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# VIRTUAL TRAINING WITH REAL-LIFE BENEFITS: A SURVEY INVESTIGATING ONLINE FITNESS COMMUNITIES DURING LOCKDOWN LEVEL 5 IN SOUTH AFRICA

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***ABSTRACT***

*In response to the COVID-19 pandemic, the South African government enforced a strict lockdown during March and April 2020. Strategies to assist people with maintaining physical activity (PA) became important, and online fitness communities (OFC) offered virtual assistance. This study aimed to investigate the benefits of participating in OFC on physical and mental health during lockdown level 5 in South Africa. The study utilised an online survey which included the Godin Leisure-Time Questionnaire. Participants maintained PA before and during lockdown (n=335 ; p=0.5). However, significant declines in PA were reported for those who did not find an OFC helpful in achieving exercise goals (p=0.004), nor motivating in pursuing fitness (p=0.001), and not helpful in alleviating perceived feelings of depression and/or anxiety (p=0.001). Participants who indicated that lockdown positively impacted motivation and that OFC were motivating in achieving fitness goals showed a significant improvement in PA (p=0.003). The proven effectiveness of OFC should encourage all health and fitness practitioners to integrate them for current and future use.*

***Keywords:*** COVID-19; Exercise; Mental health; Online fitness communities; Physical activity.

## INTRODUCTION

The benefits of physical activity (PA) are well known, with literature showing that PA lowers the incidence of non-communicable diseases and improves mental health (Reardon *et al.*, 2019; Hall *et al.*, 2020; Schuch *et al.*, 2020). Unfortunately, according to the World Hea lth Organization (WHO), many people do not meet PA recommendations and recent literature shows that the COVID-19 pandemic negatively affected PA in most cases (Bull *et al.*, 2020; Constandt *et al.*, 2020; Pillay *et al.*, 2020; Tison *et al.*, 2020; McCarthy *et al.*, 2021).

In response to the COVID-19 pandemic, governments worldwide pursued a lockdown policy attempting to slow the spread of the virus. As part of the lockdown policy, South Africa

enforced various limitations to exercise at different times. Lockdown started with a prolonged 5-week level 5 lockdown that only allowed for exercise in one's yard. Strict level 4 lockdown (for 4 weeks) followed, which allowed for exercise within a 5 km radius from one's house, between 06h00 and 09h00. The general population was only allowed to train at their fitness clubs again during the adjusted level 3 lockdown (Pillay *et al.*, 2020; South African Government, 2022). During the initial lockdown period, there was a large increase in the usage of online fitness communities (OFC) (Chapple, 2020). PA smartphone applications offering motivational, educational and ga mification features seemed to be helpful in keeping people physically active (Yang & Koenigstorfer, 2020). Key motivators such as group exercise, professional instruction and choice of exercise were met by live-streamed exercise/virtual instruction (Wilke *et al*., 2022.). The target population for online fitness included any person restricted from training as usual, as well as people who were inactive before lockdown. Some online platforms used screening tools to identify at-risk individuals before they were able to start with home-based exercise (McCarthy *et al*., 2021; Wilke *et al*., 2022). At the time of writing this article, the pandemic and its after-effects remain, and many people choose to use online fitness groups. It is thus a timely exercise to investigate whether online fitness holds physical and mental health benefits for its users, as there are no current scientific insights into OFC and how it affects PA and mental health.

## PURPOSE OF RESEARCH

This study aimed to investigate the benefits of an OFC on PA and mental health during lockdown level 5 in South Africa. Questions were asked pertaining to 1) the maintenance/deterioration of PA during lockdown level 5, 2) whether an OFC assisted participants in achieving exercise goals, 3) whether an OFC assisted participants in maintaining fitness motivation, 4) the perceived effect of an OFC on mental health and the associated effect on PA and, 5) whether OFC users continued to use an OFC after all training restrictions were lifted. The results of this study may provide valuable information to health and fitness practitioners involved in fitness instruction, coaching, rehabilitation, and primary health.

## METHODS

### Study design

The study design was retrospective, descriptive cross-sectional, and the study investigated the benefits of participation in an OFC during COVID-19 lockdown level 5 in South Africa.

### Online survey and distribution

Participants completed an online survey via the web-based Qualtrics software (Qualtrics XM, 2022). The survey link was widely distributed on social media (Facebook and Twitter) for seven days during October 2021 (approximately 18 months after lockdown level 5 in South Africa). The inclusion criteria consisted of participants aged 18 –64 years, using an OFC in South Africa during the COVID-19 level 5 lockdown.

The survey consisted of 30 questions and could be completed on a mobile phone within 10 –15 minutes. These questions came from validated questionnaires on health and fitness monitoring and self-designed questions by the authors (Godin, 2011; Amireault & Godin, 2015; Pillay *et al.*, 2020; Appendix 1).

The first part of the questionnaire included the Godin Leisure-Time Exercise Questionnaire (GLTE) (Godin, 2011). From the GLTE, the Leisure Activity Score (LAS) was calculated and used to assess activity before and during lockdown level 5. The LAS was also used to measure the impact of an OFC on achieving exercise goals, motivation to exercise and mental health (Godin, 2011). The GLTE questionnaire relies on self-reporting on the frequency of participation in various intensity exercise types in a typical week. The weekly frequency of participation in strenuous, moderate and mild activities was recorded. The raw values were multiplied by nine (strenuous), five (moderate), and three (mild) which corresponds to the metabolic equivalent of task (MET) values of the PA listed in the three categories (Godin, 2011). Adding the three values together provided the total weekly LAS. The LAS result was then used to categorise the participant into "active" (≥24), "moderately active" (14-23), and "sedentary" (<14) categories (Godin, 2011). The reliability of the GLTE questionnaire was determined by a test–retest (test–retest correlation coefficient [ICC]) method. The reliability of the strenuous activity (ICC=0.84) component and the LAS index (ICC=0.62) was excellent, followed by moderate activity (ICC=0.36) and mild activity (ICC=0.24) (Jacobs *et al.*, 1993; Amireault & Godin, 2015).

A Likert scale was used to investigate the effect of an OFC on exercise goals and motivation to exercise, whether an OFC assisted in maintaining PA during lockdown, whether an OFC created a sense of community with other athletes and whether it alleviated feelings of depression and/or anxiety (five questions). The scale had four answer options: "strongly agree", "agree", "disagree", and "strongly disagree". A second Likert scale was used to investigate mental health during lockdown, namely the presence of feelings of depression and/or anxiety (two questions). This scale also had four answer options: "yes, all of the time", "yes, on very few occasions", "yes, sometimes", and "no". The survey also featured questions on the impact of lockdown on participants' ability to achieve exercise goals and their motivation to pursue them. Lastly, the survey included a question to determine if participants were still using an OFC and why they terminated.

The survey data was downloaded from the Qualtrics software and exported as a Microsoft Excel file for further analysis (Qualtrics XM, 2022). All respondents were de-identified by the Qualtrics platform and only survey answers were coded to create the data set. The data consisted of categorical feedback reported as frequencies and percentages – 7 Likert scale questions, 5 multiple-choice questions, 10 closed-ended questions, and 8 open-ended questions with typed answers.

