



This is a repository copy of *Parkrun and the promotion of physical activity: insights for primary care clinicians from an online survey.*

White Rose Research Online URL for this paper:

<https://eprints.whiterose.ac.uk/191364/>

Version: Published Version

Article:

Haake, S., Quirk, H. orcid.org/0000-0003-2716-4681 and Bullas, A. (2022) Parkrun and the promotion of physical activity: insights for primary care clinicians from an online survey. *British Journal of General Practice*, 72 (722). e634-e640. ISSN 0960-1643

<https://doi.org/10.3399/bjgp.2022.0001>

Reuse

This article is distributed under the terms of the Creative Commons Attribution (CC BY) licence. This licence allows you to distribute, remix, tweak, and build upon the work, even commercially, as long as you credit the authors for the original work. More information and the full terms of the licence here:

<https://creativecommons.org/licenses/>

Takedown

If you consider content in White Rose Research Online to be in breach of UK law, please notify us by emailing eprints@whiterose.ac.uk including the URL of the record and the reason for the withdrawal request.



eprints@whiterose.ac.uk
<https://eprints.whiterose.ac.uk/>

parkrun and the promotion of physical activity:

insights for primary care clinicians from an online survey

Abstract

Background

To support efforts to increase social prescribing and reduce levels of physical inactivity, parkrun UK and the Royal College of General Practitioners together developed the parkrun practice initiative to link general practices to local parkruns (free, weekly, timed, physical activity events). General practice staff are encouraged to take part in parkrun events themselves and to encourage patients to participate.

Aim

To provide insights for primary care clinicians about parkrun participants (parkrunners), especially those with characteristics of patients who might be signposted to physical activity.

Design and setting

Secondary analysis of an online survey of parkrunners in the UK.

Method

Responders 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 on health and wellbeing.

Results

The survey included 45 662 parkrunners. More than 9% of all participants and 45% of walkers were found to have at least one long-term health condition, including arthritis, obesity, depression, hypertension, chronic pain, anxiety, type 2 diabetes, and asthma. Walkers were less likely to be motivated by fitness or competition, and were more likely to be motivated by physical health. Despite these differences, perceived improvements to wellbeing were broadly similar for all parkrunners, regardless of their finishing time.

Conclusion

Parkrunners are a diverse population in terms of their physical health. Information provided by this study could be combined with other research on the barriers to participation and successful brief interventions to help address the key issues of primary care clinicians' knowledge and confidence about social prescribing to increase patients' physical activity levels.

Keywords

exercise; health promotion; long-term health conditions; parkrun; running; social prescribing; walking.

INTRODUCTION

Guidance from the UK's Chief Medical Officers (CMO) recommends at least 150 min of moderate or 75 min of vigorous physical activity per week to optimise health outcomes.¹ Worldwide, one in four adults and three in four adolescents do not meet these activity guidelines.² Primary care clinicians are advised to carry out social prescribing rather than clinical interventions to increase patients' physical activity,³ and one-quarter of patients say that they would be more active if advised by a nurse or GP.⁴ The conditions that GPs would refer physical activity for include: type 2 diabetes, depression, anxiety, hypertension, arthritis, obesity, and being overweight.⁵

Previous research showed that up to 70–80% of GPs do not speak to their patients about physical activity,⁶ while 80% are unfamiliar with the CMO physical activity guidance.⁵ 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 that engage 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 such an initiative.^{3,7,8}

Given the need to increase social prescribing and reduce physical inactivity (as set out in *The NHS Long Term Plan*⁹), the parkrun practice initiative was created jointly by parkrun UK and the Royal College of General Practitioners, to support these efforts by linking primary care with a physical activity opportunity (parkrun).^{10–12} However, there is a lack of understanding among both patients and clinicians about what parkrun is and the appropriateness for some patients of participating in it.

