Nordic walking groups for people with Parkinson's disease in community rehabilitation settings: what is needed?

Sarah McCracken, Pip Logan, Frances Allen, Catherine Sears, Vicky Booth

ABSTRACT

Background: Nordic walking is an enhanced walking technique that uses special poles to provide a whole-body workout. It has shown promising outcomes for people with Parkinson's disease. Scant literature exists on the best way to deliver Nordic walking groups for people with Parkinson's disease in a community rehabilitation setting.
Aims: To establish the characteristics and core components needed to implement Nordic walking for people with Parkinson's disease in a community rehabilitation setting.
Methods: Two focus groups were held with people with Parkinson's disease who had participated in a Nordic walking intervention study for 8 weeks. A third focus group was held for instructors. Data was analysed using thematic analysis and reviewed by a second researcher. Michie's behaviour change wheel was used as a theoretical framework for organising the themes and creating recommendations.
Results: In all, 11 people with Parkinson's (6 men, 5 women), 3 Nordic walking instructors (1 man, 2 women) and 1 Nordic walking leader took part in the focus groups. From these, 6 main themes emerged: people with Parkinson's disease perceived and experienced Nordic walking as physically and psychologically beneficial; participants appreciated the social aspect of exercising with motivated peers; practical components increased engagement; the skills of the Nordic walking instructor were considered essential; safety risk assessments for the venue, group and individuals were important; Partnerships with other organisations were needed.
Conclusions: It is feasible, beneficial and safe to deliver rehabilitative Nordic walking groups for people with Parkinson's disease in a community setting, provided that core components and facilitators are addressed.

Keywords exercise, Nordic walking, Parkinson's disease, rehabilitation

Authors **Sarah McCracken**, Parkinson's Nurse Specialist[1]; **Pip Logan**, Professor of Rehabilitation Research and Occupational Therapist[2]; **Frances Allen**, Research Fellow[3]; **Catherine Sears**, Medical Student[4]; **Vicky Booth**, Associate Professor[5].
[1]University of Nottingham, School of Medicine, Nottingham CityCare, Nottingham
[2,3]University of Nottingham, School of Medicine, Nottingham
[4]University of Cardiff, School of Medicine, Cardiff, Wales
[5]University of Nottingham, Centre for Rehabilitation and Ageing research, Nottingham

Contact sarah.mccracken1@nhs.net

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Parkinson's disease (PD) is the fastest growing neurological long-term condition globally (Dorsey et al, 2018). A reduction in the neurotransmitter dopamine causes degeneration of nerve cells in the substantia nigra area of the brain. Dopamine is an important neurotransmitter for movement, mood, memory, attention, motivation, and pleasure (Rogers et al, 2017). There are around 153 000 people living with PD in the UK and there is no cure (McDonald et al, 2018). It has motor and non-motor symptoms (Rogers et al, 2017). People with Parkinson's (PwP) are often seeking for non-pharmacological therapies to complement their complex medication treatment plans (Bloem et al, 2015) and there is some evidence that exercise has both physical and psychological benefits (Ramaswamy et al, 2018).

Nordic walking (NW) is a novel form of exercise that is growing in popularity and literature suggests it is beneficial as an intervention for PwP (Ebersbach et al, 2010; Cugusi et al, 2015; Monteiro et al, 2017; Salse-Batán et al, 2022). It has been shown that NW as a group is a flexible intervention with the potential to reach people who struggle to exercise alone or who do not enjoy traditional fitness settings (Dabkowski et al, 2021). Handheld poles are used for NW, which promote better posture and stability, propelling the person forward, using exaggerated big amplitude movements (Szefler-Derela et al, 2020). The NW poles facilitate an all-over body workout using 90% of skeletal muscles, burning more calories than walking without poles (Reuter, 2011). NW has been shown to be suitable for people with a range of disabilities including neurological diseases like Parkinson's (Silva et al, 2016), arthritis (Domaille et al, 2020) limb loss, people recovering from breast cancer surgery (Fischer et al, 2015), back, hip and knee pain (Silverberg and Prejserowicz, 2018), and mental health problems (Aliberti, 2023; Silva et al, 2016). Although NW has been endorsed by the UK's Chief medical officer (Gibson-Moore, 2019) and Parkinson's UK (PUK), it is not routinely delivered as an NHS treatment or part of NHS clinical guidelines

