

Ski world cup in safety in the context of coronavirus disease 2019 (COVID-19) pandemic

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Abstract

Introduction: In the current pandemic scenario, it is necessary to ensure the health and safety of athletes, teams, and participants of competitive skiing events. This paper aimed to report a health and safety protocol for the Ski World Cup races experimented in Italy during the second wave of the COVID-19 pandemic.

Methods: A protocol was developed for the prevention of COVID-19 infection among participants at skiing competitive races conducted at Santa Caterina and Bormio cities, Lombardy region, Italy in December 2020. The protocol was based on the recommended preventive measures issued from the public health community and indications reported by the Italian Sports Medical Federation (FMSI) protocol. A self-reported questionnaire was administered to participants. Antigenic swab tests were carried out 'on-site'. Medical examinations were performed, when required. Descriptive analyses were carried out.

Results: One thousand three hundred and ninety (91.6%) out of 1,518 participants were accredited. Only one of the 694 swab tests performed on-site for accreditation turned positive in an asymptomatic subject and was confirmed by molecular swab test. During the events no suspected case of COVID-19 was reported to the LOC. At the end of the two sporting events, antigen swabs were performed on 50 participants, and these yielded negative results. No COVID-19 positive case was reported in the next 14 days after the end of the games.

Discussion and Conclusion: In Italy, the application of a protocol based on a self-administered questionnaire with a combination of antigen tests was effective for the reopening of elite skiing activity in Santa Caterina and Bormio during the second wave of the COVID-19 pandemic in Italy.

KEY WORDS: COVID-19; Italy; health protocol; rapid antigen swab; ski; sport medicine.

INTRODUCTION

In late December 2019, several clusters of patients with pneumonia of unknown etiology were reported and epidemiologically linked to a seafood market, in Wuhan, Hubei province, China [1]. As of 30th January 2020, the outbreak of the novel coronavirus named SARS-CoV-2, which was identified as the causative agent of a severe acute respiratory syndrome, later called COVID-19, was declared a public health emergency. On 11th March 2020, COVID-19 was declared a pandemic by the World Health Organization (WHO) and has spread to almost all countries of the world [2]. Governments' immediate protective measurements aimed to slow down the ongoing spread of COVID-19 [3]. In Italy, the imposition of non-pharmaceutical interventions (NPIs) such as the closure of schools [4] and non-essential activities, lockdown of cities, travel bans, restricted social gatherings and quarantine measures up to a generalized lockdown on the entire country have alleviated the pressure on the healthcare system and have been credited with getting the initial major outbreak

under control [5].

COVID-19 has posed many challenges to many regular aspects of life, including sport and physical activity. To safeguard the health of athletes and others involved, most major sporting events at international and national levels have been cancelled. For the first time in the history of the modern games, the Olympics and Paralympics have been postponed to 2021 [6]. All the restrictive and lockdown measures, however, led to both social and economic negative consequences.

In Italy, the decree of the President of the Council of Ministers (DPCM) issued on 8th March 2020 for implementing the decree-law of 23rd February 2020, No. 6 on urgent containment and management measures of the epidemiological emergency from COVID-19, suspended all the sporting events and competitions of all kinds and disciplines in public or private places. However, events and competitions, as well as the training sessions of professional athletes and athletes of absolute category participating in the Olympic Games or national or international events,

TAKE-HOME MESSAGE

In this short report, a health protocol based on a self-administered questionnaire with a combination of PCR or antigen tests was effective for the reopening of elite skiing activity in Santa Caterina and Bormio, during the second wave of the COVID-19 pandemic in Italy.

Competing interests - none declared.

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Cite this article as: Villa A, Boccardi M, Fiocchi M, Szarpak L, Ilesanmi O. Ski world cup in safety in the context of coronavirus disease 2019 (COVID-19) pandemic. J Health Soc Sci. 2021;6(2):221-230

Author Contributions: Conceptualization, study design, data collection, methodology, formal analysis, writing- original draft, writing- review & editing: AV. Data collection, resources, review & editing: MB. Data collection, writing- original draft, writing- review & editing, MF. Writing- review & editing: LS and OI.