**Participants and demographics**

A total of 514 responses were recorded but only 335 data observations were eligible for data analysis. The responses not included were due to the failure to complete pertinent questions related to the type of OFC used during lockdown, the GLTE questionnaire assessing PA for a typical week before lockdown, the GLTE questionnaire assessing a typical week during lockdown and the type of PA done during lockdown (critical data related to all study aims). Responses from participants not between the ages of 18 and 64 were also removed from the data set.

### Main outcome variables

The main categories of variables explored included demographic data (age and gender); weekly activity before lockdown level 5; weekly activity during lockdown level 5; benefits of participation in an OFC in achieving exercise goals and maintaining fitness motivation during lockdown level 5; which OFCs were used; methods to maintain PA during lockdown; PA and mental health; and whether participants continued using an OFC after lockdown level 5 was lifted.

For a more in-depth understanding of the different effects lockdown and OFC participation had, we created two groups for further analysis:

- Group 1: Participants reporting lockdown *positively* impacted motivation to pursue exercise goals *and* that participation in an OFC was motivating in achieving fitness goals.
- Group 2: Participants reporting lockdown *negatively* impacted motivation to pursue exercise goals *and* that participation in an OFC was *not* motivating in achieving fitness goals.

### Ethical considerations

The Ethics Committee from the University of Pretoria (REC 391/2021) approved the study before the onset of the research. All participants consented to the use of their data for research purposes.

### Statistical analysis

Data were analysed with the Statistica l Package for the Social Sciences (SPSS 28.0, Chicago, IL, USA). The data were coded, described as categories and analysed by frequencies and percentages. Continuous data were expressed as mean, median and standard deviations. For all comparisons between LAS, PA before lockdown and during lockdown, a Wilcoxon signed rank test was utilised. Two-by-two frequency tables for categorical variables were administered to assist with data interpretation. A p-value less than 0.05 was considered statistically significant.

## RESULTS

### Demographics

A total of 335 responses were analysed (female n=240 [72%]; male n=95 [28%]). The highest represented age group categories were 26–35 years and 36–45 years (35% each) (Table 1).

### Online fitness communities during lockdown level 5

Various OFCs were utilised during lockdown level 5 in South Africa, with Strava being the most frequently used (30%) (Table 2).

***Table 1.*** **AGE AND SEX OF PARTICIPANTS**

| Age (years) | N=335<br>n (%) | Males (n=95, 28.4% of total respondents)<br>n (%) | Females (n=240, 71.6% of total respondents)<br>n (%) |
|---|---|---|---|
| **18–25** | 24 (7.2) | 7 (2.1) | 17 (5.1) |
| **26–35** | 117 (34.9) | 33 (9.9) | 84 (25.1) |
| **36–45** | 117 (34.9) | 35 (10.5) | 82 (24.5) |
| **46–55** | 53 (15.8) | 12 (3.6) | 41 (12.2) |
| **56–64** | 20 (6.0) | 6 (2.4) | 14 (4.8) |
| **≥65** | 4 (1.2) | 2 (0.6) | 2 (0.6) |

***Table 2.*** **ONLINE FITNESS COMMUNITIES USED DURING LOCKDOWN**

| Online fitness community | Percentage (%)* |
|---|---|
| Strava | 30.4 |
| JEFF online | 18.5 |
| CrossFit at home | 12.8 |
| Public gyms' online instruction platforms | 9.0 |
| Wearable technology | 6.0 |
| Other: | 46.9 |
| Cell phone fitness apps | 19.1 |
| Online/Zoom classes | 9.0 |
| YouTube workouts | 8.1 |
| Structured online programs | 5.1 |
| Private instruction via WhatsApp/Zoom | 4.5 |
| Zwift | 3.3 |
| Cell phone tracking apps | 1.2 |

*Each research participant could select one or more categories.

The greatest benefits an OFC offered were motivation and positive re-enforcement (42%). Other benefits included convenience and accessibility (23%); virtual group support and online socialising (19%); friendship and community (18%); fitness instruction, guidance and tracking (13%); and accountability and commitment (11%). Only 1% responded that an OFC holds no benefit.

**Physical activity maintenance or deterioration: Physical activity in a typical week before and during lockdown level 5**

Most participants maintained their weekly PA as measured by LAS categories, with no significant difference (p=0.491) in the LAS before vs. during lockdown. The LAS calculations before and during lockdown were "active" (before 85% [n=283] vs. during 83% [n=278]),

"moderately active" (before 10% [n=32] vs. during 10% [n=34]), and "sedentary" (before 6% [n=20] vs. during 7% [n=23]; Table 3).

***Table 3.*** **COMPARISON TABLE: LAS BEFORE LOCKDOWN AND LAS DURING LOCKDOWN FOR ALL CATEGORIES INVESTIGATED**

| | | Before lockdown | | | During lockdown | | | |
|---|---|---|---|---|---|---|---|---|
| | **Total n=335** | **Active n (%)** | **Moderately active n (%)** | **Sedentary n (%)** | **Active n (%)** | **Moderately active n (%)** | **Sedentary n (%)** | **p-value** |
| General | | | | | | | | |
| LAS | 335 | 283 (84.5) | 32 (9.6) | 20 (6.0) | 278 (83.0) | 34 (10.1) | 23 (6.9) | 0.491 |
| Use of OFC and achievement of exercise goals | | | | | | | | |
| OFC assisted | 294 | 247 (84.0) | 30 (10.2) | 17 (5.8) | 251 (85.4) | 28 (9.5) | 15 (5.1) | 0.603 |
| OFC did not assist | 41 | 36 (87.8) | 2 (4.9) | 3 (7.3) | 27 (65.9) | 6 (14.6) | 8 (19.5) | **0.004** |
| Impact of lockdown on achieving exercise goals | | | | | | | | |
| Positive impact | 161 | 126 (78.3) | 20 (12.4) | 15 (9.3) | 138 (85.7) | 16 (9.9) | 7 (4.3) | **0.022** |
| Negative impact | 130 | 120 (92.3) | 7 (5.4) | 3 (2.3) | 99 (76.2) | 17 (13.1) | 14 (10.8) | **<0.001** |
| No impact | 44 | 37 (84.1) | 5 (11.4) | 2 (4.5) | 41 (93.2) | 1 (2.3) | 2 (4.5) | 0.279 |
| Effect of OFC participation on motivation to achieve fitness goals | | | | | | | | |
| OFC was motivating | 292 | 245 (83.9) | 30 (10.3) | 17 (5.8) | 252 (86.3) | 29 (9.9) | 11 (3.8) | 0.185 |
| OFC not motivating | 43 | 38 (88.4) | 2 (4.7) | 3 (7.0) | 26 (60.5) | 5 (11.6) | 12 (27.9) | **0.001** |
| Impact of lockdown on motivation AND the effect of OFC participation on motivation to achieve fitness goals | | | | | | | | |
| Positive impact and OFC was motivating (group 1) | 165 | 124 (75.2) | 24 (14.5) | 17 (10.3) | 142 (86.1) | 15 (9.1) | 8 (4.8) | **0.003** |
| Negative impact and OFC not motivating (group 2) | 29 | 25 (86.2) | 2 (6.9) | 2 (6.9) | 14 (48.3) | 4 (13.8) | 11 (37.9) | **0.001** |
| Does OFC participation alleviate feelings of depression and/or anxiety? | | | | | | | | |
| Yes, alleviates | 263 | 214 (81.4) | 29 (11.0) | 20 (7.6) | 222 (84.4) | 26 (9.9) | 15 (5.7) | 0.222 |
| No, does not alleviate | 47 | 45 (95.7) | 2 (4.3) | 0 (0) | 33 (70.2) | 7 (14.9) | 7 (14.9) | **0.001** |

OFC=online fitness community LAS=Leisure Activity Score

**Does OFC participation assist participants in achieving exercise goals during lockdown level 5?**

Health and wellness (91%) were the most important exercise goal, followed by physical fitness (78%), enjoyment and fun (59%) and sense of community (23%), with 3% reporting their profession as their exercise goal (Table 4).