This study is a secondary analysis of a health and wellbeing survey of parkrunners carried out in 2018.¹³ The aim of the study was to provide insights for primary care clinicians about the benefits of social prescribing for patients by outlining the broad range of people that take part in parkrun as walkers or runners, and describing whether they have long-term health conditions, what motivates them to first participate, and the impact of their participation.

METHOD

The survey employed a mix of validated measures used in health and wellbeing research, using questions created by a team of academics and health practitioners.¹³ It was sent via parkrun using Qualtrics to all 2 318 135 registered parkrunners aged ≥16 years between 29 October and 3 December 2018.

S Haake (ORCID: 0000-0002-4449-6680), PhD, director of engagement; **A Bullas** (ORCID: 0000-0003-2857-4236), PhD, MSc, research fellow, The Advanced Wellbeing Research Centre, Sheffield Hallam University, Sheffield. **H Quirk** (ORCID: 0000-0003-2716-4681), MSc, PhD, National Institute for Health Research School for Public Health Research launching fellow in public health, School of Health and Related Research, University of Sheffield, Sheffield.

Address for correspondence

Steve Haake, The Advanced Wellbeing Research Centre, Sheffield Hallam University, The Olympic

Legacy Park, 2 Old Hall Road, Sheffield S9 3TU, UK.

Email: s.j.haake@shu.ac.uk

Submitted: 6 January 2022; **Editor's response:** 21 February 2022; **final acceptance:** 25 March 2022.

©The Authors

This is the full-length article (published online 23 Aug 2022) of an abridged version published in print. Cite this version as: **Br J Gen Pract 2022; DOI: <https://doi.org/10.3399/BJGP.2022.0001>**

How this fits in

To support efforts to increase social prescribing and signposting to physical activity opportunities, the Royal College of General Practitioners and parkrun UK developed the parkrun practice initiative, which, so far, has seen more than 1500 general practices link with their local parkrun events (free, weekly, timed 5 km events). Not all GPs and primary care clinicians are confident in prescribing physical activity and this study aimed to provide useful insights from a large survey of parkrunners. A total of 9.3% of responders had at least one health condition lasting ≥ 12 months, rising to 45.2% for those taking part as walkers. The conditions reported match some of those for which GPs would prescribe physical activity, such as depression, anxiety, arthritis, hypertension, obesity, and being overweight. More than seven out of 10 of those surveyed who had health conditions improved their fitness, physical health, mental health, and other measures, suggesting that parkrun could also deliver some of the components of the *5 Steps to Mental Wellbeing* as advocated by the NHS.

There was a maximum of 47 questions asked and choices within some questions were randomised. This study analysed the responses to the questions given in Box 1.

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

Box 1. Survey questions analysed in this study

- *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.*

[Answers: 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; responders could select as many conditions as were applicable.

- *To what extent has running or walking at parkrun changed your ability to manage your health condition, disability, or illness?*

[Answers: much worse/worse/no effect/better/much better].

- *What motivated you to first participate at parkrun as a runner or walker?*

Responders were asked to select a maximum of three answers out of a possible 20 motives plus 'other' where a free text response was requested.

- *Thinking about the impact of parkrun on your health and wellbeing, to what extent has running or walking at parkrun changed?*

[Answers: 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

Responders provided 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;
- sex (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)?* [Answer: 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'; and
- their mean time for completing the parkruns.

Definition of walkers, runners/walkers, and runners

The following definitions were used in this study:

- front runners: those with mean 5 km times < 20 min;
- median runners: runners in the category containing the median runner (the 22 832th runner with a time of 29 min 20 s), that is, those with mean 5 km times between 27.5 and 30 min;
- slower runners: those with mean 5 km times between 42.5 and 45 min;
- runners/walkers: those likely to have combined running and walking with mean 5 km times between 45 and 50 min; and
- walkers: those with mean 5 km times ≥ 50 min or a mean speed of 6 km/h (1.67 m/s).¹⁴

The remaining times were split into 11 categories 2.5 min apart.

Preliminary analysis

Data were validated using Excel (version 16.46) using statistical descriptors. Data for motives and impact were coded in Excel (version 16.49) and all statistics analysed using SPSS (version 26).