DOI 10.19204/2021/skwrt8

Received: 29/03/2021

Accepted: 17/05/2021

Published Online: 30/05/2021

could take place inside sports facilities used behind closed doors, or outdoors without the presence of the public. Furthermore, the Italian Government required by sports associations and clubs, through their medical staff, to carry out appropriate controls to contain the risk of spread of the COVID-19 virus among athletes, technicians, managers, and all accompanying persons [7].

To date, there are no evidence-based strategies for reopening sporting activities after the COVID-19 lockdown [8], and the principle of 'maximal caution' has been evoked [9]. Many professional leagues in the United States have established guidelines and recommendations for their athletes to compete safely, by mitigating and limiting the risk of spread of SARS-CoV-2 [10]. Each sport has its own unique risks to the spread of SARS-CoV-2, and this fact should be considered. A distinction should be made for those sports that are low risk or high risk for spreading SARS-CoV-2 [10]. Moreover, regarding spectators or non-athletic participants, they are at risk of contracting or spreading Sars-CoV-2 as well [10]. One of the first documents to address the risk of COVID-19 transmission for sporting events was published by the WHO in March 2020 [11]. This document includes a tool for categorizing the risk of mass gatherings in case of sporting events, which organizers of events must use for the precise assessment of the overall risk of spread [12].

In the United States, the National Collegiate Athletic Association (NCAA) have established guidelines and recommendations for the safe reopening of sporting events [10]. NCAA's guidelines update the risk assessment and the risk categorization for each sport [13]. Within this framework, the publication offers recommendations for testing strategies. The strategies are based on the level of risk (low/medium or high contact risk) for any sports that are listed, including alpine skiing. In several countries, many sports federations, medical associations, and societies related to sports have developed different protocols to minimize the SARS-CoV-2 impact

prior to the return to competitions [14–17], but there are no specific protocols for alpine skiing. In Italy, the Italian Sports Medical Federation (FMSI) has recently drawn up a protocol for the return to physical activity after COVID-19 lockdown is lifted [18].

In Italy, the improvement of the epidemiological situation has allowed an easing of the restrictive measures. On 4th May 2020, Italy entered the "second phase" of its COVID-19 lockdown. The progressive easing of lockdown, in combination with contact tracing, isolation and testing activity, and widespread compliance with safety measures by citizens have led to a progressive restarting of work activities associated with a relief of the socio-economic situation [19]. However, the relaxations of lockdown policies and, after the summer, the reopening of schools, working activities and a crowded public transport needed to ensure the operation of schools and business promoted the second wave in October 2020 with a rapid rise of the curve [4, 19–21].

According to the recommendations of the International and National Ski Federations and institutional normative requirements [22–27], for the first alpine skiing competitions of the Ski World Cup in Italy, in December 2020, a health and safety protocol taking COVID-19 into consideration, was developed, and applied for all participants in the events, including sport teams, media, sponsors, staff and employees of the Local Organizing Committee (LOC). In this short paper, we report the preliminary findings of this protocol.

METHODS

Study design and procedure

In this cross-sectional, descriptive, study, all the participants (i.e., athletes, coaches, team managers, team physical therapists, equipment managers, staff and employees of the LOC, First Aid members, journalists, and photographers) from 21 countries from all over the world, attending two events of the Ski World Cup competitions in Santa Caterina (5-7 December 2020) and Bormio (28-

30 December 2020), in Valtellina, Lombardy Region, Italy, were accredited with the aim of creating the so-called 'COVID-19 bubble'.

Study participants and instruments

All the participants in the events were subdivided into four groups: 1) team groups (including athletes, coaches, team managers, team physical therapists, and equipment managers); 2) LOC (including staff and employees of LOC); 3) media (including journalists and photographers); and 4) service/sponsors (including First Aid members, sponsors, and all other participants).

