The role of personal relationships within physical activity interventions for adults with long-term health conditions: a qualitative systematic review.

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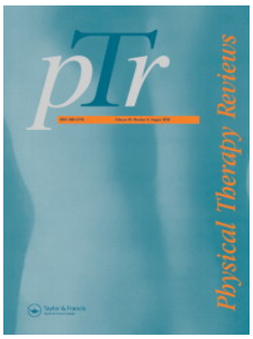

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The role of personal relationships within physical activity interventions for adults with long-term health conditions: a qualitative systematic review

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ABSTRACT

Background: Increasingly, healthcare provision in the UK has started to take account of the role of social relationships in affecting health behaviours and wellbeing.
Objective: To synthesize the literature on the types and roles of personal relationships for adults with long-term health conditions involved in physical activity interventions.
Methods: We searched eight databases from 1990 to March 2025 for mixed methods and qualitative studies of physical activity interventions in adults with a range of long-term health conditions. Interventions lasted ≥6 weeks and explored the influence of personal relationships on physical activity.
Results: Sixty-three studies met the inclusion criteria. Relationships identified included: interventionist; peers on the intervention; family members, friends, healthcare professionals, community, researchers, pets and a lack of social interaction.
Discussion: The results of this study highlight the importance of different types of social relationships and interactions for participants, illustrating the value of understanding the social context of physical activity interventions.

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Relationships; physical activity; behaviour change; long-term health conditions

Introduction

There is widespread evidence of the positive impacts of physical activity on physical and mental health [1], including treatment and prevention of long-term health conditions in adults [2,3]. Some physical activity interventions help the management or prevention of long-term health conditions such as Chronic Obstructive Pulmonary Disease [4,5], cancer [6–8], diabetes [9,10] and dementia [11,12]. Whilst there is significant variety in the intervention approaches and outcome goals, the benefits identified have largely included weight loss [13], improvements in functional capacity [14], quality of life or wellbeing [15,16], motivation to exercise [17] and physical activity levels [18]. However, studies investigating physical activity interventions have largely focused on establishing the feasibility [6,19] and evaluating the effectiveness of interventions [20–22]. Nevertheless, an increasing body of research examining the factors influencing intervention adherence [23,24] noted that psychosocial factors such as social support had a positive influence on intervention effectiveness, although these are rarely the primary focus of these studies.

There is a move across health organizations, both nationally [25] and internationally [26], to recognize the lack of social connection as a public health issue. There is evidence to show that limited social connection has serious consequences for both physical and mental health, including increasing the risk of developing coronary heart disease or stroke [27], increased risk of dementia [28], and depression [29]. Indeed, Rico-Uribe et al. [30] found that 'loneliness is a risk factor for all-cause mortality', suggesting that social relationships should be considered an essential part of health and therefore a part of healthcare.

The importance of social relationships has begun to be recognized in the UK, as can be seen in the development of the role of social prescribers within General Practitioner surgeries [31], whose remit includes treating social isolation through connecting patients with activities available in their community.

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The significance of social relationships is also being explored in physical activity interventions [32–35].

A systematic review by Richards et al. [36] on physical activity interventions where spouses were involved offers some evidence that 'spouse-involved interventions can be effective in increasing physical activity' [36,p.51]. Although it was observed that in five of the six studies included, the spouses were not targeted equally, with one spouse being the primary focus of the intervention and the second spouse recruited as a support and given less attention. Therefore, it is possible that this inequality mediated the effectiveness of the interventions. A study by Smith et al. [32] found a positive association between social support and physical activity levels in older adults, particularly when that social support comes from family members. These studies highlight the importance of social relationships for health behaviours and suggest some ways in which this consideration can be incorporated into health behaviour change interventions. Our qualitative systematic review offers a timely addition to this work as it is the first study to synthesize available information on how a range of personal relationships may shape engagement with and experiences of physical activity interventions.

