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parkrun as a tool to support public health: insights for clinicians

Steve Haake^{1*}, Helen Quirk², Alice Bullas³

¹Director of Engagement, The Advanced Wellbeing Research Centre, Sheffield Hallam University, The Olympic Legacy Park, 2 Old Hall Road, Sheffield, S9 3TU, United Kingdom. ORCID NO: <https://orcid.org/0000-0002-4449-6680>

²NIHR SPHR Launching Fellow in Public Health, School of Health and Related Research, University of Sheffield, Regent Court, 30 Regent Street, Sheffield, S1 4DA, United Kingdom. ORCID NO: <https://orcid.org/0000-0003-2716-4681>

³Research Fellow, The Advanced Wellbeing Research Centre, Sheffield Hallam University, The Olympic Legacy Park, 2 Old Hall Road, Sheffield, S9 3TU, United Kingdom. ORCID NO: <https://orcid.org/0000-0003-2857-4236>

*Corresponding author: s.j.haake@shu.ac.uk

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Abstract

Background

To support efforts to grow social prescribing and reduce levels of physical inactivity, *parkrun* UK and the Royal College of GPs developed the *parkrun Practice* initiative to link General Practices to local *parkruns* (free, weekly, timed, physical activity events). Practice staff are encouraged to take part themselves and also encourage their patients to participate.

Aim

To provide insight for clinicians about *parkrun* participants, especially those with characteristics of a patient who might be signposted to physical activity.

Design and setting

Secondary analysis of an online survey of 59,999 *parkrunners* in the UK.

Method

Respondents were ranked into 13 categories using mean *parkrun* finish time allowing the following definitions: front runners, median runners, slower runners, runners/walkers and walkers. Measures included demographics, health conditions, motives for first participating and perceived impact of health and wellbeing.

Results

Over 9% of all participants were found to have at least one long term health condition: this rose to 45% for walkers and included arthritis, obesity, depression, chronic pain, hypertension and anxiety. Walkers

were less likely to be motivated by fitness or competition and more likely to be motivated by physical health. Despite these differences, perceived improvements to wellbeing were broadly similar for all *parkrunners* regardless of finishing time.

Conclusions

The study shows that parkrunners are a diverse population in terms of physical health. The information here could be combined with other research on barriers to participation and successful brief interventions to help address the key issues of practitioner knowledge and confidence.

Keywords

Long term health conditions, physical activity, social prescribing, health promotion, *parkrun*.

How this fits in

To support efforts to grow social prescribing and signposting to physical activity opportunities, the Royal College of GPs and *parkrun* UK developed the *parkrun Practice* initiative which has, so far, seen over 1,500 General Practices link with their to local *parkrun* events (free, weekly, timed, 5km events). Not all GPs are confident prescribing physical activity and this study aimed to provide useful insight from a large survey of *parkrunners*. This research found that 9.3% of respondents had at least one health condition lasting 12 months or more, rising to 45.2% for walkers. The conditions reported match some of those for which GPs would prescribe physical activity, i.e., depression, anxiety, arthritis, hypertension and weight management. More than 7 out of 10 of those with health conditions improved their fitness, physical

health, mental health and other measures suggesting *parkrun* could also deliver some of the components of the *Five Ways to Wellbeing* advocated by the NHS.

Introduction

Chief Medical Officers encourage at least 150 minutes of moderate or 75 minutes of vigorous physical activity per week to optimise health outcomes [1]. Worldwide, 1 in 4 adults and 3 in 4 adolescents do not meet these activity guidelines [2]. Clinicians are recommended to carry out social prescribing rather than clinical interventions and a quarter of people say that they would be more active if advised by a nurse or GP [3]. The conditions that GPs would refer physical activity for include weight management, type 2 diabetes, depression, hypertension, arthritis and anxiety [4].