In 2020 a small feasibility study with ten participants

explored how, when and with whom could the NHS deliver NW to PwP. This study evaluated an 8-week NW programme delivered by an NHS Parkinson's nurse specialist (PDNS) who was trained to instruct people in NW. The results demonstrated improved physical and psychological outcome measures: Timed up and go, speed and cadence over ten metres and some non-motor benefits (improved sleep and less back pain) (McCracken et al, 2021). Limitations included a small sample size that may not have been representative of a diverse sample of PwP. A larger study with 40–60 participants undertaking an 8-week NW programme was completed in 2023 and replicated the results (some P values for motor and non-motor outcomes were <0.001), (McCracken, 2023). The present study went further to establish the characteristics and core components needed to implement NW groups for PwP in a community rehabilitation setting through focus groups. The methods and results of the focus group study are presented in this paper.

Method

Design

An exploratory qualitative approach was used to explore characteristics and enablers of community NW groups.

Participants

People with Parkinson's (PwP) and partners who had participated in an 8-week NW intervention, were invited to attend one of two focus groups. Inclusion criteria for the repeated measures and focus groups studies was experience of NW, being able to walk for up to 1 hour without a walking aid, more than 18 years of age, confirmed diagnosis of PD and ability to follow verbal and practical instructions. People with PD were excluded if they had complex comorbidities, which was assessed with an adapted physical activity readiness questionnaire (PARQ) and/or were considered stage 5 on the Hoehn and Yahr scale (Hoehn and Yahr, 2001), had more than two falls in the past 3 months or had postural hypotension (reduction of 20 mmHg systolic pressure or greater, with adverse symptoms). Dizziness upon standing with delayed recovery and poor balance were indicators of increased falls risk. Participants were excluded if they had advanced dementia as determined by the Mini-Addenbrooke's Cognitive Examination (Hsieh et al, 2015).

Nordic walking instructors (NWI) and walk leaders were invited and recruited to a third focus groups via the British Nordic Walking regional and national networks via social media (closed Facebook group). They were included if they held an instructor's qualification with British Nordic Walking and recent training and experience of running NW groups for PwP. They were excluded if they had no Parkinson's training or professional clinical experience of PD. Informed consent was obtained from all participants.

Procedure

Two interview schedules (PwP , NWI and walk leaders) were developed based on the experiences of PwP in the repeated measures NW study (McCracken, 2023), the research team and public and patient involvement (PPI) group. Each focus groups lasted 1 hour and was conducted in May and June 2022.

Facilitators encouraged group discussion, to ensure all group members were enabled to contribute their opinions. All focus groupss were recorded using a digital voice recorder and audio files were transcribed verbatim. The research team checked each transcription against the audio file.

A pseudonym was ascribed to each participant, as an identifier. Thematic Analysis (TA) was chosen, following Braun and Clarke's (2006) six-step approach to analyse the data. Data familiarisation was embedded by re-reading and checking the transcripts to match quotations to participants. Two researchers coded inductively for characteristics and core components to implement NW groups for PwP. Investigator triangulation aimed to reduce researcher bias. Codes, initial themes and subthemes were reviewed, refined, named and defined to ensure they answered the research question. Themes from all focus groupss were combined and checked against transcripts for accuracy. The formal report and data synthesis included comparison with existing literature, methods, results, observation and recommendations for future practice or research. Michie's behaviour change wheel was used as a framework to provide a model for consolidating the results into a practical output (Michie et al, 2011).

Public and patient involvement

A group of four public and patient involvement (PPI) representatives from PUK, PwP, carers, and a retired senior nurse in the NHS commented on documents and lay summaries. They helped with proofreading and attended project meetings.