***Table 4.*** **PARTICIPANTS' EXERCISE GOALS**

| Exercise goals | n | Percentage (%) |
|---|---|---|
| Health and wellness | 306 | 91.3 |
| Physical fitness | 262 | 78.2 |
| Enjoyment and fun | 197 | 58.8 |
| Sense of community | 78 | 23.3 |
| Professional athlete | 9 | 2.7 |

During lockdown level 5, 88% of participants reported that participating in an OFC assisted in achieving their exercise goals, and 12% indicated an OFC did not help them. If an OFC assisted in achieving exercise goals, the LAS before vs. during lockdown showed no significant change ($p=0.603$). However, if an OFC did not assist in achieving exercise goals, a significant change ($p=0.004$) was shown in the LAS before vs. during lockdown due to a substantial reduction in the "active" category, i.e., 88% of participants categorised as "active" before lockdown and only 66% as "active" during lockdown (Table 3).

Lockdown had a positive impact (48%), a negative impact (39%), and no impact (13%) on achieving exercise goals. In those participants in whom lockdown had a positive impact on achieving their exercise goals, the LAS difference before vs. during lockdown was significant ($p=0.022$). "Active" participants increased and "sedentary" participants decreased. In participants in whom lockdown negatively impacted achieving their exercise goals, LAS changed significantly ($p<0.001$) with fewer "active" participants (from 92% to 76%) and more "moderately active" and "sedentary" participants (from 5% to 13% and 2% to 11%, respectively). The LAS did not change significantly ($p=0.279$) in participants that indicated lockdown had no impact on achieving their exercise goals (Table 3).

**Does participation in an OFC assist athletes in maintaining fitness motivation?**

The pursuit of health (89%) was the most important motivating factor for participants to achieve their exercise goals, followed by mental well-being (85%) and fitness (79%) (Table 5).

Lockdown positively impacted motivation to pursue exercise goals in 50% of participants and was a negative impact for 32%; the remaining 18% reported no impact on their motivation. Further, 59% of participants did not struggle to keep themselves motivated to exercise, whereas 41% struggled.

Being part of an OFC motivated 292 participants (87%) to achieve their fitness goals d uring lockdown, and only 43 (13%) stated that participation in an OFC did not motivate them. LAS changed significantly (p=0.001) in those not motivated by OFC participation, i.e., a decrease in "active" participants (from 88% to 61%) and an increase in "sedentary" participants (from 7% to 28%) (Table 3).

***Table 5.*** **MOTIVATING FACTORS TO PURSUE EXERCISE GOALS DURING LOCKDOWN**

| **Motivator** | **Percentage (%)** |
|---|---|
| Health | 89.0 |
| Mental well-being | 84.5 |
| Fitness | 78.5 |
| Aesthetic appearance | 49.6 |
| Friendship | 28.1 |
| Guilt | 8.7 |
| Work requirements | 5.7 |

For participants in Group 1 (see Methods section for definition), in whom lockdown *positively* impacted motivation to pursue exercise goals *and* an OFC was *motivating* to achieve fitness goals (n=165), the LAS change before vs. during lockdown was significant (p=0.003), with an increase in "active" participants (from 75% to 86%) and a decrease in "moderately active" and "sedentary" participants (from 15% to 9% and 10% to 5%, respectively). For individuals in Group 2, in whom lockdown *negatively* impacted motivation to pursue their exercise goals *and* where participation in an OFC was *not motivating* to achieve fitness goals (n=29), the LAS before vs. during lockdown was also significant (p=0.001), but with a decrease in "active" participants (from 86% to 48%) and an increase in "sedentary" participants (from 7% to 38%) (Table 3). This finding is also visually demonstrated as percentages in Figures 1 and 2. Note the increase in sedentary behaviour from before lockdown (Figure 1) to during lockdown (Figure 2) for Group 2 (dark bars). Also note, the increase in active participants for Group 1 (grey bars) before lockdown (Figure 1) to during lockdown (Figure 2).

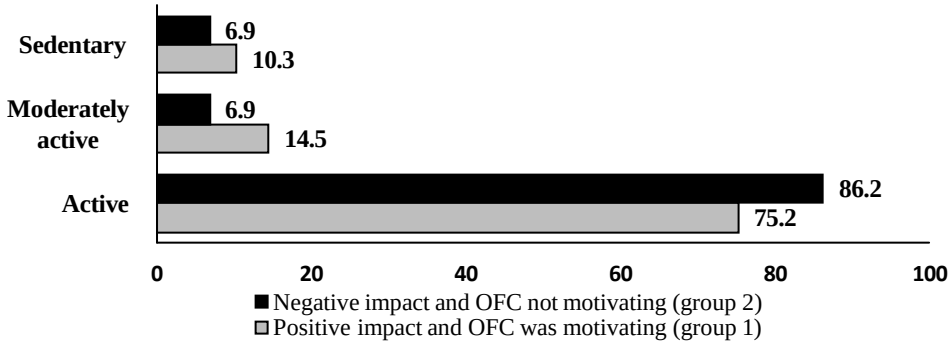


***Figure 1.*** **IMPACT OF LOCKDOWN ON MOTIVATION AND THE EFFECT OF OFC PARTICIPATION ON MOTIVATION TO ACHIEVE FITNESS GOALS BEFORE LOCKDOWN (%).**

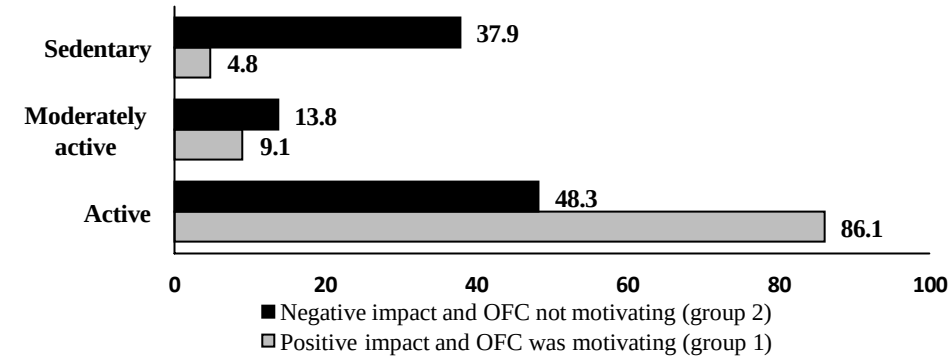


***Figure 2.*** **IMPACT OF LOCKDOWN ON MOTIVATION AND THE EFFECT OF OFC PARTICIPATION ON MOTIVATION TO ACHIEVE FITNESS GOALS DURING LOCKDOWN (%).**

