

## THE IMPACT OF COVID-19 ON PARTICIPATION, WELLBEING AND EXERCISE ACTIVITY IN TWO SOUTH AFRICAN PARKRUNS

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### ABSTRACT

*“parkrun” is an international organisation holding weekly, timed 5-km community events for runners and walkers. During the COVID-19 pandemic, parkruns were suspended globally, with gradual resumption in South Africa from October 2021. Comparison of participant event choice and performance at two Nelson Mandela Bay Municipality (NMBM) parkruns was ongoing when COVID-19 began, enabling questioning of previously recruited volunteers on their physical activity and wellness during suspension and after parkrun resumed, to determine effects on fitness and wellbeing. All respondents maintained some physical activity during suspension but missed the camaraderie and emotional support of parkrun. After reopening, 81% of respondents resumed parkrun within 1 year (i.e., by September 2022). Their stated motivations and benefits of parkrun were the same as pre-COVID-19. Enthusiasm for parkrun increased, although commitment to regularly attending a specific parkrun event reduced. The remaining respondents reported losing the habit of attending parkrun, developing new exercise routines, or moving to areas with no parkrun nearby. In the first quarter of 2022, total participation in NMBM parkruns was 29% of pre-COVID-19 numbers; by first quarter 2024 this increased to 69%. Individual parkrun times were initially reduced, but mean participant performance 1 year after resumption was not significantly impaired.*

**Keywords:** COVID-19; Fitness; parkrun; Return to performance; South Africa; Wellbeing.

### INTRODUCTION

“parkrun” (parkrun.com) was a popular form of exercise in South Africa before the COVID-19 pandemic. parkrun is a not-for-profit international organisation that organises free, weekly, timed 5-km community events for runners and walkers participating together (Woodbridge, 2023). The reported benefits of participation include improved fitness, body mass index, physical activity levels, mood and personal wellbeing; these reflect reported participant motivators of improving their physical fitness and social interaction (Grunseit *et al.*, 2020; Peterson *et al.*, 2022). parkrun has grown from 13 participants in 2004 to a global organisation in 22 countries with over 2200 events each weekend and over 13 million instances of participation recorded from 1 February 2022 to 31 January 2023 (Woodbridge, 2023). parkrun South Africa has also grown from a small number of enthusiasts in 2011 to current numbers of 950,200 registered national participants at 219 events (parkrun South Africa, 2024). In 2023

parkrun South Africa linked with the South African Department of Health to encourage the expansion of parkrun events for the entire South African community, in both affluent and marginal communities, as part of a national aim to promote a healthy lifestyle (Fordyce, 2023a). Physical inactivity is high in South Africa. Joubert *et al.* (2007) reported in 2007 that 49% of women and 43% of men were insufficiently active to achieve global public health recommendations of 150 minutes or more of health-enhancing physical activity per week. The South African National Health and Nutrition Examination Survey (SANHANES) 2012 report indicated that the South African population is changing from predominantly communicable disease causes of morbidity and mortality to noncommunicable diseases, particularly heart disease, stroke and type 2 diabetes, which have risk factors including alcohol and tobacco use, unhealthy diet and physical inactivity (Shisana *et al.*, 2014). In analysis of this more recent dataset, Patricios *et al.* (2022) found that 27.9% of males and 45.2% of females did not meet the globally recommended PA levels. The highest percentage of males exceeding the recommended physical activity lived in urban informal settlements (74.6%), with rural formal (70.5%), rural informal (66.1%) and urban formal (52.9%) areas having lower fitness levels. Area of residence had less impact on women. This agrees with the findings of Mabweazara *et al.* (2019) that rural populations are more active than urban populations and men are more active than women. parkrun can provide a safe, supportive introduction for men and women who are insufficiently active to engage with regular physical activity.

Studies of the motivation and benefits of parkrun participation in the United Kingdom (UK), Ireland and Australia have shown that females (Stevenson & Hickson, 2014; Grunseit *et al.*, 2018), older people (Grunseit *et al.*, 2018) and people who were previously inactive (Quirk *et al.*, 2021) have increasingly taken part in and benefitted from parkrun. Participation has not been studied as extensively in South Africa; however, a recent study in the Western Cape province found that the two main motivators for participation were health-related benefits and provision of a safe and organised event (Chivunze *et al.*, 2021). A second study of the four largest parkrun events in the country (de Vries *et al.*, 2022) found that accessibility and a safe, supportive social environment attracted less physically active people to engage with exercise in the natural environment.