Previous research showed that up to 70-80% of GPs do not speak to their patients about physical activity [5] while 80% are unfamiliar about the physical activity guidelines [4]. As part of its Global Action Plan on Physical Activity 2018-2030 [2], the World Health Organization (WHO) identified that mass participation initiatives in public spaces engaging whole communities could provide 'enjoyable, affordable and culturally appropriate experiences of physical activity': *parkrun*, a charity that puts on free, weekly, timed 5 km events across 23 countries was suggested by the WHO as a good example of this [6, 7].

Given the need to grow social prescribing and reduce physical inactivity (as set out in the NHS's Long Term Plan) the *parkrun* practice initiative has been created jointly by *parkrun* UK and the Royal College of General Practitioners and helps to support these efforts by linking primary care with a physical activity opportunity (*parkrun*) [8-10]. However, there is a lack of understanding about what *parkrun* is and the

appropriateness for some patients of participating in it. This paper aims to provide insight for clinicians by outlining the broad range of people that take part as walkers or runners, what motivates them to first participate, and the impact of their participation. The aim is to understand these messages as a channel for improving health and wellbeing, especially amongst patients. This raises the following research questions:

1. What are the characteristics of runners and walkers at *parkrun*?
2. Do they have specific long term health conditions?
3. What are their motives for first participating?
4. What is the impact on their health and wellbeing?

This study is a secondary analysis of a health and wellbeing survey of *parkrunners* carried out in 2018 [10]. Its aim is to provide insight for clinicians through an analysis of the motives and impact of participation on those likely to be prescribed physical activity, i.e., slower runners or walkers with long-term health conditions.

Methods

Ethical approval for the survey was granted by Sheffield Hallam University Research Ethics Committee on 24/07/2018 (reference number: ER7034346). The survey employed a mix of validated measures used in health and wellbeing research and questions created by a team of academics and health practitioners [11]. It was sent via *parkrun* using Qualtrics [12] to all 2,318,135 registered *parkrunners* aged 16 and over between 29th October and 3rd December 2018.

There was a maximum of 47 questions asked and choices within some questions were randomized.

Responses to the following questions were used in this study:

1. *Are your day-to-day activities limited because of a health condition or disability which has lasted, or is expected to last, at least 12 months? Include conditions related to old age, sensory deficits, mobility problems, developmental conditions, learning impairments and mental health.* [No/Yes, limited a little/Yes, limited a lot/Don't know, rather not say]. A list of 142 conditions were given plus 'other' where a free text response was requested; respondents could select as many conditions as were applicable.
2. *To what extent has running or walking at parkrun changed your ability to manage your health condition, disability or illness?* [much worse/worse/no effect/better/much better].
3. *What motivated you to first participate at parkrun as a runner or walker?* Respondents were asked to select a maximum of three answers out of a possible 20 motives plus 'other' where a free text response was requested.
4. *Thinking about the impact of parkrun on your health and wellbeing, to what extent has running or walking at parkrun changed:* [much worse/worse/no impact/better/much better]. There was a list of 15 impacts plus 'other' where a free text response was requested.

Matching data from *parkrun*

Respondents also gave their name, unique *parkrun* ID number (from their *parkrun* barcode, allocated at *parkrun* registration), date of birth and home *parkrun* which allowed their survey data to be matched to *parkrun* databases. This provided the following information:

- Date of *parkrun* registration;
- Gender (at *parkrun* registration);

- Index of Multiple Deprivation (IMD: derived from postcode where IMD quartile 1 is the most deprived and IMD quartile 4 the least deprived);
- Response to the following question asked at registration: *Over the last 4 weeks, how often have you done at least 30 minutes of moderate exercise (enough to raise your breathing rate)?* [less than once per week/about once per week/about twice per week/about three times per week/four or more times per week/rather not say/don't know]. Those selecting 'less than once per week' were classified as 'inactive'.
- Their mean time for completing the *parkruns*.