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 were compared with walkers using the χ^2 test with effect size calculated using Cramér's V .¹⁵ Continuous data were 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 $P < 0.001$.

RESULTS

The survey was sent to all those who had been registered with parkrun since 2004 (whether their participation had lapsed or not) and those who had never done a parkrun (around 43% of those registered), which may account for the relatively low response rate of 100 866 survey returns (around 4.4% of registrants and 7.7% of participants). The following responders were removed: 37 039 who consented to view the survey but did not answer any questions; 1786 who had registered with parkrun but had not yet participated; 1349 who did not consent; 681 who self-identified exclusively as volunteers; and 12 who provided invalid or malicious responses. This left 59 999 responses, of which approximately 75% were matched to parkrun data, resulting in 45 662 participants with matched mean 5 km times from the parkrun database.

Demographics

Figure 1 shows the demographics of participants ranked by average running time (see Supplementary Table S1 for details). In comparison with the full parkrun population, the sample had a similar proportion of females (51.7% for the sample versus 51.3% for the population), a similar ethnic and employment background, and was older (48.0 years for the sample versus 40.5 years for the population).¹³ The latter was primarily because the survey was restricted to those aged ≥ 16 years.

Responders were normally distributed about a median of 27.5 to 30 min but with a tail of slower runners, runners/walkers, and walkers (Figure 1a). Of the sample, 51.5% were female, ranging from 4.2% for front runners to 80.3% for walkers (Figure 1b). The median age increased from 37.8 years for front runners to 56.9 years for walkers (Figure 1c). There were fewest participants from IMD Q1 (most deprived areas) and most from IMD Q4 (least deprived areas),

with walkers more likely to be from deprived communities (Figure 1d). Around one-third of slower runners, runners/walkers, or walkers were inactive or did about one bout of activity per week at registration (Figure 1e).

Those faster than median runners showed significant demographic differences from 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 less active at registration.

Health conditions

Figure 2 gives the characteristics of survey participants with health conditions ranked by average running time. Figure 2a shows that the proportion limited by at least one health condition lasting ≥ 12 months rose from 3% for front runners to 25% for slower runners, 28% for runners/walkers, and 45% for walkers. The overall proportion for the full sample was 9.3% [see Supplementary Table S1 for details]. Slower runners, runners/walkers, and walkers had a median of two health conditions compared with a median of one health condition 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 (see Supplementary Table S1 for details). 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

Supplementary Figure S1 illustrates responders' motives for first participating in parkrun paired, where possible, with impact measures (see Supplementary Table S2 for details). The graphs are ranked in order of most to least selected motive for the full sample.

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 of people reporting improvements of 90.1%, 85.4%, and 91.4%, respectively.

Fewer slower runners, runner/walkers, and walkers selected 'to contribute to my fitness', while more selected 'to improve my physical health'.