The impact of COVID-19 and associated lockdowns on health, wellbeing and physical activity has been studied in the UK using parkrun data, including surveys before and after the pandemic (Quirk *et al.*, 2023). The greatest negative effects were found among females, young adults, less active people, those from areas of high deprivation, and those who had completed few parkruns. More active people and those previously involved in community-based physical activity were less affected by the COVID-19 lockdown (Quirk *et al.*, 2023). This impact extended to resumption of parkrun after the pandemic. Globally, the average attendances were lower post-COVID-19, in 2021 and 2022 (Woodbridge, 2023). Participation data for South African parkruns also indicates a national reduction in the number of participants post-COVID-19 (parkrun South Africa, 2024). It appears that exercise habits have changed and that many people do not feel fit enough or confident enough to participate (Quirk *et al.*, 2023). A reduction in numbers of female participants, especially in socially deprived areas, along with younger and less fit individuals, was also observed by Gilburn (2023a). McCarthy *et al.* (2021) conducted a longitudinal study with UK users of a smartphone app for outdoor physical activity. They found that reduction in the activity of moderately active people continued as the UK lockdown eased. However, older people showed both less initial decrease in physical

activity and recovered their activity levels faster than younger people (McCarthy *et al.*, 2021). Newer parkrun participants with slower times were less likely to return, but more participants returned to smaller parkrun events with a greater proportion of first-time adult participants than the large events (Gilburn, 2023b). This agrees with de Vries *et al.* (2022) who noted the value of parkrun being inclusive and noncompetitive, with no pressure to participate or produce fast run times. Gilburn (2023b) also found the quality of the natural environment impacted on parkrun participation. Events held at locations with freshwater and woodland encouraged resumption, reflecting the value of the outdoor experience as well as the exercise opportunity.

Thus parkrun contributes to the physical activity and wellbeing of participants by providing a safe and supportive environment for people of all levels of fitness (or previous inactivity) to partake of regular weekly exercise. parkrun also generates extensive data for the participants themselves and for researchers (with permission). Each participant's completion time and finish position is recorded and presented online on the parkrun website for their event, along with their gender, age group, age grade and number of parkruns completed. Participants can see how their times improve as their fitness increases, giving motivation for further physical activity. Personal best times are cheered by other participants and the efforts of all people are recognised. Milestone numbers of parkruns completed are also recognised, giving further impetus to continue participation. In addition, a participant can see how their performance compares with others globally using an age-graded percentage that aims to "level the playing field" by calculating the ratio of an individual's finish time against the world record for their sex and age, expressed as a percentage (parkrun.com). The higher the score the better the performance; however, factors such as the difficulty of the course (flat or steep), the terrain (a smooth paved path or a trail run), and the weather have a significant impact on performance. Furthermore, de Vries *et al.* (2022) noted that unfavourable winter weather results in fewer participants than in summer. At a population level, changes in the number of participants at an event can be analysed over time by gender and age, and performance can be compared between different parkrun courses.

In this study, the motivations for attending parkrun, the reasons for choice of a specific parkrun event and the impact of COVID-19 on participation in parkrun were analysed using reflexive thematic analysis following Byrne's six-phase guide (2022) to Braun and Clarke's approach (Braun & Clarke, 2006) to the analysis of qualitative data. This approach interprets qualitative data by identifying and analysing patterns or themes in a data set by (1) familiarisation with the data set, (2) generating initial descriptive or interpretive codes for pieces of information, (3) generating themes from these codes, (4) reviewing the themes, (5) defining and naming the themes and (6) reporting on the analysis. The quantitative impact of COVID-19 on the numbers of participants at two parkrun events and on their performance, as indicated by parkrun times, was also analysed.

## PURPOSE OF THE RESEARCH

The purpose of this study is to analyse (1) the general motivations for attending specific parkrun events and motivators influencing participation in parkrun and choice of parkrun event in the Nelson Mandela Bay Municipality (NMBM), Eastern Cape province; and (2) the impact of COVID-19 on participants' commitment to parkrun and their subsequent fitness and wellbeing.

## METHOD

### Parkruns in Nelson Mandela Bay Municipality

Currently, five parkrun events are held in NMBM and the two oldest events (PE Hobie Beach and Sardinia Bay) form the main part of this study. PE Hobie Beach is a flat course with a smooth running surface on a mixture of brick and concrete paths, wood decking and sand next to the ocean within the boundary of the city of Gqeberha (formally known as Port Elizabeth), enabling quicker finish times for each participant than Sardinia Bay, which is a hilly course entirely on trail paths in countryside outside the city. In 2019, study volunteers were asked to complete a questionnaire to determine their motivation for parkrun participation and their reasons for choosing to attend PE Hobie Beach or Sardinia Bay. The COVID-19 pandemic resulted in suspension of global parkruns in March 2020. This stopped a follow-up investigation of the effects of the PE Hobie Beach and Sardinia Bay course differences on individual participants' fitness. Consequently, the physical effects of the two courses are compared here using participants' parkrun completion times. The ongoing comparative study of the parkrun events enabled questioning of the previously recruited study volunteers on their physical activity and wellness during the first hard South African lockdown and their parkrun participation after the pandemic. In South Africa, parkrun resumption occurred gradually, event by event, from October 2021. The NMBM events reopened in December 2021 (Sardinia Bay), April 2022 (PE Hobie Beach), February 2022 (Wells Estate), July 2022 (Lady Slipper, although this parkrun was discontinued in 2022) and newly opened Norm-Hudlin Trails in January 2022. A fifth event, St George's parkrun, commenced on 7 September 2024 and is not included in this study. Once parkrun had resumed at both PE Hobie Beach and Sardinia Bay, a follow up questionnaire was distributed that addressed the motivation of the study volunteers to return to parkrun. A comparison of the run times before and after the cancellation period enabled analysis of the potential effect of COVID-19 on parkrun performance.