Definition of walkers, runners/walkers and runners

The following definitions were used in this study:

- Front runners: defined as those with mean 5 km times less than 20 minutes.
- Median runners: those with mean 5 km times between 27.5 and 30 minutes and includes the median runner (sample median of 29 minutes 20 seconds).
- Slower runners: those with mean 5 km times between 42.5 and 45 minutes.
- Runners/walkers: those likely to have combined running and walking with mean 5 km times between 45 and 50 minutes.
- Walkers: those with mean 5 km times ≥ 50 minutes or a mean speed of 6 km hr^{-1} (1.67 m s^{-1}) [13].

The remaining times were split into 11 categories 2.5 minutes apart. The following abbreviations are used: FR – front runners; MR – median runners; SR – slower runners ; RW – runners/walkers; W – walkers.

Preliminary analysis

The list of those sent the survey contained all those who had been registered since 2004 (whether their participation had lapsed or not) and those who had never done a *parkrun* (around 43%). This accounts

for the relatively low response rate of 100,866 survey returns (around 4.4% of registrants and 7.7% of participants). Data was validated using Microsoft Excel for Mac (v16.46) using statistical descriptors. The following were removed: 37,039 respondents who consented to view the survey but did not answer any questions; 1,786 respondents who had registered with *parkrun* but not yet participated; 1,349 respondents who did not consent; 681 who self-identified exclusively as volunteers; and 12 respondents who provided invalid or malicious responses. This resulted in 59,999 responses of which approximately 75% were matched to *parkrun* data. Data for motives and impact was coded in Microsoft Excel for Mac (v16.49) and all statistics analysed using IBM SPSS Statistics for Mac (v26).

In comparison to the full *parkrun* population, the sample had a similar proportion of females (51.7% for the sample vs 51.3% for the population), had a similar ethnics and employment background, and were older (48.0 for the sample vs 40.5 years for the population)[11]. The latter was primarily because the survey was restricted to those over 16 years.

Statistical analysis

Data within each time range were reported as frequencies or medians (since the variation within each time range was non-parametric). Categorical data for each time range was compared to walkers using the χ^2 test with effect size calculated using Cramer's V [14]. Continuous data was compared with walkers using the Kruskal-Wallis test with effect size defined as $r = z\text{-score}/\sqrt{n}$ where n is the number of valid cases. Effect sizes were defined as small (≤ 0.25), moderate (0.25 to 0.45) and large (≥ 0.45). Statistical

significance was set to $p < 0.001$ and effect sizes are identified on graphs using the following: *small, **medium, ***large.

Results

Demographics

Figure 1 shows the demographic of participants with data in Supplementary Table 1. There were 45,662 participants with matched mean 5 km times from the *parkrun* database. Figure 1 shows the following:

1. Respondents were normally distributed about a median of 27.5 to 30 minutes but with a tail of slower runners, runners/walkers and walkers (Figure 1a).
2. 51.5% of the sample were female, ranging from 4.2% for front runners to 80.3% for walkers (Figure 1b).
3. The median age increased from 37.8 years for front runners to 56.9 for walkers (Figure 1c).
4. There were fewest participants from IMD Q1 and most from IMD Q4 with walkers more likely to be from deprived communities (Figure 1d).
5. Around a third of those slower runners, runners/walkers or walkers were inactive or did about 1 bout of activity per week at registration (Figure 1e).

Those faster than median runners showed significant demographic differences to walkers with large effect sizes. Slower runners and runners/walkers were statistically similar to walkers and were more likely to be female, older, from deprived communities and to be less active at registration.

Health conditions

Figure 2a and Supplementary Table 1 show that the proportion with at least one health condition lasting 12 months or more was 9.3% for all respondents and increased to 25% for slower runners, 28% for runners/walkers and 45% for walkers. The latter three categories had a median of 2 health conditions

compared to 1 for the full sample. Slower runners, runners/walkers and walkers collectively represented 4.3% of the sample and reported 19.8% of health conditions. The most reported conditions are shown in Figure 2b and Supplementary Table 1. For the full sample, the top five conditions were depression, arthritis, anxiety, asthma and hypertension; slower runners, runners/walkers and walkers also reported fibromyalgia, obesity and chronic pain.