Thus, the aim of this review was to synthesize the evidence on which personal relationships have been identified in relation to physical activity interventions targeting people with long-term health conditions. The secondary aim is to understand the role of these relationships on participants involvement on physical activity interventions.

Methods

The review protocol was pre-registered in the International Prospective Register for Systematic Reviews (PROSPERO), registration number CRD42022341502 and adhered to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) [37].

Search strategy

Comprehensive searches were conducted in PubMed, CINAHL, PsycINFO, Cochrane Central Register of Controlled Trials (CENTRAL), Scopus, Web of Science and Proquest during the period 1990–August 2022; and updated twice to include July 2022–March 2025 to ensure that the studies gathered were the most up to date available. The search strategy is included in Additional File 1. The search included studies from any country but excluded studies not written in English. A broad search approach was taken in order to capture as much information as possible pertaining to relationships and social networks in existing literature. Therefore inclusion criteria were: (1) qualitative and mixed methods studies, published in peer-reviewed journals; (2) Studies that discussed a physical activity intervention that lasted six weeks or more and were aimed at adults with a long-term health condition (a condition that cannot be cured), delivered in any setting. (3) Studies which reported on the experiences of participants, exercise professionals, and those involved in supporting participants. (4) Studies where the personal relationships were related to the experiences of physical activity interventions. Personal relationships for the purposes of this review included relationships between the participants in the physical activity interventions and those they connected with, such as their spouses, peers on the interventions, or the interventionists delivering the schemes.

Studies were excluded if they were shorter than six weeks, involve children or adolescents, as well as quantitative studies, systematic reviews, conference abstracts, books, study protocols, conference abstracts and editorial comments.

Selection criteria

References identified by the database searches were imported into Covidence [37], which removed any duplicates. Title and abstract screening were performed by LP and double screened by the other authors (JE, KK, HL, AR, LA). Any disagreements were discussed and resolved as a group. Full text screening examining the full articles for inclusion was performed in the same way.

Quality assessment

The Joanna Briggs Institute (JBI) critical appraisal tool [38] for qualitative studies was used to examine the quality of the selected studies. We assessed factors including the congruity of the methodology with: the philosophical perspective, research question, methods, data analysis, interpretation of results, reflexivity, influence of the researcher, representation of participant voices, evidence of ethical approval, and coherence of conclusions. As with the screening, the quality assessment was performed by LP and double assessed by the other authors. Any disagreements were resolved by discussion with the team. The quality assessment form can be found in Additional File 2, and the scores and details of each study can be seen in Additional File 3. The quality assessment was not used to exclude studies, but rather to inform the confidence of the findings.

Data extraction and synthesis

Information on the characteristics of the studies was extracted by LP and checked by the other authors,

including location (site, country), aim of the study, sample, participant characteristics, study design, health condition. This information can be seen presented in Additional File 3.

Study findings, including quotes from study participants and interpretations by the researchers, were extracted from the 'results' or 'findings' sections by LP and checked by JE.

Data was extracted and synthesized using the software NVivo 12, using themes based on different relationships, in line with the aim of identifying personal relationships associated with physical activity interventions targeting people with long term health conditions. A closer exploration of each of these relationships was conducted by LP through analyzing the extracted data, in line with the thematic analysis approach of Thomas and Harden [39]. This included line-by-line coding of the extracted data for each relationship, and the organization of these codes into descriptive themes. The descriptive themes were then considered in terms of how they relate to the physical activity interventions examined, and what they reveal about the role of relationships within them and developed into analytical themes. Confidence in the findings was also assessed using the GRADE- CERQUAL tool [40] which included examining the evidence and critical appraisal results relevant to each finding. It was completed by three authors (LP, LA, and JE) who examined four elements: methodological limitations [41], coherence [42], adequacy of data [43], and relevance [44]. Each element was examined by the level of concern (no or very minor, minor, moderate, and serious) which led to making an overall judgment about the confidence in the review finding (high, moderate, low, or very low) [40]. The summary of the findings can be seen in Table 2, and the complete evidence profile in additional file 4.