**The perceived effect of an OFC on mental health and the associated effect on physical activity**

Participants felt depressed (64%) and anxious (66%) during lockdown level 5. More than half (55%) experienced depression and anxiety during lockdown. Participation in an OFC alleviated perceived feelings of depression and/or anxiety in 79% of participants. In 14% it offered no help, and 8% answered "not applicable". For participants in whom participation in an OFC "alleviated" feelings of depression and/or anxiety the LAS before vs. during lockdown showed no change (p=0.222). For participants in whom participation in an OFC did "not alleviate" feelings of depression and/or anxiety, the LAS before vs. during lockdown significantly changed (p=0.001) with a decrease in "active" participants (from 96% to 70%) and an increase

in "moderately active" and "sedentary" participants (from 4% to 15% and 0% to 15%, respectively; Table 3).

**Online fitness communities use after lockdown level 5**

One-and-a-half years after lockdown level 5 in South Africa, 64% of participants were still using an OFC. The ability to return to a normal training group (26%) and public gymnasiums that re-opened (17.3%) were the main reasons for terminating an OFC. Other reasons were time constraints (4.2%), illness (1.2%), injury (0.9%), financial reasons (0.6%), and expectations that were not met (3.0%).

## DISCUSSION

Globally, COVID-19 lockdowns enforced changes in exercise and training. They resulted in people seeking assistance with training at home and created opportunities to develop novel ways to provide, guide and track PA at home such as OFCs (Chapple, 2020; Pillay *et al.*, 2020; Constandt *et al.*, 2020; Nyenhuis *et al.*, 2020; Wilke *et al.*, 2022). In South Africa, elite and recreational athletes were affected by lockdown regulations. Health and fitness professionals must continue assisting a continuum of athletes in sustaining safe PA during lockdown by reinforcing good habits, maintaining training motivation, and emphasising health awareness (Dessart & Duclou, 2019; Wilke *et al.*, 2022).

A key finding from our survey investigating individuals who used an OFC showed no significant change in PA before *vs* during lockdown in the study population. A similar number of participants stayed active, moderately active or sedentary for the periods under investigation. Other studies monitoring PA during lockdown where online fitness training was either used or not reported, large declines in PA were reported (measuring step counts or wearable technology) (Tison *et al.*, 2020; McCarthy *et al.*, 2021; Wilke *et al.*, 2021). The difference in results could be attributed to the current study only assessing participants who used an OFC, whereas these studies included the general population.

Participants who did not find an OFC helpful in achieving their exercise goals signific antly decreased PA during lockdown. Participants who could not substitute usual outdoor training methods with indoor options ended up doing less PA. In addition, if the chosen OFC did not meet social, emotional or physical needs, it was deemed unhelpful (Dessa rt & Duclou, 2019; Torres *et al.*, 2021; Wilke *et al.*, 2022).

The perceived impact of lockdown on exercise goals provides subjective insight into how the participants experienced lockdown. An unexpected ly large percentage of participants reported that lockdown positively impacted their ability to achieve their exercise goals and was reflected in an increased level of PA during lockdown. A study from Belgium also conducted during a strict lockdown reported similar increases in self-reported PA by previously less-active adults (Constandt *et al.*, 2020). The current study did not differentiate between structured PA, leisure-time PA, or step counts. Canadian research investigating PA before and during the initial lockdown showed a continuous decline in leisure-time PA and step counts (Di Sebastiano *et al.*, 2020). Moderate to vigorous PA returned to pre-lockdown levels after 6 weeks of lockdown as the users replaced their usual training with online options (Di Sebastiano *et al.*, 2020).

Thirty-nine percent (39%) of the participants experienced a negative impact of lockdown on achieving their exercise goals, leading to a decrease in PA, and an increase in sedentary behaviour. The trend of decreased PA during the COVID-19 pandemic is a common finding (Tison *et al.*, 2020; McCarthy *et al.*, 2021; Wilke *et al.*, 2021). Current literature motivates healthy and unhealthy people to maintain some form of PA to limit the direct and indirect effects of the illness and, also, to possibly prevent morbidity following infection with COVID-19 (Bull *et al.*, 2020; Hall *et al.*, 2020; Pillay *et al.*, 2020; Nyenhuis *et al.*, 2020; Tison *et al.*, 2020; McCarthy *et al.*, 2021; Wilke *et al.*, 2021; Wilke *et al.*, 2022). Studies showed that individuals who were more active before lockdown experienced a more significant decrease in PA during lockdown (McCarthy *et al.*, 2021; Wilke *et al.*, 2021). The reason for this finding is still under investigation. The current data contribute to research investigating the impact of lockdown on individuals' ability to reach their exercise goals and its effects on PA. The results also reflect a decline in PA during the COVID-19 pandemic (Tison *et al.*, 2020; McCarthy *et al.*, 2021; Wilke *et al.*, 2021).

Fifty-nine percent (59%) of our study participants reported no struggle to keep themselves motivated during lockdown, and had no significant change in PA levels from before to during lockdown. An international study in nine countries experiencing restrictions (Argentina, Austria, Brazil, Chile, Germany, Italy, Ireland, South Africa and Spain) found that interactive online-based exercise is effective for the maintenance of PA and also for exercise motivation (Wilke *et al.*, 2022). In the face of a very restricted lockdown, active individuals were forced to seek new options for PA maintenance. The variety of online exercise options could have contributed to sustained motivation (Nyenhuis *et al.*, 2020; Wilke *et al.*, 2022). No significant change in PA occurred for those who reported that participation in an OFC was motivating to achieving their fitness goals. It could be explained by the fact that this study population maintained a certain fitness level during lockdown. A New Zealand study during the strict lockdown period showed similar results. Participants who already met PA recommendations did not necessarily need an OFC or the like to maintain PA (Meiring *et al.*, 2021). This study also found that the respondents had intrinsic motivation to be physically active and did not rely on replacement strategies to overcome training barriers such as closed public gyms or the inability to train with standard exercise groups (Meiring *et al.*, 2021). However, our study showed a significant decline in PA for participants who did not find OFC participation motivating. An explanation for the decline in PA in participants who did not find an OFC motivating could be that they were not habitually active before lockdown. As shown in a survey from Italy, participants were more likely to maintain PA if they had an active lifestyle before lockdown (Gallè *et al.*, 2020).