Ethical considerations

Ethical approval was granted in April 2022, by the University of Nottingham, Faculty of Medicine Research Ethics Committee. REC ref: FMHS 331-0821.

Findings

Sample

Some 15 participants were recruited into the three focus groups. Six PwP attended the first focus group (n=5 men [83.3%], 1 woman [16.7%]), five PwP the second focus group (n=1 man (20%), 4 women (80%)) and four NWI/walk leaders the third group (n=1 man [25%], 3 women [75%]). Time since PD diagnosis ranged from 1–13 years with a median of 4.5 years.

Thematic Analysis

Table 1 shows six themes (core components) and subthemes. How the themes related to Michie's

Table 1. Focus group themes and subthemes

Themes	Sub-themes
1. PwP perceived and experienced Nordic walking groups as physically and psychologically beneficial (Capability)	Improves mobility, posture, balance, and confidence A whole person approach rather than medical model of therapy, full-body workout
2. NW facilitates group interaction (Motivation)	Social interaction in a relaxed environment Peer motivation to engage and continue to exercise Parkrun/parkwalk
3. Practical aspects of implementing Nordic walking groups for PwP (Opportunity)	Accessibility, parking, public transport, amenities Time of class and medication Location, weather, and terrain Funding
4. Qualities and characteristics of the Nordic walking Instructor (Motivation and Opportunity)	Specialist experience of Parkinson's and other disabilities Builds confidence Communication and motivation walk leaders enhances group safety
5. Optimising the safety of the group and risk management (Opportunity)	Outdoor exercise after lockdown Risk assessments: Health, Parkinson's and COVID-19
6. Facilitators for setting up community rehabilitation Nordic walking groups for PwP (Capability, Opportunity and Motivation).	Adaptable to diverse levels of ability, age, disease severity Publicity, equipment, and partnerships, Parkinson's UK, British Nordic Walking, NHS, third sector Accessibility and inclusivity Lifestyle and enjoyment.

COVID-19 Coronavirus 19

behaviour change wheel(capability, opportunity and motivation) are identified in brackets (Michie et al, 2011).

Themes and subthemes

1. PwP perceived and experienced NW groups as physically and psychologically beneficial

NW Improves mobility, posture, balance and confidence

Most participants reported improvements in overall health following NW intervention. Some indicated they struggled with other forms of exercise, running/gym but engaged well with NW (*Figures 1 and 2*). In addition, some reported that their families noticed they were more upright, had improved confidence and better balance when walking. They intentionally moved both arms, even without poles, and perceived improved arm swing. One PwP remarked:

> **'The big thing with the poles is that it gets your arms working. I had stopped swinging my left arm, but I swing it now, thanks to the poles.' (PwP 4)**

Several participants reported that poles helped with confidence and that they felt invigorated.

A whole-person approach, rather than medical model of therapy, a full body workout

Several participants expressed a belief that NW had potential to improve body and mind. They talked about exercise as therapeutic treatment, complimenting their medication. They spoke positively about NW as a whole-body workout.

2. NW facilitates group interaction

Social interaction in a relaxed environment

Most participants (n=12) expressed that the social aspect of exercising with others with PD was motivating. Some felt they would not attend PD support groups yet felt comfortable meeting PwP at exercise groups. Two participants, recently diagnosed, remarked that discussing PD with friends was emotive. Another participant echoed this:

> **'This is a bit more relaxed and that's why I joined, to meet other people, but not in a "let's all sit down and talk about Parkinson's" because I think I would find that a bit daunting at the moment.' (PwP 1)**

Walking and talking was considered conducive to rich conversations and most participants expressed they felt more relaxed outside.

Peer motivation to engage and continue to exercise

Participants reported their mental health, motivation and mood were elevated by attending the group. They were positive about regular NW with friends and motivated to set personal goals. This comment was expressed frequently:

'Yes. It is the kind of encouragement or peer pressure depending on which way you look at it. If you feel a bit tired, you keep going because that is what everyone else is doing.' (PwP 5)

Some participants were of working age (n=2), with some older participants reporting they were very active:

'Yes, Nordic walking worked both physically and mentally. It has been good to meet up with people of all ages who are active.' (PwP 10)

Many expressed they completed 8 weeks of intervention and continued with NW afterwards. A common view was a desire to increase fitness, particularly after the COVID-19 lockdown, and the value of peer motivation for perseverance.

