



Facilitators and barriers to green exercise in chronic pain

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Abstract

Background Green exercise, defined as exercising in nature, demonstrates mental and physical health benefits. There is limited literature on green exercise as part of the treatment for chronic pain. Our objective was to investigate chronic pain patients' perceptions of green exercise and the possible barriers that may arise in employing it as part of their treatment regimes.

Methods After institutional ethics committee approval, a convenience sample of 113 adult patients, who attended a chronic pain clinic, were included. Participants completed a questionnaire that included a variety of questions with responses reported using a Likert scale.

Results The most frequent patient age was 50–70 years in 49% of respondents and the most frequent pain complaint was back pain (62%). Ninety-four percent of participants reported that nature improves their mood. Seventy percent of participants reported that green spaces were easily accessible to them on a regular basis. However, up to 38% reported that they would not be able to commit to three times a week of a green exercise regime. The majority (62% of participants) reported that they would like healthcare practitioners to discuss green exercise with them.

Conclusion Patients who suffer from chronic pain may be interested in green exercise as part of their treatment regime. Barriers that were identified included proximity to outdoor locations, time availability, and personal appraisal of the benefits of exercise for their condition. Green exercise should be considered as a part of a chronic pain treatment plan, and future studies should be directed to evaluating its efficacy in chronic pain.

Keywords Exercise · Green · Pain

Introduction

Regular exercise is recognized as a key preventative measure and treatment, for many chronic conditions today [1–4]. More specifically, green exercise, the practice or performance of exercising outdoors in nature, has been shown to have considerable benefits on both mental and physical health and well-being [5, 6]. Chronic pain, one of the leading causes of morbidity, is one such condition that can benefit from regular exercise [7]. In Ireland, in the year 2010, the prevalence of chronic pain was 35% [8]. Furthermore, the WHO has identified chronic pain as increasing at an ever-alarming rate [7–9].

Green exercise is defined as any range of activities, which promote the synergistic benefits of physical activity while simultaneously being exposed to nature [10]. Green exercise has benefits on both mental and physical health that outweigh the benefits of indoor exercise alone [6, 10]. Green exercise is free, and does not require specific equipment or skill acquisition before beginning. Physical well-being is enhanced, in theory, as due to the distracting nature of nature itself; participants have been shown to perceive a lower level of overall exertion while exercising in a “Green” and “Natural setting” at the same level of intensity as they would normally indoors [5]. This has significant implications as participants, as a result of this decreased perceived exertion, actually end up exerting themselves more outdoors, which yields greater results per time spent exercising [5].

The mental health benefits of green exercise are also well pronounced as participants reported higher levels of mental well-being, lower levels of anger, depression, confusion, and higher levels of self-esteem [6, 11]. Higher levels of self-esteem and mental well-being have a broad influence on treatment outcomes given that greater levels of self-esteem and efficacy are linked to more positive outcomes [6, 12, 13].

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Despite the benefits of general exercise on conditions such as chronic pain and, additionally, the advantages of green exercise on health and wellbeing, there is no literature that explores the benefits of green exercise in patients suffering from chronic pain. More importantly, no studies have been conducted to date that investigate the perceptions and attitudes of patients with chronic pain to the prospect of green exercise as a form of potential treatment. Patient's perceptions regarding treatments or care plans play a major role in the efficacy of said interventions [14].

This study aimed to outline the perceptions of patients who suffer from chronic pain, regarding green exercise. Specifically, this study intends to outline patient's perceptions of what is green exercise, and what barriers may exist with reference to its use as a part of their care plan. This information is important in order for health care practitioners to be able to better understand if and how green exercise could be integrated as a part of the individualized chronic pain care plan.

Methods

After institutional ethics committee approval, a convenience sample of 120 adult patients who attended a chronic pain clinic were included. A total of 120 patients provided demographic information; however, only 113 of these patients answered the questions relating to green exercise. This was seen as an inclusion criterion for this research, and therefore, the analysis is presented on these 113 participants. Reasons for exclusion were less than 18 years of age, if English was not the first language and mental competency.