'To manage my weight' was selected by 19.6% of the sample and was more

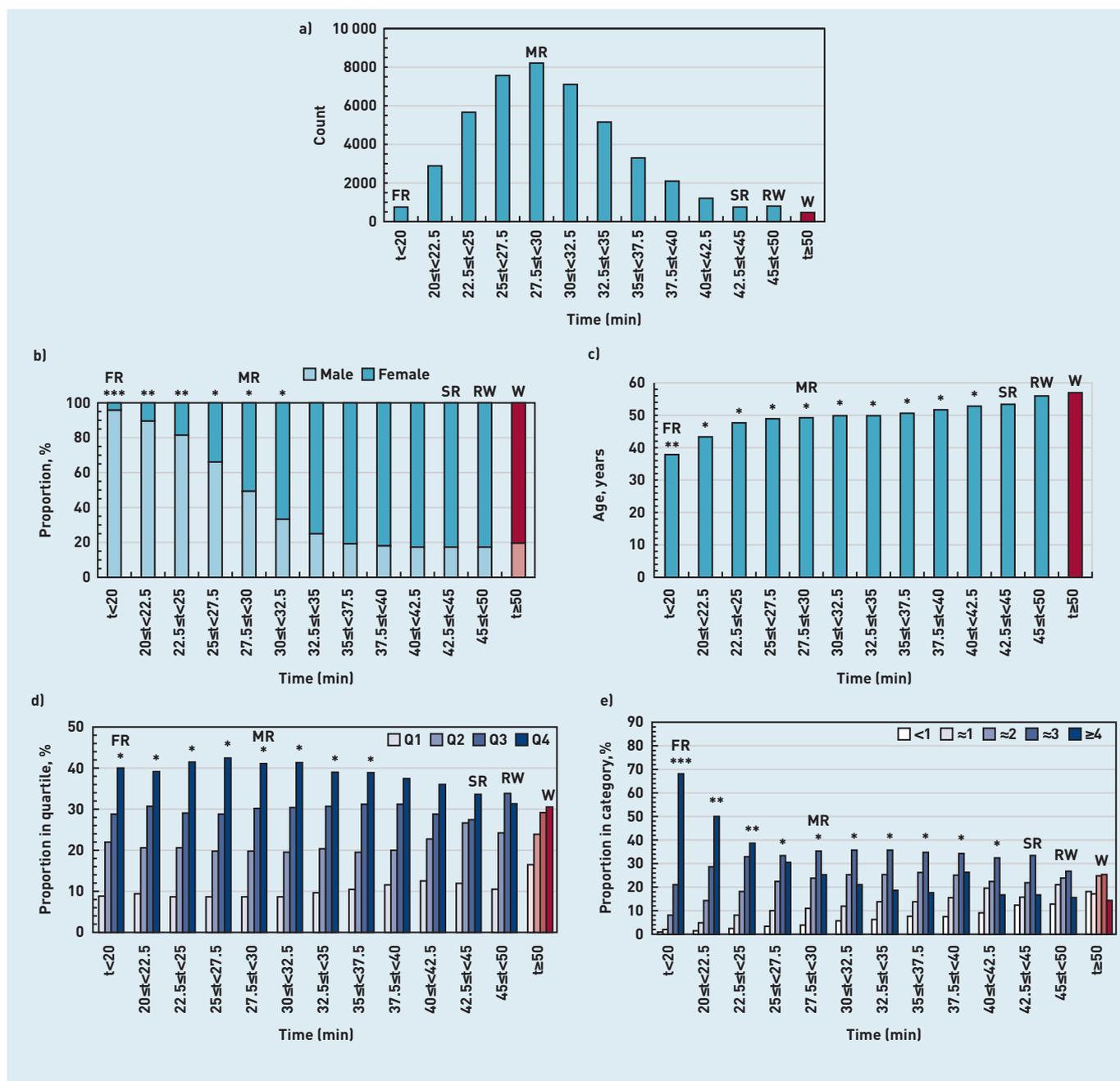


Figure 1. Characteristics of survey participants ranked by average running time: a) count; b) proportion male and female; c) age; d) Index of Multiple Deprivation quartile (Q1 is most deprived); e) activity level at registration in bouts of 30 min or more in previous 4 weeks. Comparison with walkers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

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.

'To improve or manage my health condition, disability, or illness' was selected by 17.4% of those with a health condition and was more likely to be selected by walkers (31.5%). A total of 66.8% of all responders reported improvements to 'your ability to manage your health condition, disability, or illness', with no statistical differences between walkers and other participants.

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 responders reported improvements in these areas: 69.5%, 71.1%, and 79.6%, respectively. There were few statistical differences between walkers and other responders.