3. Practical aspects of implementing NW groups for PwP

Accessibility, parking, public transport, amenities

These practical subthemes resonated strongly, stimulating rich discussion. During school holidays, if parking was restricted, participants expressed disappointment and increased stress. They stated that the location used in the study was accessible by car and public transport, with a café and easily accessable toilets and they felt this was crucial to success of the NW activity. Several participants commented:

'It has decent parking, good public transport, so you can come on the tram or bus and there's a café and toilets. Without those things it would be difficult for some people.' (PwP 6)

Time of class and medication

Three participants commented they wanted flexibility around timing of NW groups as they were more 'active' in the morning. Some reported that medication worked better after lunch and chose a later group. One NWI explained:

'I have a lady who jabs (Apomorphine injection), and she will be half-way through the walk, and you see her winding down. We stop, she will slip off, do her injections and she's like clockwork again.' (NWI 12)

Location, weather and terrain

When asked about location, participants were unanimous that the central, free access, parkland setting was ideal for NW. Flat areas for warm-up exercises, cool-down stretches and the NW were ideal for a beginners' group. A variety of terrain added challenge and interest for experienced NW. Three participants expressed that rainy days were energising and improved their sleep. They expressed the feel-good factor of exercising outdoors:

'But even not on a day like this, some days have been horrible. Even then it still felt good.' (PwP 1)

This was echoed by another participant who spoke positively about the location:

'And when you think about the variety, through the park, the walk with stepping stones. Parkinson's can affect you and this is a good place to use your poles going up a hill. The terrain is great for it.' (PwP 2)

4. Qualities and characteristics of NW Instructors

Specialist experience of Parkinson's and other disabilities builds confidence

Almost two-thirds of focus group participants reported the NWI was pivotal to the success of the group. Some 6 PwP indicated the personality, motivation, and experience of the lead researcher as NWI was crucial and built their confidence. The specialist, NHS, clinical experience of PD and other

Figure 1. People with Parkinson's exercising in a Nordic walking group, led by a qualified instructor, walking in varied country terrain

Figure 2. People with Parkinson's exercising in a Nordic walking group, led by a qualified instructor. Nordic walking is a whole-body workout

disabilities enhanced the NW groups' quality and authenticity. The participants 'trusted' the instructor because she had knowledge about PD at all stages. The comment below illustrated this point:

> **'I think you feel comfortable asking about Parkinson's because of the knowledge that she [the instructor] has. I would be quite open to have people without Parkinson's in the group. Primarily, we want someone who understands Parkinson's.' (PwP 11)**

Communication and motivation

The NW intervention groups received information in written and verbal form most weeks about community events, NW at parkrun, cancelled classes and focus groups. Participants were motivated by the NWI and peers to set personal goals regarding distance, parkwalk, or NW with family. One participant remarked:

> **'You have been a good motivator, an incredibly positive person that I can spot straight away in that red outfit at parkrun or our NW sessions.' (PwP 8)**

Walk leader (walk leaders) enhances group safety

The NWI/walk leaders focus groups expressed strongly that a walk leaders was essential for group safety especially if it was a mixed abilities group for people with or without PD. They felt a skilled NWI would have experience of a range of disabilities and could tailor the NW session. The walk leader offered their perspective, illustrating this point:

> **'It does mean that as a walk leader I have done warm-up and cool-down training, so if people arrive late, I help them while SM is getting on with the group. And there has been at least one occasion when somebody needed to stop and go back, so we did cool- down together and I made sure they were safe.' (walk leader 15)**

5. Optimising the safety of the group and risk management

Outdoor exercise after lockdown

PwP were pleased to have opportunities for group exercise outdoors after the COVID-19 lockdown especially as they stated they had spent months indoors and were isolated.