Participants completed a questionnaire that included a variety of questions with responses reported using a Likert scale. The structured questionnaire was developed in English after an extensive literature review using key words "Chronic Pain," "Green Exercise," "Exercise," "Pain". Based on the literature review, a questionnaire was developed looking at the perceptions of what is green exercise and what barriers may exist with reference to its use as a part of their care plan. The questionnaire comprised of two sections: demographic variables and perception variables. The demographic variables of patient were age, gender, employment status, pain diagnosis, living situation, and years living with chronic pain. The perception variables included patient's perception of exercise in the setting of chronic pain, appraisal of accessibility and barriers to green exercise, and finally the appraisal of green exercise as a treatment for chronic pain.

The questionnaire was piloted on 15 staff members, and amendments were made. Data was collected by the co-investigator after taking written informed consent and ensuring confidentiality. In all 120 patients were consecutively approached to take part in this study. All patients agreed to participate and were interviewed and provided with the questionnaire.

Data analysis

Categorical data were described as counts, and percentages are presented. Associations between the categorical variables were tested using Pearson's Chi-square tests. A 5% level of significance was used for all statistical tests. All statistical analysis was undertaken using SPSS Version 22.

Results

The demographic profile is presented in Table 1. The majority of participants were female (61%), aged 50–70 (49%), and living with a spouse/partner (77%). The most common pain diagnosis was back pain (62%), with 79% of participants suffering from pain for between 1 and 5 years.

The results from the green exercise questionnaire are presented in Table 2. The majority of participants reported participating in regular exercise (59%). However, only 39% participated in green exercise regularly despite 70% having access to green spaces. In general, the majority of participants saw the benefits of exercise, and 94% reported that nature improved their mood. In fact, 80% of participants reported to enjoy being in nature.

In most cases, participants disagreed with the negatives of exercise, for example, 60% disagreed with that statement that they were not willing to try green exercise treatment. Only 19% of participants reported preferring pharmacology for

Table 1 Demographic profile of sample ($n = 113$)

		<i>n</i> (%)
Sex	Female	68 (61.3)
	Male	43 (38.7)
Age	< 30	4 (3.4)
	30–50	42 (35.6)
	50–70	54 (48.6)
	70+	13 (11.7)
Employment	Employed	27 (24.3)
	Unemployed	35 (31.5)
	Retired	32 (28.3)
	Other (inc. student)	17 (15.3)
Pain location	Back	70 (61.9)
	Other	29 (25.7)
	Multisite	14 (12.4)
Years pain	< 1 year	8 (7.3)
	1–5 years	86 (78.9)
	> 5 years	15 (13.8)
Living situation	Spouse/partner and child	87 (77.0)
	Alone	13 (11.5)
	Other	13 (11.5)

Table 2 Descriptive statistics of green exercise questionnaire ($n = 113$)

Question	Response n (%)		
	Strongly disagree/disagree	Neutral	Agree/strongly agree
Participation in exercise			
Q4. Accessibly green spaces	21 (18.6)	13 (11.5)	79 (69.9)
Q5. Regular PE	29 (26.4)	16 (14.5)	65 (59.1)
Q6. Regular green exercise	45 (43.3)	19 (18.3)	40 (38.5)
Benefits of exercise			
Q1. Nature improves my mood	5 (4.5)	2 (1.8)	105 (93.8)
Q3. Health benefits	8 (7.2)	4 (3.6)	99 (89.2)
Q7. Pain helped by exercise	31 (29.8)	24 (23.1)	49 (47.1)
Negatives of exercise			
Q8. Not willing to try	62 (60.2)	17 (16.5)	24 (23.3)
Q9. Prefer pharmacology	66 (61.7)	21 (19.6)	20 (18.7)
Q11. Cannot commit	30 (28.8)	35 (33.7)	39 (37.5)
Q12. Not safe	50 (47.6)	24 (22.9)	31 (29.5)
Q14. Not near an environment	68 (63.5)	23 (21.5)	16 (15.0)
Q2. Do not enjoy nature	85 (80.3)	1 (0.9)	20 (18.9)
Requirements for future			
Q10. GP discussion	15 (14.0)	25 (23.4)	67 (62.6)
Q13. Motivated by a group	40 (38.1)	29 (27.6)	36 (34.3)

Counts (%) presented

the treatment of their chronic pain, and only 30% felt that their pain was not helped by exercise.