With this purpose, a safety protocol was prepared according to the 'COVID-19 Guidelines and rules of conduct' developed by the International Ski Federation and Health Authorities of Lombardy region [28, 29]. These guidelines require that LOC staff, media, First Aid members, and those involved in the event must prove negative results to COVID-19 test before they could take part in the event. All teams must provide own athletes and staff information on preventive measures concerning health behavior and use of personal protective equipment (PPEs) (i.e., facial mask, distance, and hygienic rules). Participants were required to wear a mouth-nose protection mask (surgical mask) and maintain 1 meter distance at all event venues, accredited zones, public areas, and during transports. The use of masks was however exempted in the following exceptional circumstances: 1) athletes in the warming-up area or after entering the start corridor; and 2) journalists and photographers in the media centre when sitting at their desk during mealtimes. Media teams were invited to travel to Santa Caterina and Bormio with their own means of transport. Team members were invited to avoid contacts with non-team members. All the invited participants could only travel if they had no COVID-19 symptoms. In addition to general preventive measures, team members were required to present before their arrival a negative Polymerase Chain Reaction (PCR) swab test result, conducted within the previous 72 hours. For other participan-

ts, antigen tests within the previous 24 hours were required, or alternatively carried out 'on site'. The nasopharyngeal antigen swab was performed by COV-S23® rapid antigen test device (B.S.N. S.r.l. – Italia) with a declared diagnostic sensitivity of 97.1% and diagnostic specificity of 99.1% [30]. Recently, the WHO recommended a minimum of 80% sensitivity and 97% specificity for antigen-detection rapid diagnostic tests that are considered useful for screening asymptomatic subjects [31]. It was also required that the results of previous swabs are uploaded on passport system of the International Ski Federation (FIS) to establish individuals' medical history [24]. A self-reported health questionnaire, developed by FIS was administered to participants [23, 24]. This questionnaire investigated the presence, in the last 14 days of suspected symptoms for COVID-19 infection, any contact with positive subjects and any positivity confirmed by a PCR test or quarantine of the subject in question. In case of positive response to at least one of these questions, a negative COVID-19 PCR test within the previous 72 hours was requested before arrival at the event for accreditation.

In case of COVID-19 symptoms, the subject was required to immediately contact the LOC to undergo a medical examination and be isolated with a notification to the local public health authority. In this case, an accreditation could not be issued until the subject has been cleared by the public health authority. Finally, athletes and accredited persons were reassured that declaring travel history from high-risk area could not preclude their participation. Races were held in Santa Caterina (3 days) and Bormio (3 days). During the games, no swabs were performed except for symptomatic participants. At the end of the games, rapid antigen swabs were performed only upon request from participants, who were asked to inform the LOC of their health conditions in the next 14 days after the end of the games.

Data analysis

We analyzed accreditation data to confirm the adequacy of protocol, which were expres-

sed in terms of the proportion of confirmed COVID-19 cases during and at the end of the ski races. Statistical analysis (number and frequency) of health data and swab tests was computed using frequency tables and Chi square test for comparison were carried out. P was set at < 0.05. SPSS software package was used for the analyses.

Ethical aspects

This study was conducted in tandem with the ethical principles of the Declaration of Helsinki. An informed consent along with each health questionnaire was administered to all participants, who were fully aware of their right to withdraw their participation prior to the completion of the questionnaire. The consent explained the aim of the study with clarification about the voluntary participation and confidentiality. Additionally, an administrative approval was obtained by the organizer, 'ATS Montagna', on behalf of Lombardy Region.