### Ethical considerations

The study received ethical approval from Nelson Mandela University Research Ethics Committee (Human), approval number H19-SCI-PHS-001, with an extension to ask questions during the COVID-19 lockdown and a follow-up post-COVID-19 with approval number H22-SCI-BCM-003. Both studies received written approval from the parkrun Research Board, chaired by the Advanced Wellbeing Research Centre at Sheffield Hallam University, UK.

### Database analysis

The total numbers of participants in NMBM during the first quarters of 2022, 2023 and 2024 were compared with those in the first quarter of 2020 (pre-COVID-19 lockdown), along with a comparison of the total number of participants at the parkrun events on closure (14 March 2020) and resumption. All data were obtained from the parkrun South Africa database. Mean participant numbers at the NMBM parkruns were calculated for the first quarter (January–March) of 2020 (pre-COVID-19) and the years following resumption (2022, 2023 and 2024 for Sardinia Bay and Norm-Hudlin; 2023 and 2024 for PE Hobie Beach and Wells Estate), enabling comparison during the same time of year and similar weather conditions. Finish times for the parkrun events during these periods were also obtained from the parkrun South Africa database.

## Study population

The study population included participants attending the PE Hobie Beach or Sardinia Bay parkrun events in October 2019. The participants were informed of the study using the website news pages and Facebook sites of the two parkrun events and via in person pre-run talks at the two events. All the parkrun participants aged 18 years or older were invited to participate. Self-selected study volunteers were recruited who chose to complete a survey (either on paper submitted to the researcher, or via email to the researcher) to provide details of their age, gender, parkrun event attended, height, weight, number of parkruns completed, personal best time (PB) and own personal estimate of fitness and to provide their email address for follow-up during the study. Body mass index (BMI) was calculated.

The following questions aimed to determine the individual's motivation for being part of parkrun and reasons for their choice of parkrun event:

### *Pre-COVID-19*

#### *Survey 1*

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1. What motivated you to take part in a parkrun?
  2. What are your goals for your parkruns?
  3. Why did you choose this parkrun (PE Hobie Beach/Sardinia Bay)?
  4. If you have run both parkrun events, which do you prefer? Give reasons.
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A total of 94 volunteers living in NMBM, Eastern Cape Province (43 males and 51 females, aged 19 to 81 years) responded to the questionnaire in 2019 and gave their email addresses for further contact and participation in the study.

During the South African hard lockdown, the 94 volunteers were asked via email at the end of April 2020 (survey 2) to answer the following COVID-19 survey:

### *COVID-19 surveys*

#### *Survey 2 (during COVID-19 lockdown, April 2020)*

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1. What exercise are you doing in place of parkrun?
  2. What do you miss most about parkrun?
  3. What are your exercise plans for when restrictions are reduced?
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After parkrun resumed, the 94 volunteers were again asked by email during August and September 2022 to answer the following questions relating to their parkrun participation:

#### *Survey 3 (after COVID-19 lockdown, September 2022)*

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1. Have you resumed running parkrun? YES/NO
2. If you answered NO to question 1, please state why you haven't resumed.
3. If you answered YES to question 1:

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- a. Which parkrun are you attending?
  - b. Is this the same parkrun as pre-COVID-19 cancellation?
  - c. If not, which parkrun did you run previously and why have you changed?
  - d. Please give your current best time.
  - e. Please give your PB time.
  - f. Please give your time just before the COVID-19 cancellation in March 2020.
  - g. Did you have covid? Has this affected your exercise performance?
  - h. What have you enjoyed most on resuming parkrun?
  - i. Do you plan to continue regular parkruns?
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### Data analysis

All data were anonymised. Responses to the surveys were transcribed into spreadsheets, with each respondent's answer recorded separately. Answers to the open-ended questions were analysed by themes following the procedure of Braun and Clarke (2006), as outlined by Byrne (2022). Mean numerical data from study volunteers at the two parkrun events before and after COVID-19 were compared using the Student's paired t-test.