Results

In total, 9,414 studies were retrieved from the database searches, 7,934 were screened, of these, 139 studies were read in full, and 63 studies were selected for inclusion. This process can be seen in more detail in Figure 1.

Study characteristics

Of the 63 studies included, the majority were from the UK ($n = 22$) [8,9,20,21,45–62], closely followed by Australia ($n = 10$) [6,7,13,63–69], Sweden ($n = 6$) [11,12,70–74], and the USA ($n = 6$) [18,75–80]. Studies from other countries include Canada [5,15,81–83], Ireland [19,84–86], Portugal [87,88], Norway [4,89], Denmark [90], Colombia [17], Mexico [91] and the Netherlands [10]. The studies were all published in the period 2007–2025, and seventy percent ($n = 38$) made use of qualitative research methods and thirty percent ($n = 16$) used mixed methods. In terms of voices represented, the studies included quotes largely from participants ($n = 56$) [4–10,12,15,17–21,45–49,51,52,54–59,61–65,67–89,91] and interventionists ($n = 12$) [6,11,13,18,21,39–45]. The voices of caregivers ($n = 3$) [21,41,71], health care professionals ($n = 3$) [45,53,71] and scheme organizers ($n = 2$) [21,73] were also included.

Main findings

Familiarization with the articles led to nine key relationships being identified as initial themes to code the data, namely the relationship between participants and: interventionists, peers, family, friends, health care professionals, community, researchers and pets. Lack of social interaction was also identified as an important relational code for some studies (Table 1). We used the GRADE-CERQUAL approach to assess confidence in these 8 findings. 3 findings were assessed as high confidence, 3 as moderate confidence, and 2 as low confidence (Table 2). The explanation for each assessment of confidence can be found in additional file 4.

The themes of the participant relationships with Interventionists, Peers, and Family were the most widely discussed in the studies included and therefore, have been given sub-themes which explore them in more depth here. The relationship between participants and Community, Friends, Pets, Health Care Professionals, Researchers, Lack of Social interaction, were not given sub-themes due to the limited number of studies examining these relationships.

Interventionists

The interventionists, who are defined here as the professionals delivering the physical activity interventions, included physiotherapists [4–6,8,9,19,20,33,46,73,90], nurses [71], football coaches [85,90] and health coaches [13,46,47,54,65,67,74,77,79] were the most frequently mentioned relationship overall. Within the 63 studies included in this analysis, 12 included the voices of interventionists reflecting on their own role in relation to participants and 52 studies (Table 1) mentioned the role they play for participants both practically and socially. Analysed together, these studies highlight different aspects of the role of an interventionist that are significant for participants, and these are reflected in the following subthemes: (1) providing encouragement and accountability; (2) creating a sense of safety

