	23.5	0	0

Table 6 Count and % Within Gender of Training Location After Closure of Sport Facilities of Male and Female.

COMPARISON OF RECOVERY STRATEGIES BETWEEN MALES AND FEMALES

Participants could choose one or more options for the multiple-choice questions in Table 7. Options not chosen by participants are not shown. Only one response was deemed invalid and subsequently deleted. This was because no new recovery strategies were chosen, and other options were chosen at the same time.

COMPONENTS	MALE		FEMALE	
	COUNT	% WITHIN GENDER	COUNT	% WITHIN GENDER
No new recovery strategies	9	52.9	10	66.7
Sleep habit changes	5	29.4	3	20.0
Nutritional supplementation	6	35.3	0	0
Increase communication/seek guidance/support	2	11.8	2	13.3
Mental reset	2	11.8	1	6.7
Meditation	2	11.8	1	6.7

Table 7 Count and % Within Gender of Recovery Strategies of Male and Female.

MANN-WHITNEY U TEST AND COMPARISON OF TRAINING QUANTITY BETWEEN MALES AND FEMALES

In Table 8, there was no significant mean rank difference ($U = 112.0, p = 0.308$) between Male ($Mr = 17.41$) and Female ($Mr = 15.47$). This means the null hypothesis can be accepted. The option “Higher than before” was not chosen by either Male or Female respondents in all three questions (Question 4.4–4.6) which was not shown in the table.

COMPONENTS		MALE		FEMALE	
		COUNT	% WITHIN GENDER	COUNT	% WITHIN GENDER
AvgInt	Lower than before	16	94.1	15	100
	Same as before	1	5.9	0	0
AvgTimeWeek	Lower than before	14	82.4	15	100
	Same as before	3	17.6	0	0
AvgTimeSession	Lower than before	14	82.4	14	93.3
	Same as before	3	17.6	1	6.7

Table 8 Count and % Within Gender of Training Quantity of Male and Female.

Abbreviations: AvgInt, average intensity of training; AvgTimeWeek, average training time per week; AvgTimeSession, average training time per session.

MANN-WHITNEY U TEST AND COMPARISON OF COACHING RECEIVED BETWEEN MALES AND FEMALES

In Table 9, there was no significant mean rank difference ($U = 113.5, p = 0.357$) between Male ($Mr = 15.68$) and Female ($Mr = 17.43$), which accepts the null hypothesis. Comparisons are outlined in the table.

COMPONENTS		MALE		FEMALE	
		COUNT	% WITHIN GENDER	COUNT	% WITHIN GENDER
Coaching received	Not at all	2	11.8	1	6.7
	Less than before	15	88.2	13	86.7
	More than before	0	0	1	6.7

Table 9 Count and % Within Gender of Coaching Received of Male and Female.

MANN-WHITNEY U TEST AND COMPARISON OF TRAINING EQUIPMENT ACCESSIBILITY BETWEEN MALES AND FEMALES

In Table 10, there was no significant mean rank difference ($U = 124.0, p = 0.865$) between Male ($Mr = 16.29$) and Female ($Mr = 16.73$), which accepts the null hypothesis. Comparison was shown in the table.

COMPONENTS		MALE		FEMALE	
		COUNT	% WITHIN GENDER	COUNT	% WITHIN GENDER
Training equipment accessibility	Not at all	5	29.4	4	26.7
	Less than before	12	70.6	11	73.3
	More than before	0	0	0	0

Table 10 Count and % Within Gender of Training Equipment Accessibility of Male and Female.

4. DISCUSSION

MANN-WHITNEY U TEST AND COMPARISON OF COVID-19 MEASURES BETWEEN MALE AND FEMALE PARTICIPANTS

Most of the participants agreed that closure of sport facilities was the most disrupting measure, which was expected and had the most direct impact on training. No dine-in at restaurant after 6 pm may inhibit athletes' post-training nutrition replenishment which was ranked as second. Mandatory face mask policy ranked third which may be the cause of performance reduction such as maximal oxygen consumption (VO₂ max) when exercising with a face mask (Driver et al., 2022). This proposal needs further experimental investigation.

MANN-WHITNEY U TEST AND COMPARISON OF PHYSICAL PERFORMANCE BETWEEN MALE AND FEMALE PARTICIPANTS

Following the closure of sport facilities, athlete's chances of accessing proper training facilities were greatly impaired. Athlete's body mass, body composition, functional capacity and the neuromuscular and cardiovascular systems were impaired, which can lead to a reduction in strength, speed, flexibility and endurance (Wiltshire, Supriya and Baker, 2022). A further examination on the reason of choice of athletes perceived disruption is needed.