## RESULTS

### Study participant characteristics

More people volunteered for the 2019 study at PE Hobie Beach (50) than at Sardinia Bay (44) parkrun, although more female study volunteers attended Sardinia Bay (27) compared with PE Hobie Beach (23) (Table 1). Study volunteers' ages ranged from 19 to 81 years; the study volunteers at Sardinia Bay were older than at PE Hobie Beach, but this was not significantly different ( $p=0.17$ ) (Table 1). Data for the month of October 2019 for each of the parkruns indicate that these reflect the demographics of the two events. These demographics are similar to those reported by de Vries et al. (2022) for the four largest parkruns in South Africa. The mean BMIs of the 18–44 years age group (young) at both events, the 45–65 years group (middle aged) at PE Hobie Beach and the over 65 years group (elderly) at Sardinia Bay were in the normal adult range of 18.5–24.9 kg/m<sup>2</sup> (defined by the World Health Organization, 2024). The mean BMIs for the over 65 years group at PE Hobie Beach and the 45–65 years group at Sardinia Bay fell into the overweight category of 25–29.9 kg/m<sup>2</sup>. However, only 6 of the 94 volunteers were in the obese category (>30 kg/m<sup>2</sup>). The mean BMI for all the study volunteers was 24.5 kg/m<sup>2</sup>, with a male mean of 25.1 kg/m<sup>2</sup> and female mean of 24.0 kg/m<sup>2</sup>. These are lower than BMIs reported for similar age groups of South Africans using data from the National Income Dynamics Study (Wandai et al., 2020).

The number of parkruns completed before the survey varied greatly for all study volunteer age groups at both parkrun events, ranging from 1 to 216 (Table 1). The mean PB times of study volunteers below 65 years were faster at PE Hobie Beach compared with Sardinia Bay, by 2 min 14 s for the 18–45 years age group and 6 min 6 s for the 46–65 years age group (Table 1). Surprisingly this trend was reversed for the over 65 years age group, most likely reflecting the low numbers of people in this group. Nevertheless, the overall trend is as expected for a flat course compared with a hilly trail run. Study volunteers were asked to provide a personal estimate of their fitness: 28% estimated they had a high fitness activity level, 24% estimated a moderate level, 35% a low level and 13% said parkrun was their only physical activity.

**Table 1. STUDY PARTICIPANT CHARACTERISTICS**

|                       | Male (M)    | Female (F)  | PE Hobie Beach (HB)  | Sardinia Bay (SB)   | Mean BMI (kg/m <sup>2</sup> )            | Mean PB min:s                                     | Mean no. of parkruns (range)             |
|-----------------------|-------------|-------------|----------------------|---------------------|------------------------------------------|---------------------------------------------------|------------------------------------------|
| 18–44 years, <i>n</i> | 18          | 27          | 24<br>(M: 11, F: 13) | 21<br>(M: 7, F: 14) | –                                        | –                                                 | –                                        |
| Mean age±SD           | 29±8        | 32±8        | 27±6                 | 35±8                | 23.9±4.2<br>HB: 23.1±3.9<br>SB: 24.7±4.6 | 30:33±08:52<br>HB:29:28±09:43<br>SB:31:48±07:50   | 36±34(1–150)<br>HB: 38±38<br>SB: 35±29   |
| 45–65 years, <i>n</i> | 18          | 21          | 22<br>(M: 12, F: 10) | 17<br>(M: 6, F: 11) | –                                        | –                                                 | –                                        |
| Mean age±SD           | 54±5        | 55±5        | 54±5                 | 55±5                | 24.9±3.4<br>HB: 24.0±3.2<br>SB: 26.6±3.3 | 32:32±08:36<br>HB: 29:35±06:35<br>SB: 36:20±09:33 | 86±55 (8–216)<br>HB: 103±56<br>SB: 63±47 |
| >65 years, <i>n</i>   | 7           | 3           | 4<br>(M: 4)          | 6<br>(M: 3, F: 3)   | –                                        | –                                                 | –                                        |
| Mean age±SD           | 75±4        | 73±6        | 76±5                 | 73±4                | 25.3±4.2<br>HB: 26.2±4.6<br>SB: 24.8±4.3 | 42:42±07:42<br>HB: 43:52±05:10<br>SB: 41:56±09:26 | 98±78 (5–200)<br>HB: 123±74<br>SB: 81±81 |
| Total, <i>n</i> (%)   | 43 (46)     | 51 (54)     | 50 (53)              | 44 (47)             | –                                        | –                                                 | –                                        |
| Overall means         | 47±18 years | 44±15 years | 43±17 years          | 48±15 years         | 24.5±3.9<br>M:25.1±3.9<br>F:24.0±3.9     | 32:40±09:17<br>M: 27:59±08:28<br>F: 36:37±08:04   | 63±55(1–216)                             |