Motives for first participating and impact following participation

Figure 3 shows the motives for first participating in *parkrun* paired, where possible, with impact measures: data is given in Supplementary Table 2. The graphs are ranked in order of most to least selected motive for the full sample. Inspection of Figure 3 shows the following:

1. The three most selected motives were *to contribute to my fitness* (57.0%), *to improve my physical health* (37.2%) and *to gain a sense of personal achievement* (27.2%); these had large proportions reporting improvement of 90.1%, 85.4% and 91.4% respectively.
2. Fewer slower runners, runner/walkers and walkers selected *to contribute to my fitness*, while more selected *to improve my physical health*.
3. *To manage my weight* was selected by 19.6% of the sample and was more likely to be selected by slower runners (33.8%), runners/walkers (33.0%) and walkers (32.7%), with improvement for approximately 55% of runners with times slower than the median.
4. *To improve or manage my health condition, disability or injury* was selected by 17.4% of those with a health condition and was more likely to be selected by walkers (31.5%). 66.8% of all respondents reported improvements to *your ability to manage your health condition, disability or illness*, with no statistical differences between walkers and other participants.
5. Few selected as a motive *to improve my mental health* (12.7%), *to feel part of a community* (11.3%), or *to improve my happiness* (6.5%). However, large proportions of 69.5%, 71.1% and 79.6%

respectively reported improvements. There were few statistical differences between walkers and other respondents.

6. Few respondents selected to *spend time outdoors (10.0%)* or *to be active in a safe environment (3.9%)*, although the former was statistically more likely to be selected by walkers and the latter by runners slower than the median. *The amount of time you spend outdoors* was improved for 74.8% while *your ability to be active in a safe environment* was improved for 60.0% of participants. There were higher values for walkers at 81.8% and 71.3% respectively.
7. Over 20% of slower runners, runners/walker and walkers were more likely to select *my friends, family or colleagues encouraged me to* and, while more walkers selected *a health professional advised me to*, this was only 1.8% compared to 0.3% for the full sample. (It should be noted that the survey was carried out as *parkrun practice* was being set up). Finally, 51.9% of the full sample improved *your overall lifestyle choices (e.g. diet and smoking)* with little difference between walkers and other respondents.

Discussion

Summary

In a survey of 59,999 *parkrunners*, slower runners tended to be older, more likely to be from a deprived community, inactive at registration and were four times as likely to be female as male. Over 9% of the full sample were found to have at least one long term health condition lasting 12 months or more: this rose to 45% for walkers. While slower runners, walkers/runners and walkers represented 4.3% of participants, they reported 19.8% of health conditions; these conditions included arthritis, obesity, depression, chronic pain, hypertension and anxiety.

Slower runners, runners/walkers and walkers were less likely to be motivated by fitness or competition than other *parkrunners* and more likely to be motivated by physical health, weight management, the management of their health condition(s), to spend time outdoors and be active in a safe environment. Despite these differences, perceived improvements to wellbeing were broadly similar regardless of finishing time.

Strengths and limitations

The analysis is drawn from a large survey, allowing statistically significant differences to be found between categories of runner. Any survey is biased by the respondents who answer it: in this case, respondents might be considered 'keen' *parkrunners* with fewer health conditions than the general population and may be more likely to report improvements. Gender is a confounding factor in the analysis so that, for runners slower than the median, motives and impact may reflect the views of females rather than males. Other confounding factors are age, IMD, activity level at registration and *parkrun* participation.

Comparison with existing literature

As with previous studies [15-18] this study has shown that walking can confer similar health benefits to running. Fleming et al. [9] found that *parkrun* practices suggested to patients that participation could be through jogging or walking. This study shows that those with health conditions may already be participating in this way. The health benefits of *parkrun* have previously been studied [19-23] and this work confirms a 2013 study [19] which found that large proportions improved wellbeing measures with non-runners more likely to improve than runners. Another study of the *parkrun* survey [23] found that

volunteering could also improve wellbeing and suggested that *parkrun* could deliver some of the components of *Five Ways to Wellbeing* promoted by the NHS [24]. The results here show that this is also true of running or walking.