RESULTS

Overall, in the two events, we received requests for 1,518 accreditations. The mean age was 42 ± 15 years, 1,357 (89.4%) were males, while 161 (10.6%) were females. After the evaluation of the applicants' health data and the eventual execution of the swabs, 1,390 (91.6%) subjects were accredited of which 1,247 (89.7%) were males and 143 (10.3%) were females. One subject was not accredited on site because of a positive antigenic swab (confirmed with a molecular swab), while 127 (9.1%) subjects were not accredited, of which 114 (8.2%) had not a valid swab, 2 (0.1%) were under home quarantine measure, 1 (0.1%) tested COVID-19 positive and 10 (0.7%) were suspected positive and did not complete the self-reported questionnaire. Among non-accredited subjects, there were 10 athletes in Santa Caterina and 8 athletes in Bormio. Subjects who were accredited were from the following countries: Italy 891 (64.1%); Switzerland 82 (5.9%); Norway 76 (5.5%); France 73 (5.3%); Austria 71 (5.1%); Germany 45 (3.2%); Slovenia 32 (2.3%);

United States of America 31 (2.2%); Canada 21 (1.5%); Sweden 15 (1.1%); Great Britain 10 (0.7%); Spain 8 (0.6%); Croatia 7 (0.5%); Russia 6 (0.4%); Slovakia 6 (0.4%); Belgium 5 (0.4%); Japan 4 (0.3%); Czech Republic 3 (0.2%); Netherlands 3 (0.2%); Argentina 1 (0.1%).

Table 1 shows the accreditation data subdivided for the two events.

From the health questionnaire completed by the 1,390 accredited subjects, 7 subjects (0.5%) have had suspicious symptoms in the past 14 days; 13 subjects (0.9%) had been in contact with persons affected by Coronavirus infection; and 5 subjects (0.4%) had been in quarantine in the past 14 days. Among all these subjects, an antigen swab control yielded negative results.

Some cases were assessed individually, by questioning the subject (or in some cases the referring physician of the team), in relation to the clinical history of previous findings of positive swab.

Finally, 694 rapid antigen swabs were performed on site for accreditation and a single case of positivity was found (in an asymptomatic subject), confirmed with a molecular swab; this positivity was reported to the Health Authority and the subject was placed in domiciliary isolation.

However, during the event no suspected case of COVID-19 was reported to the LOC. At the end of the two sporting events, antigen swabs were performed on 50 participants, and these yielded negative results. No COVID-19 positive case was reported in the next days after the end of the events.

DISCUSSION AND CONCLUSION

In the current COVID-19 pandemic scenario, the Federations of elite sports have strongly advocated for a resumption of sporting events and there was a wide debate about the desirability of a restart of races [9, 32]. The resumption of sporting events will signal the return to normalcy, while providing off site viewers with a form of entertainment. However, proper safety precautions must be put in place to ensure the health of athletes, teams,

Table 1. Health and swabs data for accreditation ($n = 1,518$ participants).

	Santa Caterina 'Event'	Bormio 'Event'	Total
Accredited subjects			
LOC	235 (92.9%)	284 (96.6%)	519 (94.9%)
Team	218 (89.0%)	224 (92.6%)	442 (90.8%)
Media	106 (82.2%)	146 (89.6%)	252 (86.3%)
Service/sponsor	42 (80.8%)*	135 (96.4%)*	177 (92.2%)
Total	601 (88.5%)	789 (94.0%)	1390 (91.6%)
Mean age (years \pm SD)	42\pm14	43\pm15	42\pm15
Non-accredited subjects			
LOC	18 (7.1%)	10 (3.4%)	28 (5.1%)
Team	27 (11.0%)	18 (7.4%)	45 (9.2%)
Media	23 (17.8%)	17 (10.4%)	40 (13.7%)
Service/sponsor	10 (19.2%)*	5 (3.6%)*	15 (7.8%)
Total	78 (11.5%)	50 (6.0%)	128 (8.4%)
Mean age (years \pm SD)	41\pm13	43\pm15	43\pm15

LOC: Local Organizing Committee

* $Chi^2 = 10.83$; $P < 0.001$

Table 2. Comparison of data between accredited or non-accredited subjects.