The majority of patients would like further discussion regarding a green exercise treatment plan with their primary health care provider (63%); however, there was considerably mixed reviews regarding group motivation or group exercise sessions.

Statistically significant differences were observed for age and pain duration on the opinion that exercise will not help with pain (Table 3). Younger participants were least likely to agree with this statement (7% compared to 36% for 50–70 and 22% for 70+) (Table 3). Participants suffering from pain for over 5 years were more likely to think exercise does not help

Table 3 Difference in thinking green exercise will not help pain (Q8) by demographic information

		Do not think green exercise will help with pain n (%)			p value
		Strongly disagree/disagree	Neutral	Agree/strongly agree	
Sex	Male	23 (59.0)	8 (20.5)	8 (20.5)	0.58
	Female	39 (62.9)	8 (12.9)	15 (24.2)	
Age	< 50	30 (69.8)	10 (23.3)	3 (7.0)	0.02*
	50–70	26 (52.0)	6 (12.0)	18 (36.0)	
	> 70	6 (66.7)	1 (11.0)	2 (22.2)	
Employment	Employed	14 (51.9)	8 (29.6)	5 (18.5)	0.16
	Unemployed	23 (69.7)	2 (6.1)	8 (24.2)	
	Retired	13 (50.0)	4 (15.4)	9 (34.6)	
	Other	11 (73.3)	2 (13.3)	2 (13.3)	
Living situation	Spouse/partner and child	46 (57.5)	14 (17.5)	20 (25.0)	0.38
	Alone	8 (72.7)	0 (0.0)	3 (27.3)	
	Other	8 (66.7)	3 (25.0)	1 (8.3)	
Pain duration	< 1	2 (33.3)	3 (50.0)	1 (16.7)	0.004*
	1–5	51 (64.5)	13 (16.5)	15 (19.0)	
	> 5	6 (42.9)	0 (0.0)	8 (57.1)	

*Statistically significant difference

with pain (57% compared to 17% for < 1 year and 19% for 1–5 years) (Table 3).

Discussion

Based on the results of this study, patients who suffer from chronic pain would be interested in green exercise as part of their treatment regime. There were, however, several barriers that were identified that could possibly limit patient's participation in green exercise despite benefits and willingness to participate. These barriers primarily include proximity to outdoor locations, time availability, and personal appraisal of the benefits of exercise for their condition.

Our findings are consistent with several studies that indicate the benefits of spending time outdoors [6]; 94% of study patients felt that being in nature improved their mood. In addition to this improvement in mood, 89% of respondents reported that spending time outdoors has health benefits, which is significant given that participants feel that simply the act of engaging with the outdoors may be beneficial to their health, independent of exercise or ability to exercise within it. However, 19% of participants reported green spaces, such as parks and river paths, are not easily accessible to them on a regular basis. Studies have shown that communities with a lower level of access to such natural environments have a greater incidence of disease and morbidity [15].

The most prevalent age category observed in our study was patients aged 30–70 (85%), which fits with the current literature for the age of patients suffering from chronic pain [7, 16]. Our findings showed that 56% of participants self-reported as being either retired or unemployed. This is a worrying statistic considering past research has found that a lack of active employment is a risk factor for chronic pain [17]. Our result that 62% of our respondents identified back pain as their most pressing source of chronic pain, which also fits with current knowledge of the most frequent source of pain [17].

Forty-seven percent of participants reported that exercise relieved their chronic pain. This is an encouraging finding given that a well-recognized form of treatment for chronic back pain has moved from rest to exercise in recent years [1]. Furthermore, in order for patients to be willing to undertake a green exercise plan, it is advantageous that they be either active at baseline or else willing to undertake an active lifestyle. Patient education may also be important in the case of patients who suffer from chronic pain, given that exercise has been shown to have benefit in these cases [6]. Notably, education should be in reference to how to go about green exercise and how exercise can be appropriately incorporated into a chronic pain care plan regime.