MANN-WHITNEY U TEST OF MSP BETWEEN MALES AND FEMALES

The result did not show significant differences in perceived stress. Contrary to this point (Carnevale Pellino et al., 2022) showed that female athletes had higher subjective distress levels than males. It is important to compare the results to more available data. On the other hand, studies have found the association between negative changes in health behaviours such as physical activity and increased psychological distress (Woodford and Bussey, 2021). The findings support the result that mental preparation was negatively affected in the athletic population.

MANN-WHITNEY U TEST OF NP BETWEEN MALES AND FEMALES

Although the results show no significant mean difference between males and females, it is possible to interpret females as having lower self-regulation ability during the COVID-19 pandemic. It is associated with the fact that the relationship between age and food cravings is stronger in female than in male individuals (Guzek, Skolmowska and Głbska, 2022). On the other hand, the total mean score of male and female was considered medium level of eating self-regulatory skills. Despite the high amount of stress, athletes were able to control their diet in a healthy way. Contradictory to the work of (Alexandra and Custódio, 2021), the research shows that there was an increased intake of unhealthy foods and out-of-control eating during the COVID-19 pandemic.

COMPARISON OF TRAINING LOCATION BEFORE AND AFTER CLOSURE OF SPORT FACILITIES BETWEEN MALES AND FEMALES

Before the closure of sport facilities, most of the participants trained at sport grounds (Male 94.1%, Female 100%) and gym facilities (Male 94.1%, Female 100%). Post closure, the common training location was the home (Male 76.5%, Female 100%) and streets (Male 76.5%, Female 73.3%). This could be influenced by the closure of sports-related facilities, causing athletes to find other locations for training and reducing sport-specific training such as plyometrics and weightlifting. Unlike professional athletes (Olympic/ international/ national level) who retained training specificity to a greater degree than others due to more access to training resources, lower classified athletes (recreational) saw marked reduction in training specificity (Wiltshire, Supriya and Baker, 2022). This highlights the point that recreational level athletes, or those who were not in the professional classification had to change training location and reduce sport specific training.

COMPARISON OF RECOVERY STRATEGIES BETWEEN MALES AND FEMALES

Participant's coping methods during the pandemic were also analysed. The results show that half of males (52.9%) and females (66.7%) had no new recovery strategies. If excluding "No new recovery strategies", nutritional supplementation had the highest response (35.3%) for male, and sleep habit changes had the highest response (20.0%) for females. According to (Alexandra and Custódio, 2021), despite the limited evidence on the specific food or supplement recommendations that can prevent or help in the treatment of COVID-19. It is important to prevent micronutrient deficiencies through balanced diet and supplements such as vitamins and minerals to maintain immune health. Thus, it is possible that athletes may seek nutritional supplementation as a coping strategy during the pandemic. On the other hand, according to (Facer-Childs et al., 2021), the research reported a significant increase in sleep latency and delay in mid-sleep times in elite athletes. Therefore, Sleep habits were affected during the COVID-19 lockdown which may be the associated with the use of sleep habit changes of female participants.

MANN-WHITNEY U TEST AND COMPARISON OF TRAINING QUANTITY BETWEEN MALES AND FEMALES

The results show that over 80% of males and females had lower average intensity of training, lower average training time per week, and lower average training time per session compared with prior COVID-19. According to (Jagim et al., 2020), most participants reported training at lower intensities, training frequency, and time spent on sport-specific training. In addition to this, compared with pre lockdown, most athletes reported reduced training frequency and shorter training sessions (Wiltshire, Supriya and Baker, 2022). This indicates an athlete's overall training quantity was decreased compared to pre-COVID-19 and is like the situation observed Hong Kong.

MANN-WHITNEY U TEST AND COMPARISON OF COACHING RECEIVED BETWEEN MALES AND FEMALES

The results show that over 85% of male and females had less coaching received than before. Contradictory (Jagim et al., 2020), a survey reported 94.3% of individuals continued to receive guidance from their coach or strength training staff, although it was not specified whether athletes had a change in the quantity of coaching received. This result indicates that athletes continued to work with coaches during the pandemic, which was not the same as the situation in Hong Kong, where athletes' coaching was decreased compared to pre-COVID 19. Another study suggested that athlete's access to coaches, medical and health professionals were hindered (Wiltshire, Supriya and Baker, 2022). The study suggests that the level of coaching received differs in a range of variables such as level of athlete and geographic location. Practitioners should be careful when analysing the impact on athletes.