Implications for research and/or practice

This paper provides the rationale to practice staff for signposting to *parkrun* by outlining the broad range of people that take part as walkers and runners, what motivates them and the impact of participating. Those at the front are very different to those at the back where 45% of walkers reported long-term health conditions. These conditions are those for which GPs say they would prescribe physical activity: depression, anxiety, obesity, weight management and hypertension. When discussing potential benefits with patients, messages may include obvious impacts such as fitness and physical health. However, while few chose mental health, happiness or feeling part of a community as a motive, 7 to 8 out of 10 reported improvements, with little difference between walkers and other runners. These may be equally important to those new to activity as well as to those who are already active but who might benefit from improved mental health. The information provided in this study should be combined with other research investigating the barriers to participation in *parkrun* [25]. A 'Toolkit' could be provided via *parkrun* practice [8] that incorporates the latest knowledge about delivering brief physical activity interventions in primary care [26] to help address the key issues of practitioner knowledge and confidence.

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Institutional Review Board Statement

Ethical approval for the *parkrun* Health and Wellbeing study was granted by Sheffield Hallam University Research Ethics Committee on 24/07/2018 (reference number: ER7034346).

Informed Consent Statement

Informed consent was obtained from all subjects involved in the study.

Data Availability Statement

The datasets supporting the conclusions of this article are stored in the Sheffield Hallam University Research Database (SHURDA: DOI to be provided). The full anonymised dataset is also accessible to researchers for research purposes through the *parkrun* Research Board, as originally outlined in the participant information sheet.

Conflicts of Interest

At the time of writing this manuscript, SH was chair of the *parkrun* Research Board, while AB and HQ were deputy chairs. SH and HQ are *parkrun* participants. No authors completed the survey.

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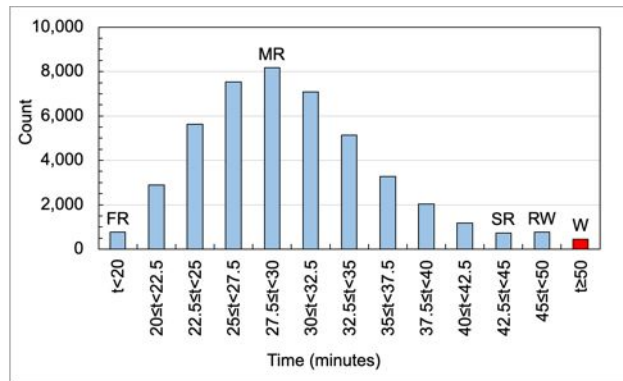
Supplementary Data

Table S1. Demographic of *parkrun* participants as runners and walkers ranked by mean running time.

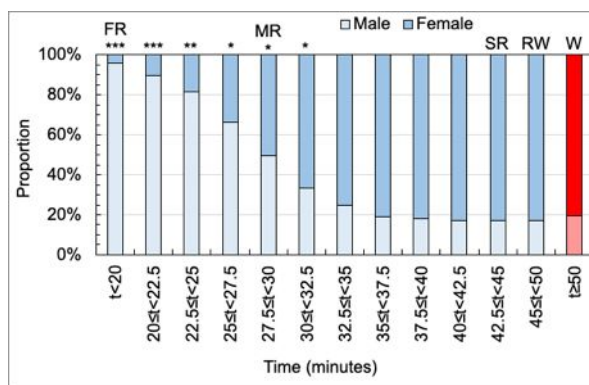
Table S2. Motives for first participating in *parkrun* and impact of participation on health and wellbeing.

Respondents could only choose three motives.