Few responders 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

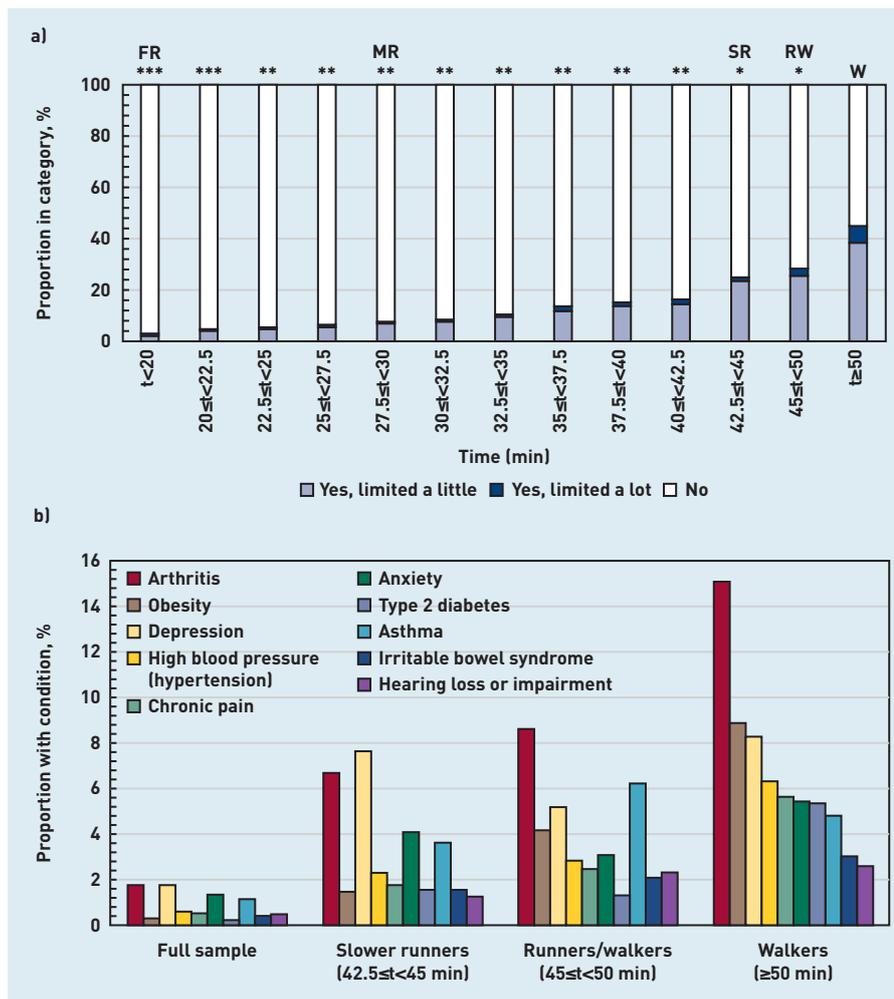


Figure 2. Characteristics of survey participants ranked by average running time: a) proportion limited by a health condition for ≥12 months; and b) proportion with each health condition (only top 10 conditions shown). Note: participants could have more than one health condition. Comparison with walkers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

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.

More than 20% of slower runners, runners/walkers, 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 with 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 (for example, diet and smoking)', with little difference between walkers and other responders.

DISCUSSION

Summary

In a survey of 45 662 parkrunners, slower runners tended to be older, and were more likely to be female, from a deprived

community, and inactive at registration. More than 9% of the full sample were found to have at least one long-term health condition lasting ≥12 months: 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, anxiety, asthma, depression, chronic pain, fibromyalgia, hypertension, and obesity.

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 to be active in a safe environment. Despite these differences, perceived improvements to wellbeing were broadly similar, regardless of the responder's finishing time.

Strengths and limitations

The analysis is drawn from a large survey, allowing statistically significant differences to be found between categories of runner/walker. Any survey is biased by the responders who answer it: in this case, responders might be considered 'keen' parkrunners with fewer health conditions than the general population, and they may be more likely to report improvements. Sex 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,¹⁶⁻¹⁹ the current study has shown that walking can confer similar health benefits to running. Fleming *et al*¹¹ 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,²⁰⁻²⁴ and this work confirms a 2015 study,²⁰ which found that large proportions of participants improved wellbeing measures, with non-runners more likely to improve than runners. Another study involving the parkrun survey²⁴ found that volunteering could also improve wellbeing and suggested that parkrun could deliver some of the components of *5 Steps to Mental Wellbeing* promoted by the NHS.²⁵

Funding

Parkrun commissioned Sheffield Hallam University to conduct the original survey. For the preparation of the manuscript, Helen Quirk was funded by the National Institute for Health Research School for Public Health Research post-doctoral launching fellowship. Alice Bullas and Steve Haake were funded by Sheffield Hallam University.