MANN-WHITNEY U TEST AND COMPARISON OF TRAINING EQUIPMENT ACCESSIBILITY BETWEEN MALES AND FEMALES

Over 70% of both male and females reported less training equipment accessibility. In addition to this, Jagim et al. (2020) reported that the athletes did not have a diverse resistance training equipment, and they did not have enough time to prepare appropriate equipment for training at home. Such that the situation of having less accessibility to training equipment is like the situation for Hong Kong athletes. This situation may influence an athlete's ability to maintain sports-specific training, and will have a detrimental effect on their performance.

LIMITATIONS OF THE STUDY

Convenience sampling was used in this study which may cause bias. Since the COVID-19 variant Omicron started to spread widely in January, the Hong Kong Government had closed the sport facilities again to stop the spread of the disease. The unforeseeable repeated closure of sport facilities may change the perception of athletes when recalling the period (2/2020–2/2021) because there could be further possible adaptations to the situation. However, since athletes are subjected to regular training and should be very familiar with their training schedules, which could reduce the recall bias and increase the reliability and accuracy of the recall result. On the other hand, the factors affecting performance and training methods are multi-factorial and not all factors could be included. The results show possible implications showing associations between factors but cannot be directly regarded as a cause.

Correlations between COVID-19 measures and Physical performance as well as the degree of impact should be analysed to examine the association between the two components. Apart from comparing male and females' mental health, participant's life conditions such as socio-economic status, and the degree of impact on mental health related components such as motivation also need to be examined. The relationship between self-regulatory eating behaviour and the pandemic can also be further assessed. The details of recovery strategies can also be further examined. This includes what nutritional supplementation were used or how sleep habit changes were implemented. The detail of training quantity can be further examined, such as how many average training hours increased/decreased per session per week. A safe return to sport should be developed for training and competition after the re-opening of sport facilities for the health and well-being of individuals. The length of closure on sport facilities may affect athletes' perception, including changes in physical, mental, nutritional, and training methods need further examination in a long-term study.

5. CONCLUSIONS

From the results and discussions, it can be concluded that there was no significant mean differences between males and females relating to the effects of COVID-19 regarding PSP, MSP, NP, and MTM. The impact from the pandemic shows that athletes were disrupted by the pandemic and by the COVID-19 restrictions. Physical performance, mental health, medium level of eating self-regulatory skills, lower average intensities of training, lower training frequency and time, less coaching received, and less accessibility to training equipment were observed. Results also show changes in training locations. On the other hand, athletes can reflect on the effects of the COVID-19 pandemic to address their personal needs based on the results of this study. The information provided here is useful for sports practitioners and can help develop better preparation for sprinting performance for individuals during the continuing COVID-19 pandemic and for future pandemics.

ACKNOWLEDGEMENTS

The authors would like to express deepest gratitude to all participants involved in this study.

COMPETING INTERESTS

The authors have no competing interests to declare.

AUTHOR AFFILIATIONS

Jackie Ho  orcid.org/0000-0002-2111-3499
Hong Kong Baptist University, HK

Dan Tao  orcid.org/0000-0002-9437-3646
Hong Kong Baptist University, HK

Rashmi Supriya  orcid.org/0000-0003-2995-1910
Hong Kong Baptist University, HK

Julien S. Baker  orcid.org/0000-0001-7550-8616
Hong Kong Baptist University, HK

REFERENCES

- Alexandra, C., & Custódio, R.** (2021). 'COVID-19 pandemic: Impact on athletes and nutritional considerations Pandemia da COVID-19: Impacto nos atletas e considerações nutricionais'.
- Carnevale Pellino, V., et al.** (2022). 'Effects of the lockdown period on the mental health of elite athletes during the COVID-19 pandemic: a narrative review'. *Sport Sciences for Health* [Preprint], (0123456789). DOI: <https://doi.org/10.1007/s11332-022-00964-7>
- Cohen, S.** (1983). 'Cohen Perceived Stress'. *J Health Soc Behav*, 24(4), 2. Available at: <http://podcast.uctv.tv/webdocuments/COHEN-PERCEIVED-STRESS-Scale.pdf>. DOI: <https://doi.org/10.1037/t02889-000>
- Driver, S., et al.** (2022). 'Effects of wearing a cloth face mask on performance, physiological and perceptual responses during a graded treadmill running exercise test'. *British Journal of Sports Medicine*, 56(2), 107-113. DOI: <https://doi.org/10.1136/bjsports-2020-103758>