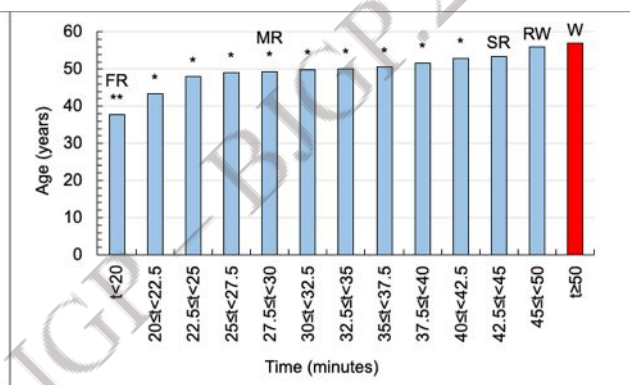
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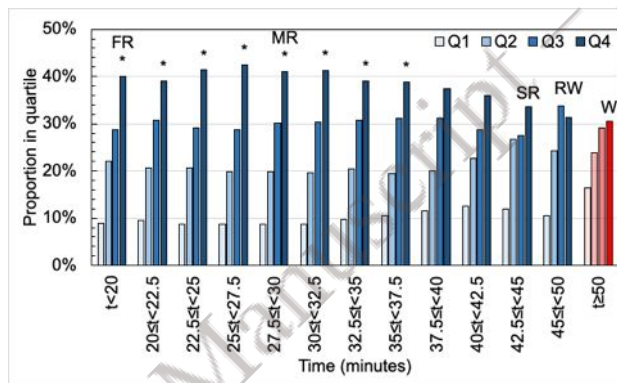
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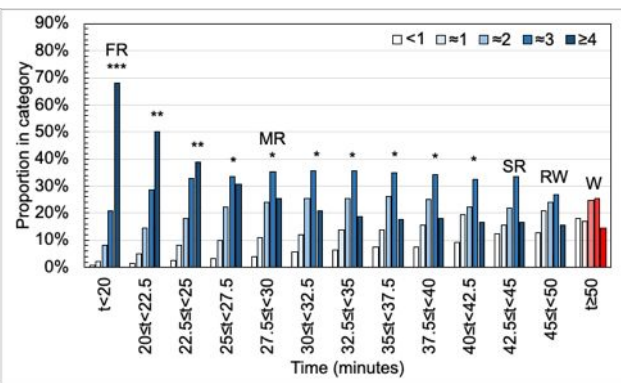
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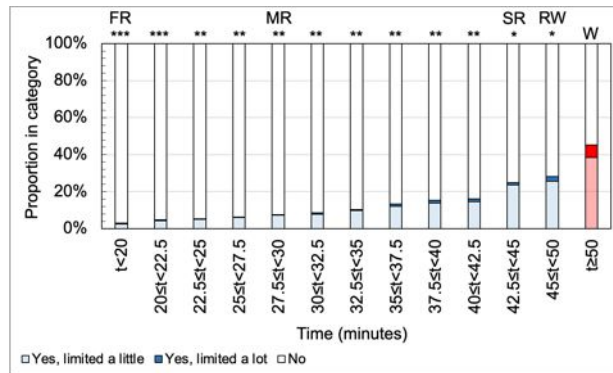


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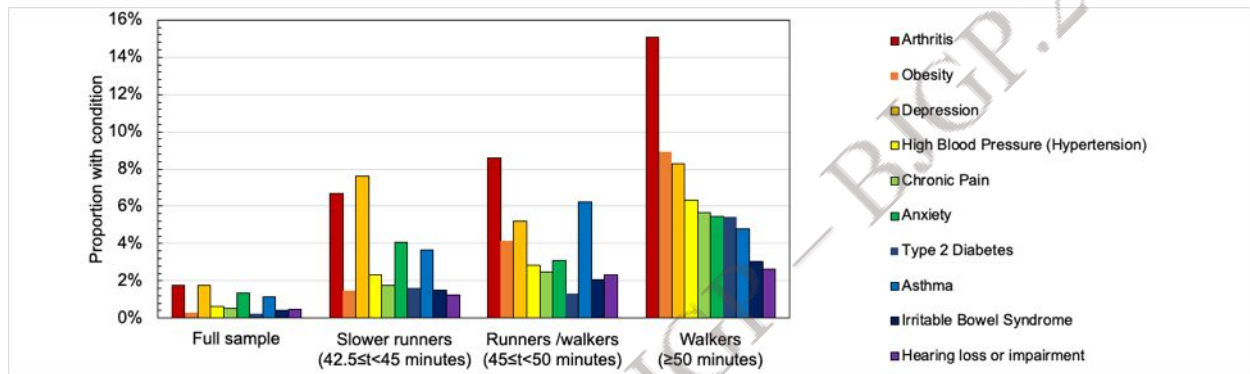