BMI = body mass index; PB = Personal best; SD = standard deviation

### **Motivation for parkrun participation and event choice**

The questions regarding motivation to participate in parkrun, and the goals and event choice questions were open-ended, enabling study participants to provide their own undirected responses. These were analysed to identify a number of themes. Many study participants cited aspects of more than one of the identified themes (e.g., “fitness and time together with other runners and walkers”; “I choose Sardinia Bay because it’s closest to my home and I prefer the sort of terrain and challenge it offers”). Therefore, the total percentage of each theme in all the responses was calculated. Common themes for motivation to join parkrun emerged for both the group at PE Hobie Beach and the Sardinia Bay group. These were (1) a desire to improve their fitness/health/reduce weight (61% of responses), (2) for social interaction with friends/family (27% of responses), (3) to have a regular outdoor exercise challenge (23% of responses) and (4) for psychological wellbeing/enjoyment/stress relief (19% of responses). The goals of the study volunteers were also common to both parkruns. These related to (1) exercise: complete the run/improve PB time/complete target number of runs (78% of responses), (2) health: improve fitness/health/lose weight (28% of responses) and (3) social wellbeing: enjoyment/socialising/psychological aspects (22% of responses). Factors affecting event choice were also the same for both events: closeness to home, particularly for those at PE Hobie Beach, several of whom ran or walked to the event (59% of responses); appreciation of the beauty of the course, either the ocean or the countryside (32%); the exercise/training opportunity, which participants identified as either speed training on the flat PE Hobie Beach course, or the challenging endurance training on the hilly Sardinia Bay trail run (26%); and to run with friends or family (8%).

Comments on motivation and goals to attend parkrun, reflecting the above themes, included fitness/health: “To lose weight and become active for health reasons”; “Originally just to try and see where it went. It shortly became a goal to achieve 100 events before I turned 60”; “Better cardiovascular fitness”; and “Live as long as possible and stay fresh”. They also included interaction: “Making new friends”; “To be a motivation to others, to set an example to them to care for their health”; “Keep running with my children”; and “A lot of people talk about how fun the parkrun is. It is nice to see people of Port Elizabeth getting together, tackling the same activity”. Other comments on motivation and goals were about regular exercise: “Usually just to participate, but every once in a while I like to try to get a faster time”; “parkrun helps me to focus and be motivated to improve my performance and helps me prepare for running mentally and physically”; “To encourage me to run regularly and to have my run timed”; and “Eventually start to jog – normally fast walk”. Psychological wellbeing/enjoyment/stress relief were also mentioned as motivation and goals: “To start my weekend on an energised note”; “I enjoy jogging and competitive running because it is a stress reliever”; “Feeling good afterwards”; and “To enjoy myself”.

Comments on event choice, reflecting the above themes, were about closeness to home: “I live nearby”; “Hobie is 1 km from home”; “Run direct to it”; and “I swim, cycle and enjoy the beach afterwards”. Event choice was also related to appreciation of the beauty of the course: “Seeing the beach once a week, often seeing dolphins”; “I like the soft trail and coastal forest”; and “I like the bush and escape from the city”. Exercise/training opportunity was also part of event choice: “Hobie Beach is a faster terrain so therefore it is a good place to run a personal best”; “I prefer the flatter terrain at Hobie as I can focus on my technique rather than battling



the terrain”; “Sardinia Bay is for challenge and Hobie Beach for motivation”; “Hobie Beach is crowded but nice and easy when I am in the mood for an easier run”; and “Sardinia Bay gives the opportunity to do a tougher uphill endurance trail run”. A desire to run with friends/family also influenced event choice: “There are less people present at Sardinia Bay compared with Hobie Beach so the run feels like less of a ‘competition’ than a recreational activity”; “We sit at the ocean and have a picnic thereafter”; and “My friend runs here”.

## **COVID-19 surveys**

### ***Survey 2 (during COVID-19 lockdown)***

Twenty people from the original study participants who responded to survey 1 also responded to survey 2 during the hard lockdown. All found a way to include daily exercise: 15 of the respondents ran or walked measured laps around their homes; 4 recorded their performances in the virtual “(not) parkruns” (de Vries & Gunter, 2022) and the Mzansi Lockdown Marathon (2020); 11 participated in online training regimes, including high-intensity interval training (HIIT), weights and trainer cycles; and 5 exercised with yoga, Pilates, karate, swimming, skipping and gardening.

Fourteen respondents missed the emotional support, camaraderie and social interactions; 13 respondents missed the freedom to run/walk outdoors in a safe environment; and 7 people missed the challenge to improve their times and to compare with others in their age group or family, giving the achievement of reaching fitness goals.

Respondents said they missed “being part of the parkrun community – parkrun changed my life in many ways”. They also said, “It’s a ‘safe’ place which gets safer the more you get to run it as you meet different people” and “The COVID pandemic has taught us to appreciate the small things in life, which are the real values we have”.

All respondents planned to resume their exercise activities after lockdown, including parkrun, and to socialise with others. Comments included “It will be an absolute joy to the soul to be out in the fresh air with like-minded people” and “I realise what a privilege it will be and how we all took it for granted before COVID”.