Ethical approval

Ethical approval for the study was granted by Sheffield Hallam University Research Ethics Committee on 24 July 2018 (reference number: ER7034346).

Data

The datasets supporting the conclusions of this article are stored in the Sheffield Hallam University Research Database (SHURDA: DOI: <http://doi.org/10.17032/shu-180037>). 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.

Provenance

Freely submitted; externally peer reviewed.

Competing interests

At the time of writing this article, Steve Haake was chair of the parkrun research board, while Alice Bullas and Helen Quirk were deputy chairs. Steve Haake and Helen Quirk are parkrun participants. No authors completed the survey.

Acknowledgements

The authors would like to thank all the participants who completed the parkrun health and wellbeing survey in 2018. Thanks also to Chrissie Wellington at parkrun for helping with the design and implementation of the survey, and to Mike Graney of parkrun for matching responders' data to their registrant and performance data held by parkrun.

Open access

This article is Open Access: CC BY 4.0 licence (<http://creativecommons.org/licenses/by/4.0/>).

Discuss this article

Contribute and read comments about this article: bjgp.org/letters

The results of the current study show that this is also true of running or walking.

Implications for practice

This article provides the rationale to general 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 to them of participation. Faster runners are very different from the slowest, although they still perceive some of the same wellbeing benefits. Forty-five per cent of walkers reported long-term health conditions, some of which are those for which GPs say they would prescribe physical activity: depression, anxiety, hypertension, obesity, and being overweight.^{1,5,6,12} When discussing potential benefits with patients, messages may include obvious impacts such as

improvements to fitness and physical health. However, while few responders chose mental health, happiness, or feeling part of a community as a motive to join parkrun, seven to eight out of 10 responders reported improvements in these areas, with little difference between walkers and other runners. These areas 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.²⁶ A toolkit could be provided via parkrun practice¹⁰ that incorporates the latest knowledge about delivering brief physical activity interventions in primary care²⁷ to help address the key issues of clinicians' knowledge and confidence.