More diverse results emerged by combining the responses concerning the impact of lockdown on motivation and if participation in an OFC was motivating in achieving fitness goals. There was a significant increase in PA in Group 1 ($p=0.003$) and a significant decline in PA ($p=0.001$) in Group 2. The authors hypothesise that the result could be due to a snowball effect, where decreased PA leads to decreased motivation and a reduced need to seek PA, resulting in increased sedentary behaviour. A study from the University of Witwatersrand supports this finding. Reporting the mere availability of a PA application was not enough to motivate participants to do daily PA. Still, that trainer–client interaction is needed to maintain effective PA during forced home training in a lockdown (Torres *et al.*, 2021). The authors noted that the health benefits sought by the user should be addressed by the fitness application to successfully

maintain PA (Torres *et al.*, 2021). Technological tools available for exercise motivation include web-based tracking and guidance platforms, mobile apps, self -monitoring apps, and online instruction portals. These methods are proven to be effective in motivating users to maintain favourable behaviour changes to sustain PA (Tate *et al.*, 2015; Jakobsson *et al.*, 2020).

Mental health is highly investigated and emphasised in the modern sporting environment (Reardon *et al.*, 2019). A large percentage (84.5%) of the participants stated that mental well-being was a motivating factor to pursue exercise goals. Approximately half (55%) of the survey participants experienced feelings of depression and/or anxiety during lockdown. Literature supports that regular PA is associated with decreased feelings of depression an d anxiety and improved cognitive functioning (Stubbs *et al.*, 2017; Jakobsson *et al.*, 2020; Schuch *et al.*, 2020). Lockdown resulted in a sudden decrease in physical social interaction with others and hampered psychosocial development within a community (Jakobsson *et al.*, 2020). This sudden confinement negatively affected mental health (Wilke *et al.*, 2021). We saw a significant decrease in PA in participants who did not find participation in an OFC helpful in alleviating feelings of depression and/or anxiety. These participants showed a reduction in activity levels and increased sedentary behaviour. This result demonstrates another facet of the effect of lockdown on PA and mental health. Other studies (some within lockdown) investigating the interplay of PA and mental health showed that decreased PA had deleterious effects on mental health (Stubbs *et al.*, 2017; Schuch *et al.*, 2018; Reardon *et al.*, 2019; Schuch *et al.*, 2020; Jakobsson *et al.*, 2020; Wilke *et al.*, 2021). Wilke *et al.* (2022) reported improved PA and mental health during lockdown level 5 with live-streamed exercise, but that the improvements in mental health were less when the study moved to distributed pre-recorded exercises. This supports the notion that some form of direct social interaction is one of the driving forces behind successful online training (Zhang *et al.*, 2015; Sibley & Bergman, 2018; Dessart and Duclou, 2019; Yang &Koenigstorfer, 2020). Consequently, the type of online platform is important to consider when choosing an OFC (Tate *et al.*, 2015; Stubbs *et al.*, 2017; Schuch *et al.*, 2020; Wilke *et al.*, 2022).

Lastly, approximately two-thirds (63.6%) of the participants still used an OFC 1.5 years after lockdown level 5 in South Africa. This information adds insight into the use of OFCs when there are no restrictions on standard training, as previous studies focused on the immediate effects of OFC use and not the sustainability thereof (Tate *et al.*, 2015; Tong *et al.*, 2018; Yang & Koenigstorfer, 2020; Laranjo *et al.*, 2020). According to the current survey, the main benefits of an OFC are motivation, positive reinforcement, convenience, and accessibility. Nyenhuis *et al*. (2020) identified health benefits, convenience, safety, accountability and the social function of "live" tracking as the main reasons why users either initiated or maintained OFC use during lockdown. The question remains whether positive changes are maintained in the absence of restrictions, as continued increased PA will have a cumulative preventative effect on multiple aspects of health (Wilke *et al.*, 2022). With the change in more people working from home after COVID-19, the habitual use of an OFC could provide possible reasons for continued online training, although the study did not explore this finding (Constandt *et al.*, 2020). According to the participants, the main reasons for terminating the use of an OFC were the return to regular training groups (26%) and the re-opening of public gymnasiums (17%). Other reasons mentioned included injury, illness, time constraints, financial reasons and the OFC not meeting their expectations. Reasons for terminating the use of an OFC were similar to the training barriers identified by the New Zealand survey (Meiring *et al.*, 2021). These main

reasons mentioned emphasise the underlying need for social interaction to maintain PA, which one-directional fitness instruction does not provide (Meiring *et al.*, 2021; Wilke *et al.*, 2022).

### Limitations

By only utilising social media for advertising, the study probably excluded non-social media users. The survey was conducted 1.5 years after lockdown, and recall bias may have affected the accuracy of answers. However, strict lockdowns brought a significant and memorable change in lifestyle and PA. Although some questions were not previously validated, they were combined with validated PA questionnaires with specific investigatory strengths that are known to provide unique insights and may have resulted in less recall bias (Sattler *et al.*, 2021). The participants were predominantly female and some age groups are much more represented than others. Further demographic information such as employment type and status, socio - economic status and medical history may have provided a more holistic view of lockdown and its effects.

### Recommendations

Additional studies on the long-term use of OFCs are warranted to investigate whether training with only virtual support effectively maintains and improves PA. Further investigations of specifically tailored OFCs for various non-communicable disease groups, such as patients with major depressive disorder or a generalised anxiety disorder, can also be designed to elucidate further an OFC's benefits and how to utilise it correctly. Future research on the relationship between PA during lockdown in different socio-economic status groups as well as the impact of lockdown on PA in critical workers could further explore the far-reaching effects of the COVID-19 lockdown.

## CONCLUSION

In conclusion, lockdown guidelines could have, unintentionally, increased sedentary behaviour and decreased general PA, which has compounding adverse effects on health (Jakobsson *et al.*, 2020). There is a definite need for developing OFCs and guidance in choosing the appropriate OFC. The study population, in general, maintained their levels of fitness during lockdown level 5. Individuals who did not find participation in an OFC helpful in achiev ing their exercise goals showed significant decreases in PA and/or increases in sedentary behaviour. The same occurred in those who did not find an OFC helpful in maintaining fitness motivation and in those who did not experience an OFC to alleviate perceived feelings of depression and/or anxiety. These specific groups may experience significant long-term effects of increasing physical inactivity and debilitating consequences on physical and mental health. Therefore, an effort to investigate effective ways to sustain PA levels in individuals who use OFCs is required.

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### Conflict of interest

No conflict of interest declared

## REFERENCES

AMIREAULT, S. & GODIN, G. (2015). The Godin-Shephard leisure-time physical activity questionnaire: Validity evidence supporting its use for classifying healthy adults into active and insufficiently active categories. *Perceptual and Motor Skills*, 120(2)**:** 604-622. https://doi.org/10.2466/03.27.PMS.120v19x7

BULL, F.C.; AL-ANSARI, S.S.; BIDDLE, S.; BORODULIN, K.; BUMAN, M.P.; CARDON, G.; CARTY, C.; CHAPUT, J.P.; CHASTIN, S.; CHOU, R.; DEMPSEY, P.C.; DIPIETRO, L.; EKELUND, U.; FIRTH, J.; FRIEDENREICH, C.M.; GARCIA, L.; GICHU, M.; JAGO, R.; KATZMARZYK, P.T.; LAMBERT, E.; LEITZMANN, M.; MILTON, K.; ORTEGA, F.B.; RANASINGHE, C.; STAMATAKIS, E.; TIEDEMANN, A.; TROIANO, R.P.; VAN DER PLOEG, H.P.; WARI, V. & WILLUMSEN, J.F. (2020). World Health Organization 2020 guidelines on physical activity and sedentary behaviour. *British Journal of Sports Medicine*, 54(24)**:** 1451-1462. http://dx.doi.org/10.1136/bjsports-2020-102955

CHAPPLE, C. (2020). "Health & fitness app adoption up record 47% so far in quarter 2 2020." *Sensor Tower*. Hyperlink: [https://sensortower.com/blog/health-and-fitness-app-record-download-growth]. Retrieved on 20 February 2021.