### ***Survey 3 (after COVID-19 lockdown)***

Survey 3 was completed in September 2022, once parkrun had resumed in NMBM, by 27 respondents from the original survey 1 group. They comprised 13 males and 14 females, aged 24–73 years at the time of the 2019 pre-COVID-19 questionnaire and 27–77 years for the second survey (15 of these people also responded to the first survey). Twenty-two people (81% of respondents) had resumed parkrun by the time of the second survey (September 2022), although four of them asserted in their responses that they were less committed and their attendance was less regular than previously. Reasons for the lack of commitment or resumption were given as laziness, not back into the habit of attending parkrun, development of new exercise routines, reduced exercise due to age, illness or injury, and moving to an area with no parkrun nearby. Four people (all younger) moved to new locations, three of them were attending parkruns near their new addresses. Seventeen people resumed attending the same parkrun event as before COVID-19. The introduction of a new NMBM parkrun event at Norm-Hudlin has resulted in some people moving there, or alternating between PE Hobie Beach,

Sardinia Bay and Norm-Hudlin. Thus, it appears that people are not as committed to regular attendance at a preferred parkrun event as before COVID-19.

Of the 27 respondents, 10 had COVID-19, with 4 saying that it affected their performance, citing breathlessness and reduced parkrun times. Comparison of performance data provided by the participants in survey 3 who resumed parkrun at the same event as before COVID-19 is given in Table 2. Half of the people improved their time after COVID-19 compared with their last parkrun before COVID-19 (9 out of 17), with 2 people setting PBs after COVID-19. However, the overall mean time for the study respondents after COVID-19 was not significantly different from the mean time before COVID-19 ( $p=0.96$ ). The mean PB pre-COVID-19 was significantly quicker than the post-COVID-19 mean PB ( $p<0.005$ ) but this is to be expected, as all except two of the PBs were set some years previously when the individuals were younger. Therefore, it appears that the COVID-19 interruption did not significantly impair the performance of the study respondents.

**Table 2. RESPONDENTS' PARKRUN PERFORMANCE BEFORE AND AFTER THE COVID-19 CLOSURE**

|                                                           | Age groups (years) |         |       | Overall mean | Range         |
|-----------------------------------------------------------|--------------------|---------|-------|--------------|---------------|
|                                                           | 18 - 44            | 45 - 65 | >65   |              |               |
| Mean personal best time (min:s)                           | 29:47              | 27:33   | 20:00 | 27:30        | 20:00 – 46:03 |
| Mean time of last parkrun before COVID-19, (min:s) (n=27) | 31:12              | 33:02   | 27:00 | 32:21        | 23:41 – 46:03 |
| Mean best time post-COVID-19, min:s (n=27)                | 37:13              | 31:17   | 33:00 | 32:26        | 22:07 – 57:06 |

### Parkrun database analyses

#### *Attendance at NMBM parkruns before and after COVID-19 closure*

The mean number of participants at all NMBM events in the 3 months prior to the COVID-19 parkrun closure (January–March 2020) and the mean numbers in the same months in 2022, 2023 and 2024 are presented in Table 3. Participants may choose to attend any parkrun event on a given date, so the mean population numbers at each event may potentially give a slight over- or underestimate of attendants. The introduction of Norm-Hudlin and the closure of Lady Slipper resulted in some changes to participants' preferred events. Mean attendances during the first quarter of 2022, 2023 and 2024 at PE Hobie Beach and at Sardinia Bay were significantly lower ( $p<0.005$ ) than comparable attendances pre-COVID-19 in the first quarter of 2020 (Table 3). Furthermore, the total numbers of NMBM parkrun participants during the first quarter of 2022, 2023 and 2024 (calculated from the sum of the mean attendances at all the NMBM events) were 29% of the 2020 pre-COVID-19 period in 2022, 58% in 2023 and 69% in 2024 (Table 3). This indicates progressive recovery of attendance, but is still lower than before COVID-19, matching the parkrun South Africa data (parkrun.co.za, 2024) of a peak of 64,157 participants on 19 January 2019 compared with a post-COVID-19 peak of 42,681 participants on 20 January 2024. In keeping with the pre-COVID-19 parkrun demographic in South Africa, older, less fit (as assessed by parkrun times) and female participants continue to be well represented.

**Table 3. THE MEAN ATTENDANCE BEFORE AND AFTER THE COVID-19 CLOSURE BETWEEN JANUARY AND MARCH 2020 - 2024**

| Event                              | Last run<br>before<br>closure,<br>14/3/2020 | First run after<br>reopening,<br>4/12/21 SB;<br>9/4/22 HB;<br>22/1/22 NH;<br>12/2/22 WE;<br>9/7/22 L | Attendance number       |                                      |                                      |                                      |
|------------------------------------|---------------------------------------------|------------------------------------------------------------------------------------------------------|-------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
|                                    |                                             |                                                                                                      | pre-<br>COVID<br>(M±SD) | January–<br>March<br>2022,<br>(M±SD) | January–<br>March<br>2023,<br>(M±SD) | January–<br>March<br>2024,<br>(M±SD) |
| <b>PE Hobie Beach (HB)</b>         | 694                                         | 230                                                                                                  | 886±130                 | No event                             | 340±50*                              | 483±66*                              |
| <b>Sardinia Bay (SB)</b>           | 285                                         | 122                                                                                                  | 421±82                  | 163±45*                              | 156±41*                              | 211±28*                              |
| <b>Norm-Hudlin (NH)</b>            | No event                                    | 410                                                                                                  | No event                | 267±58                               | 296±56                               | 252±54                               |
| <b>Total largest NMBM parkruns</b> | 979                                         | 762                                                                                                  | 1307                    | 430                                  | 792                                  | 946                                  |
| <b>Wells Estate (WE)</b>           | 111                                         | 86                                                                                                   | 95±23                   | No event                             | 52±14*                               | 59±10                                |
| <b>Lady Slipper (L)</b>            | 41                                          | 29                                                                                                   | 46±14                   | No event                             | No event                             | No event                             |
| <b>Total all NMBM parkruns</b>     |                                             |                                                                                                      |                         |                                      |                                      |                                      |
| <b>(% mean Jan–Mar preclosure)</b> | 1131                                        | 877                                                                                                  | 1448                    | 430<br>(29%)                         | 844<br>(58%)                         | 1005<br>(69%)                        |