Thirty percent of patients in this study reported that pain was not helped by exercise. This may be due to a wide range of factors including pain can limit patient's ability to exercise

effectively [7]. Over 60% of participants think that green exercise is something they would be willing to try to alleviate pain, and less than 20% of participants would prefer pharmacological treatment to physical exercise as a treatment modality for their chronic pain. As well as this, the fact that over 62% of patients would like their general practitioner or pain specialist to discuss such a treatment plan with them is encouraging for the development of green exercise programs. Considering how exercise has been shown to have great health benefits in the setting of chronic pain [7], there is potential for tailored green exercise regimes, to improve patients' pain experience [6].

Currently, there are many barriers to the treatments of chronic pain given the complex nature of this condition. It is important for healthcare practitioners to have an understanding, of such limitations, in order to better tailor treatment plans to the individual patient [18]. The barriers to engaging in green exercise that were identified in this study included time commitments, safety, and proximity to green exercise environments. Thirty-eight percent of participants reported that they would not have the time to commit to 3 h a week of green exercise; less than 30% felt they did not feel safe doing so, and 15% reported that living far green environments was a factor in their lack engagement in green exercise.

A lack of time and energy, social influence, lack of motivation, fear of injury, weather conditions, travel, retirement years, and family obligations are possible barriers to exercise [19]. Thus, more research is required to ascertain specific barriers to exercise in the presence of chronic pain, and how to overcome such barriers. When patients are referred to a pain clinic, they are often searching for a cure or a rigid diagnosis [20]. This search for curative treatments and establishing a clear diagnosis is often not fulfilled, and thus patients may leave pain clinics discouraged and unwilling to take part in a beneficial care plan, especially one that involves physical exertion and effort such as exercise [20]. Medical practitioners may also have time constraints in their consultations which may hinder the physician's ability to counsel the patient on appropriate green exercise plans [21]. Furthermore, patients may have low levels of perceived self-efficacy, and this may hinder their participation in exercise programs, if one was suggested [22].

Specifically, with regard to green exercise, there are many possible barriers, such as access to fresh outdoor environments [12]. Patients may have family and work demands that prevent them from having both the time and mental energy to pursue an exercise regime, particularly one outdoors [12]. It is possible that it may be dangerous to exercise outdoors for certain participants, due to animal wildlife or human crime, which may make green exercise difficult [12]. Additionally, patients may live in a climate that does not allow for comfortable outdoor exercise, such as extreme heat waves or cold icy snow [12].

The general population as with our patients have an affinity for nature. Exercise in this environment is more sustained [10]. General advice regarding pacing, conditioning, and re-injury concerns for exercise in the chronic pain population [23] also pertains to exercise in nature.

Strengths and limitations

The strengths of this study lie in that it addresses a topic where past research is limited. To our knowledge, no studies have explored the benefits of green exercise in the setting of chronic pain, and our findings suggest there is potential for green exercise as a treatment for chronic pain. A limitation of this study is the small sample size. This is a pilot questionnaire and therefore further research should look to replicate the results presented here on a larger more representative sample. This would provide further validity to the questionnaire used here.

Conclusion

Chronic pain encompasses many interacting elements that are biomedical, psychosocial, and physiological in nature [24]. Green exercise is one treatment modality that has the potential to engage both the physical and psychosocial elements of a person who suffers from chronic pain and provides them with a holistic treatment modality. The results of this study indicate that patients are willing to engage in green exercise as a possible treatment modality. Green exercise has the potential to be a part of a patient centered, treatment care plan for patients who suffer from chronic pain. Patient involvement and adherence in treatment programs has great importance for positive health outcomes. Therefore, health care practitioners should aim to better understand patient's perceptions of green exercise before including it in treatment recommendations. Physicians should consider green exercise as a possible part of a chronic pain treatment plan, and future studies should be directed to evaluating its efficacy in chronic pain.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

Ethical approval All procedures performed were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent Informed consent was obtained from all individual participants included in the study.

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