(e)

Figure 1. Characteristics of survey participants ranked by average running time: (a) count; (b) proportion male and female; (c) age; (d) Index of multiple deprivation quartile (Q1 is most deprived); (e) activity level at registration in bouts of 30 minutes or more in previous 4 weeks. Comparison with walkers at $p < 0.001$ with effect sizes: *small, **moderate, ***large. Abbreviations: FR – front runners; MR – median runners; SR – slower runners; RW – runners/walkers; W – walkers.

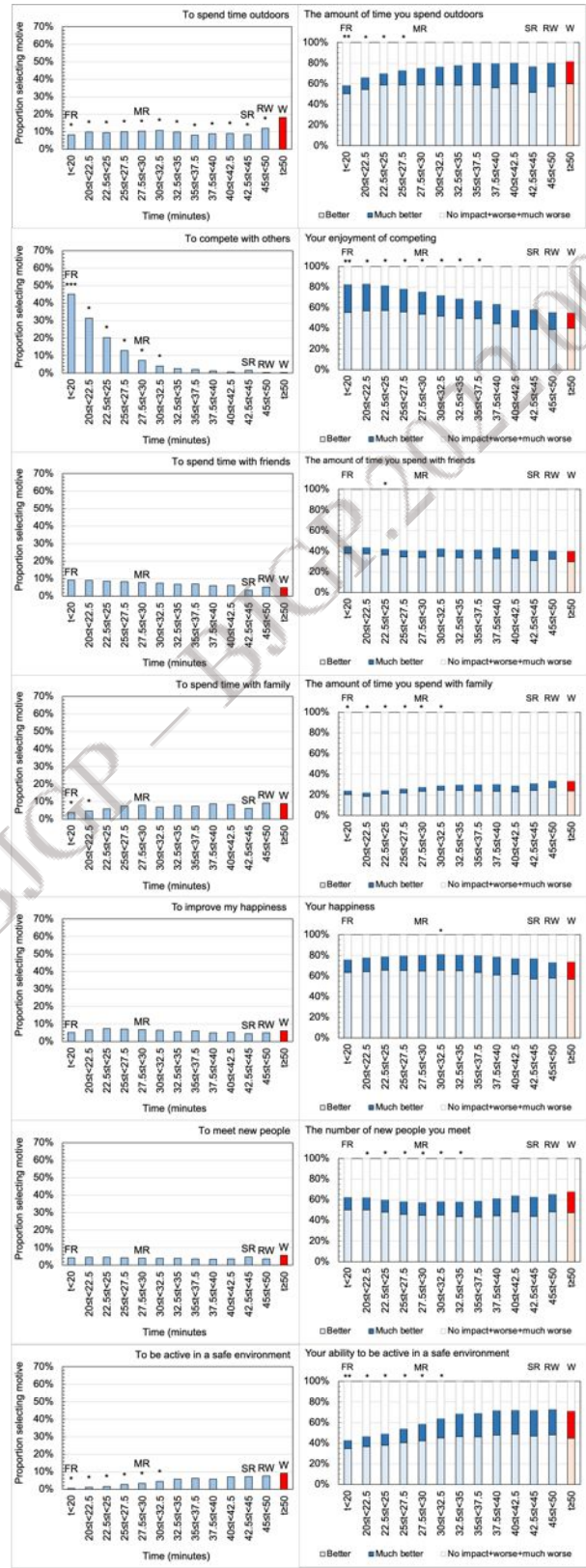
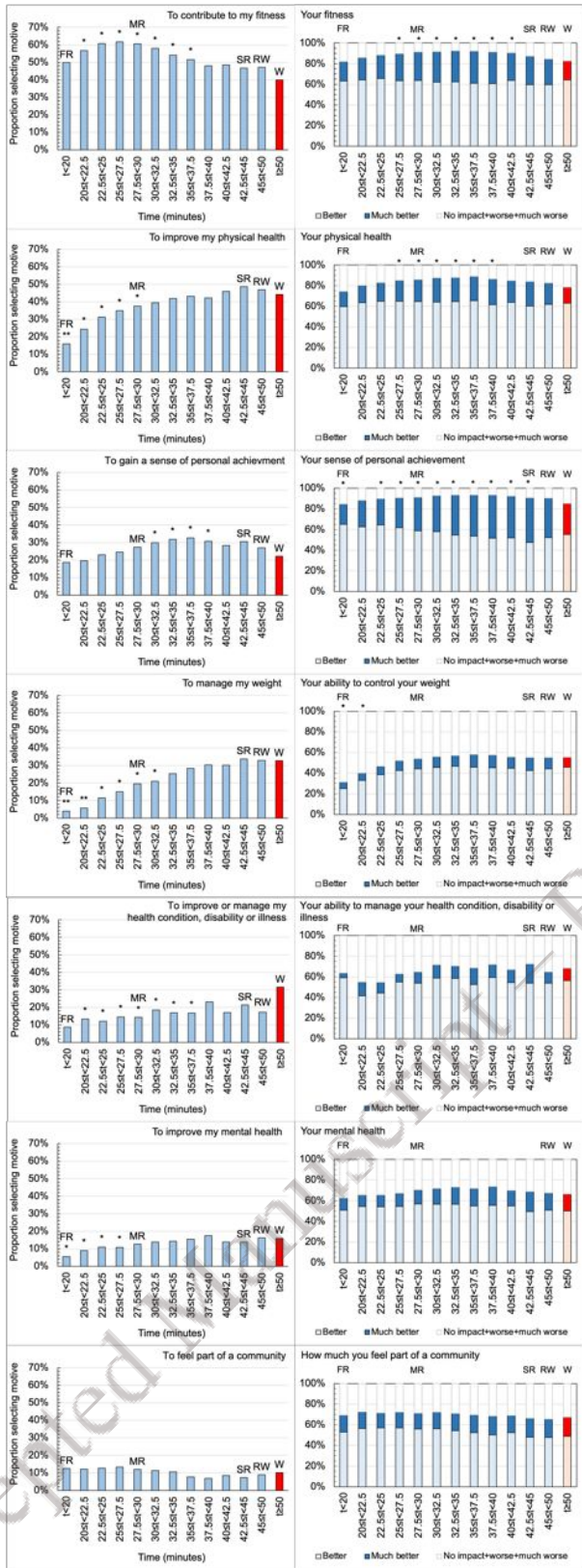


(a)



(b)

Figure 2. Characteristics of survey participants ranked by average running time: (a) proportion limited by a health condition for 12 months or more; and (b) proportion with each health condition (only top-10 conditions shown). Note: participants could have more than one health condition. Comparison with walkers using χ^2 test at $p < 0.001$ with effect sizes: *small, **moderate, ***large. Abbreviations: FR – front runners; MR – median runners; SR – slower runners; RW – runners/walkers; W – walkers.



Motive

Impact

Motive

Impact

Figure 3. Motives and perceived impact. Response to the questions: (1) **Motive**: “What motivated you to **first** participate at parkrun as a runner or walker?” Participants were able to select up to three motives; proportions of 45,283 participants shown; (2) **Impact**: Response to the question “Thinking about the impact of parkrun on your health and wellbeing, to what extent has running or walking at parkrun changed...” Comparison with walkers at $p < 0.001$ with effect sizes: *small, **moderate, ***large. Abbreviations: FR – front runners; MR – median runners; SR – slower runners; RW – runners/walkers; W – walkers.

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