CONSTANDT, B.; THIBAUT, E.; DE BOSSCHER, V.; SCHEERDER, J.; RICOUR, M. & WILLEM, A. (2020). Exercising in times of lockdown: An analysis of the impact of COVID-19 on levels and patterns of exercise among adults in Belgium. *International Journal of Environmental Research and Public Health*, 17(11): 4144. https://doi.org/10.3390/ijerph17114144

DESSART, L. & DUCLOU, M. (2019). Health and fitness online communities and product behaviour. *Journal of Product and Brand Management*, 28(2)**:** 188-199. https://doi.org/10.1108/JPBM-12-2017-1710

DI SEBASTIANO, K.M.; CHULAK-BOZZER, T.; VANDERLOO, L.M. & FAULKNER, G. (2020). Don't walk so close to me: Physical distancing and adult physical activity in Canada. *Frontiers in Psychology*, 11: 1895. https://doi.org/10.3389/fpsyg.2020.01895

GALLÈ, F.; SABELLA, E.A.; FERRACUTI, S.; DE GIGLIO, O.; CAGGIANO, G.; PROTANO, C.; VALERIANI, F.; PARISI, E.A.; VALERIO, G.; LIGUORI, G.; MONTAGNA, M.T.; ROMANO SPICA, V.; DA MOLIN, G.; ORSI, G.B. & NAPOLI, C. (2020). Sedentary behaviors and physical activity of Italian undergraduate students during lockdown at the time of COVID-19 pandemic. *International Journal of Environmental Research and Public Health*, 17(17): 6171 https://doi.org/10.3390/ijerph17176171

GODIN, G. (2011). The Godin-Shephard leisure-time physical activity questionnaire. *Fitness Journal of Canada*, 4(1)**:** 18-22. https://doi.org/10.14288/hfjc.v4i1.82

HALL, G.; LADDU, D.R.; PHILLIPS, S.A.; LAVIE, C.J. & ARENA, R. (2020). A tale of two pandemics: How will COVID-19 and global trends in physical inactivity and sedentary behavior affect one another? *Progress in Cardiovascular Diseases*, 64: 108-110. https://doi.org/10.1016%2Fj.pcad.2020.04.005

JACOBS, D.R.; AINSWORTH, B.E.; HARTMAN, T.J. & LEON, A.S. (1993). A simultaneous evaluation of 10 commonly used physical activity questionnaires. *Medicine and Science in Sports and Exercise*, 25(1)**:** 81-91. https://doi.org/10.1249/00005768-199301000-00012

JAKOBSSON, J.; MALM, C.; FURBERG, M.; EKELUND, U. & SVENSSON, M. (2020). Physical activity during the coronavirus (COVID-19) pandemic: Prevention of a decline in metabolic and immunological functions. *Frontiers in Sports and Active Living*, 2(57). https://doi.org/10.3389/fspor.2020.00057

LARANJO, L.; DING, D.; HELENO, B.; KOCABALLI, B.; QUIROZ, J.C.; TONG, H.L.; CHAHWAN, B.; NEVES, A.L.; GABARRON, E.; DAO, K.P.; RODRIGUES, D.; NEVES, G.C.; ANTUNES, M.L.; COIERA, E. & BATES, D.W. (2020). Do smartphone applications and

activity trackers increase physical activity in adults? Systematic review, meta-analysis and metaregression. *British Journal of Sports Medicine*, 55(8): 422-432. http://dx.doi.org/10.1136/bjsports-2020-102892

MCCARTHY, H.; POTTS, H.W.W. & FISHER, A. (2021). Physical activity behavior before, during, and after COVID-19 restrictions: Longitudinal smartphone-tracking study of adults in the United Kingdom. *Journal of Medical Internet Research*, 23(2)**:** 23701. https://doi.org/10.2196/23701

MEIRING, R.M.; GUSSO, S.; MCCULLOUGH, E. & BRADNAM, L. (2021). The effect of the COVID-19 pandemic movement restrictions on self-reported physical activity and health in New Zealand: A cross-sectional survey. *International Journal of Environmental Research and Public Health*, 18(4): 1719. https://doi.org/10.3390/ijerph18041719

NYENHUIS, S.M.; GREIWE, J.; ZEIGER, J.S.; NANDA, A. & COOKE, A. (2020). Exercise and fitness in the age of social distancing during the COVID-19 pandemic. *The Journal of Allergy and Clinical Immunology In practice*, 8(7)**:** 2152-2155. https://doi.org/10.1016/j.jaip.2020.04.039

PILLAY, L.; JANSE VAN RENSBURG, D.C.; JANSEN VAN RENSBURG, A.; RAMAGOLE, D.A.; HOLTZHAUSEN, L.; DIJKSTRA, H.P. & CRONJE, T. (2020). Nowhere to hide: The significant impact of coronavirus disease 2019 (COVID-19) measures on elite and semi-elite South African athletes. *Journal of Science and Medicine in Sport*, 23(7)**:** 670-679. https://doi.org/10.1016/j.jsams.2020.05.016

QUALTRICS XM. (2022). Qualtrics xm // the leading experience management software. Hyperlink: [https://www.qualtrics.com/]. Retrieved on 20 August 2021.

REARDON, C.L.; HAINLINE, B.; ARON, C.M.; BARON, D.; BAUM, A.L.; BINDRA, A.; BUDGETT, R.; CAMPRIANI, N.; CASTALDELLI-MAIA, J.M.; CURRIE, A.; DEREVENSKY, J.L.; GLICK, I.D.; GORCZYNSKI, P.; GOUTTEBARGE, V.; GRANDNER, M.A.; HAN, D.H.; MCDUFF, D.; MOUNTJOY, M.; POLAT, A.; PURCELL, R.; PUTUKIAN, M.; RICE, S.; SILLS, A.; STULL, T.; SWARTZ, L.; ZHU, L.J. & ENGEBRETSEN, L.(2019). Mental health in elite athletes: International Olympic Committee consensus statement (2019). *British Journal of Sports Medicine*, 53(11)**:** 667-699. http://dx.doi.org/10.1136/bjsports-2019-100715

SATTLER, M.C.; AINSWORTH, B.E.; ANDERSEN, L.B.; FOSTER, C.; HAGSTRÖMER, M.; JAUNIG, J.; KELLY, P.; KOHL III, H.W.; MATTHEWS, C.E.; OJA, P.; PRINCE, S.A. & VAN POPPEL, M.N.M. (2021). Physical activity self-reports: Past or future? *British Journal of Sports Medicine*, 55(16): 889-890. http://dx.doi.org/10.1136/bjsports-2020-103595