They felt this had resulted in physical deconditioning and reduced wellbeing. This participant summarised positive group sentiments:

> **'It was picking up from where you stopped. The first activity when you found out everybody had been living all their lives in lockdown and were glad to be getting back to normal. We could all meet up, be outside and get fit. Better than online Zoom!' (PwP 2)**

Risk assessments: health, Parkinson's & COVID-19

The NWI and walk leaders group felt it was essential to complete safety and risk assessments, in particular specific health assessments for PwP at each NW session. They stated that the PD risk assessment should contain detailed information about falls, medication, blood pressure (low or high) and cognition. Two PwP participants expressed gratitude that they felt safe and enabled by the NWI and walk leaders to walk further and participate in additional 5K community events. One NWI voiced her reflections about the standard British Nordic Walking physical activity readiness (health) questionnaire (PAR-Q) for PwP:

> **'I always fill in the back page, the Parkinson's assessment, and write down that the person told me this is their norm. I observed this when I walked with them, so I make additional notes.' (NWI 13)**

6. Facilitators for setting up community rehabilitation NW groups for PwP

Adaptable to diverse levels of ability, age, disease severity

Participants commented NW was adaptable for PwP with diverse backgrounds, regarding age, stage of disease and disease duration. Having a choice between beginner or faster paced groups provided flexibility. Participants appreciated this approach:

> **'I have attended other walking groups. Sometimes the pace is too fast, but when it's set for a Parkinson's group the leader knows how to set the level for the exercises and the NW.' (PwP 7)**

The NWI were knowledgeable about adapting exercises for older people or those with disabilities.

> **'I have a painful knee, so sometimes I need to walk slowly, and the poles help me to keep moving. We run a Nordic Amblers group with a gentler pace.' (NWI 13)**

Publicity, equipment and partnerships

Several participants (n=5) commented that publicity from PUK, British Nordic Walking and NHS nurse specialists and physiotherapists motivated them to take part in the NW group.

> **'Nordic walking is something I always wanted to try. Our Parkinson's chairperson is very active and sent emails about the trial.' (PwP 11)**

Although NW requires little equipment, apart from special NW poles, most participants expressed gratitude that the poles were provided.

> **'They are quite sporty. They don't look like a walking aid and that is a real sale. You feel confident with them. It is energising.' (PwP 10)**

Accessibility and inclusivity

Accessibility and availability of NW sessions were reported major factors and participants commented choice was important regarding time, day, and location. Some participants found alternative NW groups, near home on different days. A walk leader made this point:

> **'One gentleman swapped to a later group, because his medication worked better, and he enjoyed the company of other participants.' (walk leader 15)**

Lifestyle and enjoyment

The NW intervention was inclusive and enjoyable for people with mixed abilities and backgrounds. Some members of the focus groups joined parkwalk weekly and enjoyed NW with others who did not have PD. They commented they were motivated to adopt NW into their lifestyle by an enthusiastic NWI and friends. Most participants said NW was fun.

They enjoyed group interaction, conversation and physical exercise. Two couples attended focus groups and NW together. They left this comment:

> **'I think what P is trying to say, there is embarrassment, walking with sticks. I wouldn't walk around the village on my own but to come to a group and enjoy it, I don't feel embarrassed at all.' (PwP 7)**

In summary, NW groups were relaxed, accessible, suitable for people with diverse backgrounds and were fun.

Discussion

Principal findings

Three focus groups were successfully conducted with a broad range of PwP who had completed a course of NW in the community. Six main characteristics and components were identified as being essential for successful implementation of NW groups for PwP. These were that NW groups needed to be promoted as physically and psychologically beneficial for PwP. Practical aspects such as parking, public transport and toilets need to be available, the NW instructor should be knowledgeable about PD and deliver NW according to the ten-step International Nordic walking federation standardised method (Mass, 2023). Safety and risk management should be monitored, and funding needs to be available.