Comparison of pre-COVID-19 mean attendance with post-COVID-19 mean attendance at same course, \* $p<0.005$ . NMBM = Nelson Mandela Bay Municipality

### Performance before and after COVID-19 closure at PE Hobie Beach and Sardinia Bay parkruns

Data on parkrun completion times before and after COVID-19 show that, whilst there was some reduction in times immediately after resumption, performance now largely reflects pre-COVID-19 performance. Comparison of the mean fastest times and mean slowest times for males and females at PE Hobie Beach and Sardinia Bay in the first quarter of 2020 (pre-COVID-19) with those in the first quarter of 2023 (post-COVID-19) indicated no significant difference in times at PE Hobie Beach (Table 4). At Sardinia Bay the mean fastest time for males post-COVID-19 was significantly slower ( $p<0.005$ ) than pre-COVID-19. However, mean fastest time for females and mean slowest times for both males and females were not significantly different (Table 4). Thus, overall, the COVID-19 pandemic has not had a serious long-term effect on parkrun performance.

**Table 4. MEAN TIMES IN FIRST QUARTER 2020 COMPARED TO MEAN TIMES IN FIRST QUARTER 2023**

|                                   | PE Hobie Beach parkrun      |                             | Sardinia Bay parkrun        |                             |
|-----------------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
|                                   | Jan–March 2020<br>(h:min:s) | Jan–March 2023<br>(h:min:s) | Jan–March 2020<br>(h:min:s) | Jan–March 2023<br>(h:min:s) |
| <b>Mean fastest time, males</b>   | 00:18:41                    | 00:19:42                    | 00:21:23                    | 00:23:13*                   |
| <b>Mean fastest time, females</b> | 00:23:10                    | 00:23:18                    | 00:25:52                    | 00:27:04                    |
| <b>Mean slowest time, males</b>   | 01:12:47                    | 01:10:19                    | 01:11:25                    | 01:09:16                    |
| <b>Mean slowest time, females</b> | 01:13:40                    | 01:08:55                    | 01:14:24                    | 01:11:14                    |

Comparison of pre-COVID-19 mean fastest time with post-COVID-19 mean fastest time at same course, \* $p < 0.005$ .

## DISCUSSION

This study (1) identified the study volunteers' motivation for attending parkrun and their reasons for choice of parkrun event before the COVID-19 pandemic and (2) investigated the effects of the COVID-19 lockdown on parkrun attendance and performance in the following years using both participants' responses to surveys and parkrun database information for the NMBM parkruns. It should be noted that the numbers of respondents in the COVID-19 surveys are small and that there was attrition of participants across the life of this study. The original participants were contacted via their given email addresses to participate in the COVID-19 surveys 2 and 3; however, it is possible that the nonrespondents changed email address during the intervening time, or that they were no longer interested in participating, or that they were affected by COVID-19. This limits the study, but those who completed the COVID-19 surveys represent a cohort of people followed before, during and after the pandemic lockdown. The original study volunteers reflected the local parkrun population, with ages ranging from 19 to 81 years and 46% males/54% females. This agrees with findings that females (Stevenson & Hickson, 2014), older people (Grunseit *et al.*, 2018) and previously inactive people (Quirk *et al.*, 2021) have increasingly taken part in parkrun. It is clear from the original survey that parkrun provided an opportunity for healthy exercise and social interaction, confirming the health and wellbeing gains of participation derived from parkrun's friendly, welcoming and social nature (Grunseit *et al.*, 2020). The major reason cited for event choice was closeness to home, confirming that ease of access is important (Smith *et al.*, 2021). Appreciation of the natural surroundings (ocean or countryside) was the next most cited reason for course choice, supporting the concept that physical activity in the outdoor environment is important to provide a connection with nature to protect mental health (Roche *et al.*, 2022) and reduce loneliness (Astell-Burt *et al.*, 2022). Wicks *et al.* (2022) also emphasised the value of exercise in natural environments compared with urban environments. Surprisingly, the course characteristics affecting exercise (flat, fast vs. hilly trail) were less critical. Most people participated in parkrun for enjoyment rather than as a major part of their physical training, although several commented on the challenge of setting a fast PB at PE Hobie Beach or tackling the hills at Sardinia Bay.