SCHUCH, F.B.; VANCAMPFORT, D.; FIRTH, J.; ROSENBAUM, S.; WARD, P.B.; SILVA, E.S.; HALLGREN, M.; PONCE DE LEON, A.; DUNN, A.L.; DESLANDES, A.C.; FLECK, M.P.; CARVALHO, A.F. & STUBBS, B. (2018). Physical activity and incident depression: A meta-analysis of prospective cohort studies. *American Journal of Psychiatry*, 175(7)**:** 631-648. https://doi.org/10.1176/appi.ajp.2018.17111194

SCHUCH, F.B.; BULZING, R.A.; MEYER, J.; VANCAMPFORT, D.; FIRTH, J.; STUBBS, B.; GRABOVAC, I.; WILLEIT, P.; TAVARES, V.D.O.; CALEGARO, V.C.; DEENIK, J.; LÓPEZ-SÁNCHEZ, G.F.; VERONESE, N.; CAPERCHIONE, C.M.; SADARANGANI, K.P.; ABUFARAJ, M.; TULLY, M.A. & SMITH, L. (2020). Associations of moderate to vigorous physical activity and sedentary behavior with depressive and anxiety symptoms in self-isolating people during the COVID-19 pandemic: A cross-sectional survey in Brazil. *Psychiatry Research*, 292(October): 113339. https://doi.org/10.1016/j.psychres.2020.113339

SIBLEY, B.A. & BERGMAN, S.M. (2018). What keeps athletes in the gym? Goals, psychological needs, and motivation of CrossFit™ participants. *International Journal of Sport and Exercise Psychology*, 16(5)**:** 555-574. https://doi.org/10.1080/1612197X.2017.1280835

SOUTH AFRICAN GOVERNMENT. (2022). Regulations and guidelines - coronavirus COVID-19. South African Government. Hyperlink: [https://www.gov.za/covid-19/resources/regulations - and-guidelines-coronavirus-covid-19]. Retrieved on 14 February 2022.

STUBBS, B.; VANCAMPFORT, D.; ROSENBAUM, S.; FIRTH, J.; COSCO, T.; VERONESE, N.; SALUM, G.A. & SCHUCH, F.B. (2017). An examination of the anxiolytic effects of exercise for people with anxiety and stress-related disorders: A meta-analysis. *Psychiatry Research*, 249(March): 102-108. https://doi.org/10.1016/j.psychres.2016.12.020

TATE, D.F.; LYONS, E.J. & VALLE, C.G. (2015). High-tech tools for exercise motivation: Use and role of technologies such as the internet, mobile applications, social media, and video games . *Diabetes spectrum : a publication of the American Diabetes Association*, 28(1)**:** 45-54. https://doi.org/10.2337/diaspect.28.1.45

TISON, G.H.; AVRAM, R.; KUHAR, P.; ABREAU, S.; MARCUS, G.M.; PLETCHER, M.J. & OLGIN, J.E. (2020). Worldwide effect of COVID-19 on physical activity: A descriptive study. *Annals of Internal Medicine*, 173(9)**:** 767-770. https://doi.org/10.7326/M20-2665

TONG, H.L.; COIERA, E. & LARANJO, L. (2018). Using a mobile social networking app to promote physical activity: A qualitative study of users' perspectives. *Journal of Medical Internet Research*, 20(12)**:** 11439. https://doi.org/10.2196/11439

TORRES, G.; NEOPHYTOU, N.; FOURIE, P.; BUNTING, X.; CONSTANTINOU, D. & GRADIDGE, P.L. (2021). 'I'm doing it for myself: Using a smartphone-based exercise service during the COVID-19 lockdown in the Faculty of Health Sciences, University of the Witwatersrand, South Africa. *South African Journal of Sports Medicine*, 33(1)**:** 1-6. https://doi.org/10.17159/2078 - 516X/2021/v33i1a9053

WILKE, J.; MOHR, L.; YUKI, G.; BHUNDOO, A.K.; JIMÉNEZ-PAVÓN, D.; LAIÑO, F.; MURPHY, N.; NOVAK, B.; NUCCIO, S.; ORTEGA-GÓMEZ, S.; PILLAY, J.D.; RICHTER, F.; RUM, L.; SANCHEZ-RAMÍREZ, C.; URL, D.; VOGT, L. & HESPANHOL, L. (2022). Train at home, but not alone: A randomised controlled multicentre trial assessing the effects of live-streamed tele-exercise during COVID-19-related lockdowns. *British Journal of Sports Medicine*, 56(12): 667-675. http://dx.doi.org/10.1136/bjsports-2021-104994

WILKE, J.; MOHR, L.; TENFORDE, A.S.; EDOUARD, P.; FOSSATI, C.; GONZÁLEZ-GROSS, M.; SÁNCHEZ RAMÍREZ, C.; LAIÑO, F.; TAN, B.; PILLAY, J.D.; PIGOZZI, F.; JIMENEZ-PAVON, D.; NOVAK, B.; JAUNIG, J.; ZHANG, M.; VAN POPPEL, M.; HEIDT, C.; WILLWACHER, S.; YUKI, G.; LIEBERMAN, D.E.; VOGT, L.; VERHAGEN, E.; HESPANHOL, L. & HOLLANDER, K. (2021). A pandemic within the pandemic? Physical activity levels substantially decreased in countries affected by COVID-19. *International Journal of Environmental Research and Public Health*, 18(5): 2235. https://doi.org/10.3390/ijerph18052235

YANG, Y. & KOENIGSTORFER, J. (2020). Determinants of physical activity maintenance during the COVID-19 pandemic: A focus on fitness apps. *Translational Behavioral Medicine*, 10(4)**:** 835-842. https://doi.org/10.1093/tbm/ibaa086

ZHANG, J.; BRACKBILL, D.; YANG, S. & CENTOLA, D. (2015). Efficacy and causal mechanism of an online social media intervention to increase physical activity: Results of a randomised controlled trial. *Preventive Medicine Reports*, 2(August)**:** 651-657. https://doi.org/10.1016/j.pmedr.2015.08.005

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## APPENDIX 1

**Questionnaire for this research survey:**

What are the benefits of an online fitness community on Physical Activity and Mental Health during lockdown level 5 (26 March 2020 – 30 April 2020) in South Africa?

**Questionnaire**

1. Did you participate in an online fitness community i.e. virtual training classes, online training groups, fitness app guidance etc., during COVID-19 lockdown level 5?

| | |
|---|---|
| Yes | |
| No | |

2. Which online fitness community did you use during lockdown level 5?

   Multiple options may be selected.

| | |
|---|---|
| CrossFit | |
| Virgin Active | |
| Planet Fitness | |
| JEFF Online | |
| LK Fitness | |
| Polar | |
| Strava | |
| Other | |

3. If you selected "other" in the above question, please provide the name of the online platform which you used.

   …….