Within each of these components several additional key characteristics were highlighted as aspects which could help PwP engage with a course of NW and then continue outside of the research study. Participants enjoyed the social aspect of exercising with like-minded, motivated peers so it would seem advisable for anyone setting up NW groups to ensure a social aspect, such as a cafe for after the walking. In the study NW sessions were free of charge, NW poles were provided, a varied terrain was offered, and the results suggest these items helped engagement and long-term behaviour change.

People setting up future NW community rehabilitation programmes for PwP could seek NHS, social values, social prescribing, or third-party funding sources, in partnership with British Nordic Walking and PUK. A service model could be designed for commissioners, NHS or third sector organisations, clinicians, and policymakers for the roll out of community NW groups. To provide the correct intervention we recommend that the NW instructor is trained by the International Nordic Walking Association and educated in PD following the British Nordic Walking accredited course or clinical PD experience (Pellegrini et al, 2018; Mass, 2023). Having these skills will allow them to address practical aspects for implementing NW in a suitable location, accessible for people with mixed abilities, tailor sessions regarding medication efficacy and timing, complete appropriate risk assessments and establish networks to enable the spread and uptake of NW.

Strengths and weaknesses of the study

A major strength of this study was the partnership with PUK, British Nordic Walking and NHS colleagues, which facilitated broad sources of participant recruitment. However, we must recognise that participants were self-selecting and may have had preconceived positive attitudes towards NW. People less enthusiastic or unable to attend the NW and focus groupss may not have provided the same results. However, as this was a study to gather data to inform the implementation of NW, we felt it was essential to gain the views of PwP who had recent lived experience of attending or leading a NW group and who could speak with first-hand knowledge about the intervention.

A strength of this study was the opportunity for participants to converse about shared experiences of a novel rehabilitation intervention. However, the NWI who delivered the NW groups was present, so participants may not have felt free to express negative comments. This may have led to information bias (Smith and Noble, 2014). To mitigate this, all results were checked by a second researcher, adding validity and reliability to the study (Noble and Heale, 2019). Although this study was conducted during the COVID-19 pandemic and participants might have been, more than usually, positive about exercising outdoors, the authors consider the results are relevant in non-pandemic environments as NW is conducted outside (Braun and Clarke, 2006; Smith and Noble, 2014; Helen and Roberta, 2019). Another strength was that the integrated approach to PD treatment in literature (drugs and non-drug therapies) was also reported by focus groupss. However, this could be a biased sample as this was a novel NW intervention, not routinely provided by the NHS.

KEY POINTS

- Nordic walking is a novel, low-cost group activity that is beneficial for people of all ages, including those with Parkinson's Disease. Research suggests there are physical and psychological benefits to exercising outdoors with a qualified instructor.
- Physiotherapy resources are limited and many people with Parkinson's disease experienced a deterioration in their physical and mental health during the COVID-19 pandemic.
- Nordic walking has potential for significant savings to health and social care services, promoting balance activities, muscle strengthening and psychological wellbeing.
- This study established the core components needed to replicate Nordic walking groups for PwP in the community.

Results in relation to other studies and future research

During the writing of the study a systematic review and meta-analysis was published (Salse-Batán et al, 2022). The review provided guidance for practitioners in prescribing NW for PwP. The most clinically meaningful results were that NW appeared to improve walking ability and quality of life. There was a positive impact on motor impairment, functional autonomy, gait impairment, quality of life, as well as on some non-motor symptoms and physical fitness (Salse-Batán et al, 2022). The review's guidance was that neurologists and practitioners could decide to encourage NW practice, as the specialist would have responsibility for identifying suitable exercise for PwP. This was supported by Radder's meta-analysis of 191 trials, a comprehensive guide to treatment modalities for PD in which they scrutinised the evidence for a range of novel, non-drug therapies (Radder et al, 2020). The authors concluded that NW improved motor symptoms, balance and gait, and made recommendations for policy makers, clinicians and PwP. Nordic walking was included as part of the Parkinson's Exercise Framework and recommendations given for its frequency and intensity (Ramaswamy et al, 2018).