The post-COVID-19 survey was completed by only 29% of the original study volunteers, therefore these respondents represent a group more committed to research and to parkrun. The respondents were of a somewhat older demographic ranging from 27 to 77 years and were 48% male/52% female, reflecting that younger people were less likely to resume parkrun than older people (McCarthy *et al.*, 2021; Quirk *et al.*, 2023; Gilburn, 2023a), although female participation was not reduced. The respondents identified more strongly than before with the motivation and freedom provided by a regular outdoor exercise challenge and the psychological wellbeing and stress relief felt as part of a parkrun community, reinforcing their commitment to parkrun. This interaction of motivations stimulating participation supports the views of Furman *et al.* (2023) that having multiple reasons to engage in a physical activity may help to maintain the activity during periods of disruption, and of McCormick *et al.* (2024) that new runners who have a meaningful personal reason for running can maintain their running under difficult circumstances. It also indicates the need for direct personal connections and role models, rather than impersonal participation in virtual (not) parkrun during lockdown, as reported by de Vries and Gunter (2022). The safety of a group parkrun was cited, as found by Chivunze *et al.* (2021) in Western Cape province, but not as a major factor. Interestingly, respondents were less committed to regular participation at a specific parkrun event than to participating weekly in a parkrun. Those who moved away from NMBM indicated that they tried to find another parkrun near to their new location. This indicates the value of the parkrun organisation as an entity and the role of the wider parkrun community.

Performance post-COVID-19 was not affected when comparing individual respondents' parkrun times (Table 3), although it should be noted that the respondents in this study were faster (mean post-COVID-19 time: 32 min 26 s, Table 2) than the South African parkrun average (41 min 49 s, parkrun.co.za, 2024). However, matched mean participant data from the first quarters of 2020, 2022, 2023 and 2024 at PE Hobie Beach and Sardinia Bay also indicate that performance was not greatly changed after COVID-19 (Table 4). The mean slowest times of over 1 h remained similar before and after COVID-19 (Table 4). These slow times reflect the fact that almost one-third of South African participants are walkers or slow runners, recording the slowest average finish time in the parkrun world (Fordyce, 2023b). Thus, the findings of Reece *et al.* (2023) that younger women in the UK, Ireland and Australia were deterred from joining parkrun because of lack of fitness are not born out in the present study. Nevertheless, whilst the numbers of parkrun participants are increasing in the years post-COVID-19 and include many first-time participants (parkrun South Africa, 2024), they have not yet reached pre-COVID-19 levels.

## RECOMMENDATIONS

The current format of parkrun in South Africa encourages participation of people of all ages, genders and levels of fitness as part of a fun, safe, inclusive and supportive community. The two parkrun events featured in this study highlight this and indicate the value of exercising in a natural nonurban outdoor setting. These features should be maintained and promoted to continue the increase in numbers of participants who benefit from the weekly events.

Nearness to home was the most cited reason for choice of a parkrun event; therefore a further increase in participant numbers and diversification of the parkrun South Africa community could be achieved by creating new parkrun events in locations previously without a nearby

parkrun to improve geographical accessibility and make the events more accessible to everyone, regardless of background and ability. In this respect, a new parkrun was opened in Gqeberha in September 2024 at St George's park (St George's parkrun). This parkrun is easily accessible to many people living in the city centre and has had very good attendance in the month it has been operating.

Future research to follow up the original survey could determine whether, as might be predicted from the findings of this study, new "first time" parkrunners may be attracted to St George's parkrun due to its proximity to their homes, and to identify what benefits they find in an inner city parkrun, compared with parkruns on the beach and in the countryside.

## CONCLUSION

The after-effects of the COVID-19 pandemic initially reduced participation at NMBM parkrun events to 29% of pre-pandemic numbers in the first quarter of 2022, but participation has steadily increased to 69% in the first quarter of 2024. Amongst the respondents to the post-COVID survey reported here, 81% resumed parkrun in the first months that the parkruns reopened locally. Therefore, it appears from the study participants that parkrunners are returning, valuing highly the health, social interaction and psychological wellbeing they derive. Nonrespondents may have found alternative exercise, or reduced their physical activities. In the overall NMBM parkrun population they are being replaced by new people (first-timers) joining these two parkrun events (and the other local events). Data from the two parkrun events featured in this study indicate that the COVID-19 pandemic did not impair the performance of this population of returning and new parkrunners after resumption of the parkrun events. Thus, although the effects of COVID-19 infection itself, and/or the effects of the limitations to physical activity during COVID-19 lockdown, may well have had negative impacts on the potential performance of parkrunners, the parkrun times of people after resumption at matched periods of the year and matched NMBM events are not reduced. This indicates that the current parkrunners have regained levels of fitness equivalent to those before the COVID-19 pandemic. Furthermore, numbers of parkrun participants are still increasing, indicating the long-term attraction of parkrun.

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## Conflict of interest

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