	Accredited subjects	Non-accredited subjects	P
LOC	519 (37.3%)	28 (21.9%)	0.15
Team	442 (31.8%)	45 (35.2%)	0.77
Media	252 (18.1%)	40 (31.3%)	0.08
Service/sponsor	177 (12.7%)	15 (11.7%)	0.77
Male	1247 (89.7%)	110 (85.9%)	0.28
Female	143 (10.3%)	18 (14.1%)	0.93
18-25 years	302 (21.7%)	18 (14.1%)	0.64
25-35 years	350 (25.2%)	37 (28.9%)	0.77
35-45 years	291 (20.9%)	35 (27.3%)	0.51
>45 years	447 (32.2%)	38 (29.7%)	0.89
Italy	891 (64.1%)	84 (65.6%)	0.88
Other Countries	499 (35.9%)	44 (34.4%)	0.97
Total	1,390	128	

LOC: Local Organizing Committee

and all participants amid the COVID-19 pandemic.

Many documents have appeared in the scientific literature to plan and evaluate the return to competitive activity [8, 10, 12–18, 32]. Our protocol contributed to the safe restart of elite skiing activity in Italy. Some documents [11, 12] have updated the risk categorizations of spread for each sport. Alpine skiing is considered a low/medium contact risk sports, thus it was possible to return to the competition in safety. Our protocol emphasizes the necessity to isolate the participants, tracing the clinical history of each member of the team, and a demonstration of negative swab test results (a molecular swab for athletes and sport team members or an antigen swab for other participants).

Rapid antigen tests are widely used for scre-

ening large proportions of population groups [33]. These tests are currently adopted for the frequent monitoring of personnel operating in at-risk environments such as schools or hospitals or to carry out extensive screening activities on populations where a new outbreak of infection is suspected [33–36]. Compared to PCR-based methods, rapid antigenic tests are characterized by more rapid execution time of about 15–30 minutes, a lower cost and easier procedure that does not require the presence of highly trained personnel [37]. These characteristics are optimal in an environmental condition as a skiing event. Lombardy Region approved the use of rapid antigen tests for surveillance of COVID-19 infection [28]. It is therefore demonstrated that rapid antigenic tests can offer advantages in terms of rapid response and costs, especial-

ly in situations where the possibility of performing PCR-tests could be limited (as in the event we represent). Rapid antigen tests, providing the result promptly, can therefore play a role in screening asymptomatic persons and who have not had recent close contact with subjects affected by COVID-19 [38].

However, the 'gold standard' for clinical diagnostic detection of SARS-CoV-2 remains PCR-based tests [39]. Therefore, these positive tests should always be confirmed by PCR analysis [33].

In consideration of the data presented, we posit that the two events took place under safe conditions from a health perspective. Comparison of the data between the two events showed a statistically significant reduction ($P < 0.001$) of non-accredited subjects in the service/sponsor subgroup. No other significant difference was observed when comparing gender, age groups and country of origin between accredited and non-accredited subjects.

Strengths and limitations

On the systematic analysis of the documentation on the FIS Passport: there was a case in which an athlete reported a positive swab on November 18th, with a subsequent negative swab after 18 days; however, in the questionnaire filled out on November 29th (therefore 11 days after the positive test was performed) all questions were answered in the negative way. These data cast doubt on the truthfulness

(and perhaps the usefulness) of the self-compilation of this document.

A further consideration on the significance of the health questionnaire (self-completed by each subject) is necessary. On 1,390 questionnaires, too low percentages of affirmative answers emerged: 0.9% to the question about possible contact with infected individuals and 0.3-0.5% to the other questions. Therefore, enrolment in COVID-19 testing should be encouraged among individuals, athletes, and other members of the team. The data of the Italian Ministry of Health reports that about 2 million Italians (1.2%) have had contact with the virus [40], and percentages significantly higher than those found in our sample. Despite these limitations, this study present valid reports on the safe reopening of skiing events in Italy amid the COVID-19 pandemic.

In conclusion, the authors are certain that the application of a protocol, which requires careful monitoring of the health conditions of the sport teams and of the numerous employees in the organization of an important sporting event worldwide, can allow the safe execution of such events.

Acknowledgements

We thank Omar Galli and Michela Andreola of LOC; Federazione Italiana Sport Invernali; Associazione Cancro Primo Aiuto Onlus; ATS Montagna, Regione Lombardia for their precious collaboration to this research.

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