Physical health improvements were stated by participants and family members who reported notable improvements in posture, balance and bilateral arm-swing. These results add to the growing evidence that NW can improve walking speed (Monteiro et al, 2017), posture (Berg et al, 1992), balance (Bullo et al, 2018), gait (Silva et al, 2016), upper body strength and core stability (Fischer et al, 2015), augmented arm-swing (Bombieri et al, 2017) and better coordination (Monteiro et al, 2017).

Psychological health improvements reported in this study aligned with results from another focus groups study, which reported NW had helped PwP with coping strategies, perceptions about PD, and facing the future with PD (Casarotto et al, 2022).

The participants in this study reported enjoying a full-body workout, which is in line with results from studies by Cugusi et al, (2017) and Yang et al, (2022). The evidence for a whole-person approach for PwP, rather than a traditional medical model which might concentrate on only one aspect and the use of drugs, is growing (Salse-Batán et al., 2022).

The benefit of social interaction in a relaxed environment was a strong subtheme from this the study and supports previous community exercise studies (Lamont et al, 2012; Yang et al, 2022). This may have contributed to 11 (73%) focus group participants continuing to NW after the designated intervention ceased. Enjoyment and having fun were important for engagement, resilience and perseverance, and this echoed previous similar studies (Farnsworth and Burtscher, 2010; Bloem et al, 2015; Dabkowski et al, 2021).

The results indicated that PwP were motivated by the instructor and inspired by others who were highly active, which echoes the results of a qualitative study by Dabkowski et al, (2021) where older adults completed a community exercise programme. These results, while making sure exercise is inclusive and accessible, indicated that for PwP who have lower levels of motivation and self-determination (due to PD), practitioners will need to include additional components to make NW groups widely accessible. This might be highly active PwP joining less active groups as motivators because we know from the results that PwP with higher levels of motivation participated and engaged with parkrun (Ahern et al, 2022).

Results from the focus groups identified the NWI was pivotal to the success of the group to motivate, understand PD symptoms which are both physical and psychological, understand medication use in PwP, be an expert in NW and, importantly, be trained in group dynamics. In the present and previous studies the intervention was delivered by a PDNS who was trained as an NWI for PwP (McCracken et al, 2021). This finding was echoed in a study in which the authors described the social context of exercise and the motivating role of instructors (White et al, 2023). Chartered physiotherapists, as a NWI have been acknowledged in studies which explored the freezing of gait (Wróblewska et al, 2019) and mobility (Bassett et al, 2012; Ebersbach et al, 2014; Radder et al, 2020; Domingos et al, 2022b). The instructor needs specific skills and training but could be from a range of health care professionals.

The author's results about location reflected previous studies, such as Domingos et al (2022a). Although few studies had a Parkinson's specific focus, it seems obvious that to encourage PwP, who are already suffering a long-term condition, to take part in emerging novel rehabilitation (Bhakaney

and Vardhan, 2022) the practical aspects need to be clear, simple and inexpensive. Flexible timing of groups, effective communication, parking, toilets, and safety would appear to be basic requirements for this population. Although the study did not complete a health economic evaluation, the cost of the group was kept low by using an outdoor venue that was free to use. Costs included the NWI and NW poles. Other studies have also cited low cost and ease of access to a variety of locations as compelling reasons to take up NW (Salse-Batán et al, 2022).

Studies published with a similar population of people living with neurological conditions found comparable results to those presented here (Elsworth et al, 2011). The practical facilitators for setting up community rehabilitation interventions were similar. Attainment of a physically active lifestyle benefited mobility, health, and wellbeing. This had potential to reduce the impact of disease burden and health care costs in people living with long-term neurological conditions (Elsworth et al, 2011).

Conclusions

This study demonstrated that NW can be delivered safely for PwP in a community setting when the core components have been established. Future research is needed to evaluate clinical and cost effectiveness, and scalability of the intervention. NW remains a novel area of research interest for rehabilitation in PwP. BJNN

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