- Facer-Childs, E. R., et al.** (2021). 'Sleep and mental health in athletes during COVID-19 lockdown'. *Sleep*, 44(5), 1–9. DOI: <https://doi.org/10.1093/sleep/zsaa261>
- Guzek, D., Skolmowska, D., & Głabska, D.** (2022). 'Analysis of Self-Regulation of Eating Behaviors within Polish Adolescents' COVID-19 Experience (PLACE-19) Study'. *Nutrients*, 14(8), 1–14. DOI: <https://doi.org/10.3390/nu14081679>
- 'Hong Kong Government: New regulations to fight COVID-19' (2020).
- Jagim, A. R., et al.** (2020). 'The Impact of COVID-19-Related Shutdown Measures on the Training Habits and Perceptions of Athletes in the United States: A Brief Research Report'. *Frontiers in Sports and Active Living*, 2(December), 1–6. DOI: <https://doi.org/10.3389/fspor.2020.623068>
- Kliemann, N., Beeken, R. J., et al.** (2016). 'Development and validation of the Self-Regulation of Eating Behaviour Questionnaire for adults'. *International Journal of Behavioral Nutrition and Physical Activity*, 13(1), 1–11. DOI: <https://doi.org/10.1186/s12966-016-0414-6>
- Kliemann, N., Beeken, R. J., et al.** (2016). 'Self-Regulation of Eating Behaviour Questionnaire (SREBQ)'. *PsycTESTS Dataset*, 1. DOI: <https://doi.org/10.1037/t56365-000>
- 'Leisure and Cultural Services Department' (2020). 2020.
- Liu, X., et al.** (2020). 'Factor Structure of the 10-Item Perceived Stress Scale and Measurement Invariance Across Genders Among Chinese Adolescents'. *Frontiers in Psychology*, 11(April), 1–10. DOI: <https://doi.org/10.3389/fpsyg.2020.00537>
- 'Perceived Stress Scale (PSS-10)' (1988). 1988.
- Ross, A., Leveritt, M., & Riek, S.** (2001). 'Neural influences on sprint running training adaptations and acute responses'. *Sports Medicine*, 31(6), 409–425. DOI: <https://doi.org/10.2165/00007256-200131060-00002>
- Slater, G. J., Sygo, J., & Jorgensen, M.** (2019). 'Sprinting... Dietary approaches to optimize training adaptation and performance'. *International Journal of Sport Nutrition and Exercise Metabolism*, 29(2), 85–94. DOI: <https://doi.org/10.1123/ijsnem.2018-0273>
- Wiltshire, H. D., Supriya, R., & Baker, J. S.** (2022). 'COVID-19 Impact on the Sport Sector Economy and Athletic Performance'. *Journal of Risk and Financial Management*, 15(4). DOI: <https://doi.org/10.3390/jrfm15040173>
- Woodford, L., & Bussey, L.** (2021). 'Exploring the Perceived Impact of the COVID-19 Pandemic Social Distancing Measures on Athlete Wellbeing: A Qualitative Study Utilising Photo-Elicitation'. *Frontiers in Psychology*, 12(July), 1–16. DOI: <https://doi.org/10.3389/fpsyg.2021.624023>
- World Health Organization.** (2020). 'Archived: WHO Timeline – COVID-19'. World Health Organization, (June), p. 2020. Available at: https://www.who.int/news-room/detail/27-04-2020-who-timeline---covid-19?gclid=EAiaIQobChMI4MaewOeo6gIVyyMrCh2JRgUIEAAYASAAEgLo3_D_BwE

TO CITE THIS ARTICLE:

Ho, J., Tao, D., Supriya, R., & Baker, J. S. (2022). The Impact of COVID-19 on Performance Preparation in Sprint Trained Athletes. *Physical Activity and Health*, 6(1), pp. 208–218. DOI: <https://doi.org/10.5334/paah.196>

Submitted: 07 July 2022

Accepted: 22 September 2022

Published: 14 October 2022

COPYRIGHT:

© 2022 The Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CC-BY 4.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited. See <http://creativecommons.org/licenses/by/4.0/>.

Physical Activity and Health is a peer-reviewed open access journal published by Ubiquity Press.