REFERENCES

1. UK Government. *UK Chief Medical Officers' physical activity guidelines*. 2019. <https://www.gov.uk/government/collections/physical-activity-guidelines> [accessed 31 May 2022].
2. World Health Organization. *Global action plan on physical activity 2018–2030: more active people for a healthier world*. Geneva: WHO, 2018. <https://apps.who.int/iris/bitstream/handle/10665/272722/9789241514187-eng.pdf> [accessed 31 May 2022].
3. National Institute for Health and Care Excellence. *Physical activity: brief advice for adults in primary care. PH44*. London: NICE, 2013. <https://www.nice.org.uk/guidance/ph44> [accessed 3 August 2022].
4. Orrow G, Kinmouth AL, Sanderson S, Sutton S. Effectiveness of physical activity promotion based in primary care: systematic review and meta-analysis of randomised controlled trials. *BMJ* 2012; **344**: e1389.
5. Chatterjee R, Chapman T, Brannan MG, Varney J. GPs' knowledge, use, and confidence in national physical activity and health guidelines and tools: a questionnaire-based survey of general practice in England. *Br J Gen Pract* 2017; DOI: <https://doi.org/10.3399/bjgp17X692513>.
6. Booth HP, Prevost AT, Gulliford MC. Access to weight reduction interventions for overweight and obese patients in UK primary care: population-based cohort study. *BMJ Open* 2015; **5**(1): e006642.
7. Parkrun. *Our countries*. <https://www.parkrun.com/countries/> [accessed 31 May 2022].
8. Parkrun. *Weekly totals history/UK*. 2021. https://wiki.parkrun.com/index.php/Weekly_Totals_History/UK [accessed 31 May 2022].
9. NHS. *The NHS Long Term Plan*. NHS, 2019. <https://www.longtermplan.nhs.uk/> [accessed 3 August 2022].
10. Royal College of General Practitioners. *parkrun practice*. 2018. <https://r1.dotdigital-pages.com/p/49LX-52M/parkrunpractice> [accessed 31 May 2022].
11. Fleming J, Bryce C, Parsons, J, *et al*. Engagement with and delivery of the 'parkrun practice initiative' in general practice: a mixed methods study. *Br J Gen Pract* 2020; DOI: <https://doi.org/10.3399/bjgp20X710453>.
12. Tobin S. Prescribing parkrun. *Br J Gen Pract* 2018; DOI: <https://doi.org/10.3399/bjgp18X700133>.
13. Quirk H, Bullas A, Haake S, *et al*. Exploring the benefits of participation in community-based running and walking events: a cross-sectional survey of parkrun participants. *BMC Public Health* 2021; **21**(1): 1978.
14. Bohannon RW. Comfortable and maximum walking speed of adults aged 20–79 years: reference values and determinants. *Age Ageing* 1997; **26**(1): 15–19.
15. Cohen J. *Statistical power analysis for the behavioral sciences*. 2nd edn. Hillsdale, NJ: L Erlbaum Associates, 1988.
16. Wen CP, Jackson PMW, Tsai MK, *et al*. Minimum amount of physical activity for reduced mortality and extended life expectancy: a prospective cohort study. 2011. *Lancet* 2011; **378**(9798): 1244–1253.
17. Williams PT. Effects of running and walking on osteoarthritis and hip replacement risk. *Med Sci Sports Exerc* 2013; **45**(7): 1292–1297.
18. Williams PT, Thompson PD. Walking versus running for hypertension, cholesterol, and diabetes mellitus risk reduction. *Arterioscler Thromb Vasc Biol* 2013; **33**(5): 1085–1091.
19. Williams PT. Breast cancer mortality vs. exercise and breast size in runners and walkers. *PLoS One* 2013; **8**(12): e80616.
20. Stevinson C, Wiltshire G, Hickson M. Facilitating participation in health-enhancing physical activity: a qualitative study of parkrun. *Int J Behav Med* 2015; **22**(2): 170–177.
21. Quirk H, Haake S. How can we get more people with long-term health conditions involved in parkrun? A qualitative study evaluating parkrun's PROVE project. *BMC Sports Sci Med Rehabil* 2019; **11**: 22.
22. Morris P, Scott H. Not just a run in the park: a qualitative exploration of parkrun and mental health. *Adv Ment Health* 2019; **17**(2): 110–123.
23. Grunseit AC, Richards J, Reece L, *et al*. Evidence on the reach and impact of the social physical activity phenomenon parkrun: a scoping review. *Prev Med Rep* 2020; **20**: 101231.
24. Haake S, Quirk H, Bullas A. The health benefits of volunteering at a free, weekly, 5 km event in the UK: a cross-sectional study of volunteers at parkrun. *PLoS Glob Public Health* 2022; **2**(2): e0000138.
25. NHS. *5 steps to mental wellbeing*. 2019. <https://www.nhs.uk/mental-health/self-help/guides-tools-and-activities/five-steps-to-mental-wellbeing/> [accessed 31 May 2022].
26. Reece LJ, Owen K, Graney M, *et al*. Barriers to initiating and maintaining participation in parkrun. *BMC Public Health* 2022; **22**: 83.
27. Hall LH, Thorneloe R, Rodriguez-Lopez R, *et al*. Delivering brief physical activity interventions in primary care: a systematic review. *Br J Gen Pract* 2022; <https://doi.org/10.3399/BJGP.2021.0312>.