4. Were you in South Africa during its level 5 lockdown?

| | |
|---|---|
| Yes | |
| No | |

5. What encouraged you to join an online fitness community?

   Multiple options may be selected.

| | |
|---|---|
| To get professional guidance while at home | |
| For motivational purposes | |
| To assist you in reaching your fitness goals | |
| Because your friends joined an OFC | |
| Other | |

6. If you selected "other" in the above question, please provide a typed answer as to why you joined an online fitness community.

   ……...

7. Age

| | |
|---|---|
| 18-25 | |
| 26-35 | |
| 36-45 | |
| 46-55 | |
| 56-64 | |
| ≥65 | |

8. Gender

| | |
|---|---|
| Male | |
| Female | |
| Prefer not to say (PNTS) | |

9. During a typical **7-Day period** (a week) **before** lockdown level 5, how many times on average did you do the following kinds of exercise for **more than 15 minutes** during your free time (write in each block the appropriate number).*

| **BEFORE lockdown level 5** | How many times on average in 1 week? |
|---|---|
| **Strenuous Exercise** (heart beats rapidly)<br>(e.g. running, jogging, hockey, soccer, rugby, squash, mountain biking, swimming, weight lifting, cross-training) | |
| **Moderate exercise** (not exhausting)<br>(e.g. fast walking, tennis, easy swimming, popular and folk dancing, strength pilates) | |
| **Mild/ Light exercise** (minimal effort)<br>(e.g. yoga, golf, easy walking, fishing from river bank) | |

10. With regards to your response to the previous question, please indicate what type of structured physical activity you did prior to lockdown:

| **BEFORE lockdown level 5** | Type of Physical Activity |
|---|---|
| **Strenuous Exercise** (heart beats rapidly)<br>(e.g. running, jogging, hockey, soccer, rugby, squash, mountain biking, swimming, weight lifting, cross-training) | |
| **Moderate exercise** (not exhausting)<br>(e.g. fast walking, tennis, easy swimming, popular and folk dancing, strength pilates) | |
| **Mild/ Light exercise** (minimal effort)<br>(e.g. yoga, golf, easy walking, fishing from river bank) | |

11. During a typical **7-Day period** (a week) **during** lockdown level 5, how many times on average did you do the following kinds of exercise for **more than 15 minutes** during your free time (write in each block the appropriate number).*

| **DURING lockdown level 5** | How many times on average in 1 week? |
|---|---|
| **Strenuous Exercise** (heart beats rapidly)<br>(e.g. running, jogging, hockey, soccer, rugby, squash, mountain biking, swimming, weight lifting, cross-training) | |
| **Moderate exercise** (not exhausting)<br>(e.g. fast walking, tennis, easy swimming, popular and folk dancing, strength pilates) | |
| **Mild/ Light exercise** (minimal effort)<br>(e.g. yoga, golf, easy walking, fishing from river bank) | |

12. With regards to your previous response, please indicate what type of structured physical activity you did during lockdown level 5:

| **BEFORE lockdown level 5** | Type of Physical Activity |
|---|---|
| **Strenuous Exercise** (heart beats rapidly)<br>(e.g. running, jogging, hockey, soccer, rugby, squash, mountain biking, swimming, weight lifting, cross-training) | |
| **Moderate exercise** (not exhausting)<br>(e.g. fast walking, tennis, easy swimming, popular and folk dancing, strength pilates) | |
| **Mild/ Light exercise** (minimal effort)<br>(e.g. yoga, golf, easy walking, fishing from river bank) | |

13. How did you maintain activity during lockdown? **

Multiple answers may be selected.

| | |
|---|---|
| Alone with an OFC | |
| Directed digitally by a fitness or physical trainer | |
| Directed digitally by a physiotherapist, bio-kineticist or a sport scientist | |
| Using technology like Zoom etc. with other athletes | |

14. Being part of an online fitness community assisted you in maintaining your pre-lockdown fitness level during lockdown level 5.

| | |
|---|---|
| Strongly Agree | |
| Agree | |
| Disagree | |
| Strongly disagree | |

15. What are your exercise goals?
Multiple options may be selected.

| | |
|---|---|
| Physical fitness | |
| Health and wellness | |
| Professional athlete | |
| Sense of community | |
| Enjoyment and fun | |

16. How did lockdown impact your ability to achieve your exercise goals?

| | |
|---|---|
| Positive impact | |
| Negative impact | |
| No impact | |

17. Being part of an online fitness community assisted you in achieving your exercise goals during lockdown level 5.

| | |
|---|---|
| Strongly Agree | |
| Agree | |
| Disagree | |
| Strongly disagree | |

18. What motivates you to pursue your exercise goals?
Multiple options may be selected.

| | |
|---|---|
| Health | |
| Aesthetic appearance | |
| Fitness | |
| Mental wellbeing | |
| Guilt | |
| Friendship | |
| Work requirements | |

19. How did the lockdown impact your motivation to pursue your exercise goals?

| | |
|---|---|
| Positive impact | |
| Negative impact | |
| No impact | |

20. Did you struggle to keep yourself motivated to exercise? **

| | |
|---|---|
| Yes | |
| No | |

21. Being part of an online fitness community motivated you to achieve your fitness goals during lockdown level 5.

| | |
|---|---|
| Strongly Agree | |
| Agree | |
| Disagree | |
| Strongly disagree | |

22. Being part of an online fitness community provided a sense of community with other athletes that enabled you to achieve your exercise goals and maintain your fitness motivation during lockdown level 5.

| | |
|---|---|
| Strongly Agree | |
| Agree | |
| Disagree | |
| Strongly disagree | |

23. Did you feel depressed during lockdown? **

| | |
|---|---|
| Yes, all of the time | |
| Yes, on very few occasions | |
| Yes, sometimes | |
| No | |

24. Did you feel anxious during lockdown?

| | |
|---|---|
| Yes, all of the time | |
| Yes, on very few occasions | |
| Yes, sometimes | |
| No | |

25. Did you feel constantly fatigued during lockdown level 5? **

| | |
|---|---|
| Yes | |
| No | |

26. Did being part of an online fitness community alleviate feelings of depression and/ or anxiety?

| | |
|---|---|
| Strongly Agree | |
| Agree | |
| Disagree | |
| Strongly disagree | |

27. What benefits, would you say, does an online fitness community provide?

…….

…….

28. Are you still using an online fitness community? (18 months after lockdown level 5)

| | |
|---|---|
| Yes | |
| No | |

29. If you answered "No" to the above question, what were your reasons for discontinuing use of an online fitness community?

Multiple options may be selected.

| | |
|---|---|
| Public gyms open again | |
| Back to normal training groups | |
| Injury | |
| Illness | |
| Time constraints | |
| The OFC did not meet your expectations | |
| Other | |

30. If you selected "Other" in the above question, please provide a typed reason for discontinuing the use of an online fitness community.

……

**Key:**

* Question adapted from the Godin Leisure-Time Exercise Questionnaire (Godin, 2011).

** Question adapted from the questionnaire used by Pillay et al. in Nowhere to hide: The significant impact of coronavirus disease 2019 (COVID-19) measures on elite and semi-elite South African athletes (Pillay *et al*., 2020).