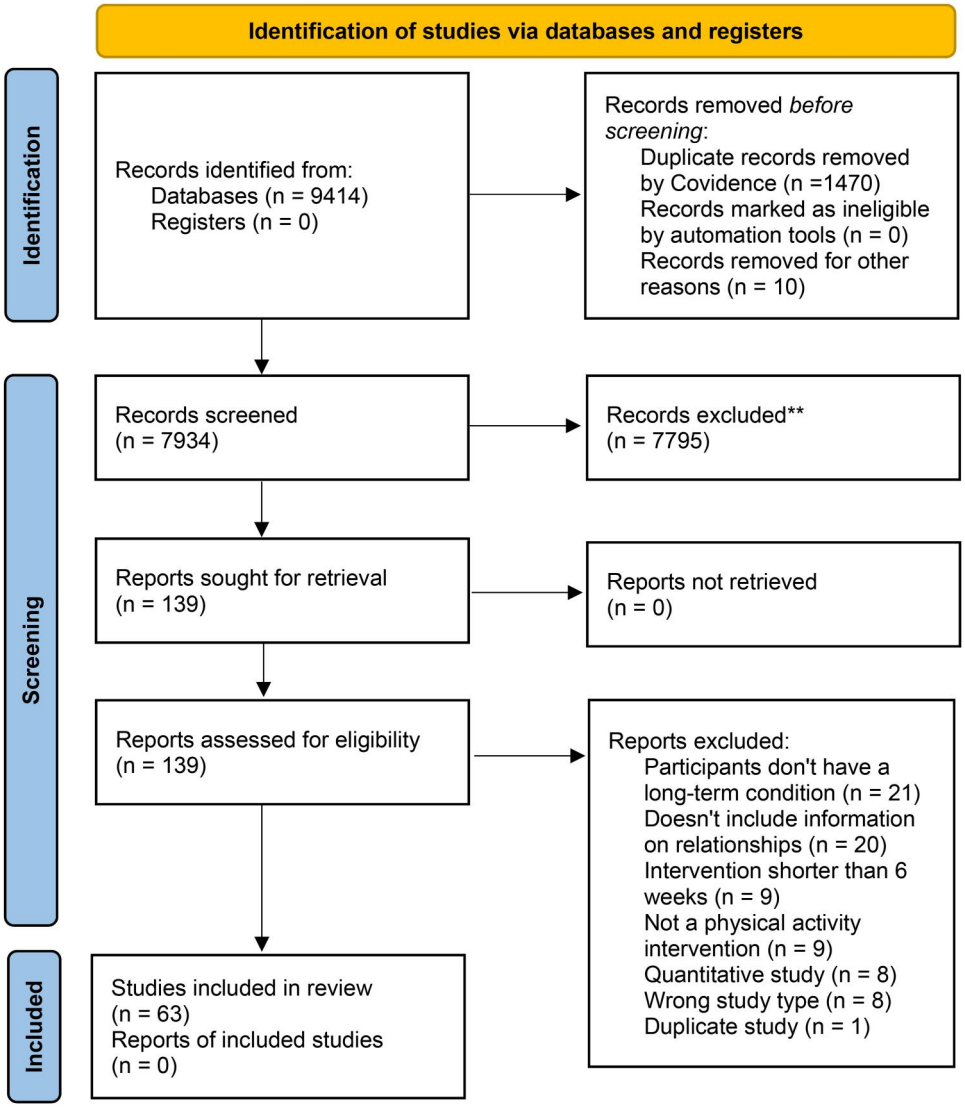

Figure 1. PRISMA flow diagram.

and (3) developing tailored interventions; (4) emotional support.

Providing encouragement and accountability

A key skill of the interventionist as reported by participants was providing encouragement [53,60,66,70,71,85,87]. This helped to motivate participants and enhanced adherence with the intervention [60]. The encouragement, combined with the participants' trust in the interventionists' skills in terms of giving them exercises that were achievable for participants pushed the participants to try harder and feel safe whilst trying [5].

> I'm not disciplined enough to do this on my own. I needed somebody to encourage me. [73,p.6]

The interventionists are also described as accountable because they create structure within the interventions through monitoring activity and regular contact with participants [54,71,73] and this accountability provided extra motivation for participants [5,6,54,59,62,65,66,70,71,73,83]

Creating a sense of safety

The presence of an interventionist is frequently reported to offer a sense of physical safety for participants who felt unsure how to exercise appropriately with their health conditions [5,8,12,46,54,57,62,66,69–71,73,75,88].

One participant said that the exercise class 'feels like a safe environment' and another that the physiotherapists 'cater to his care and needs' [8,p.4].

The specialized knowledge provided by physiotherapists or healthcare professionals was also key in helping participants feel safe and it provided reassurance that the intervention they were receiving was of good quality and appropriate for them [6,8,46,57,69,71,73].

Developing tailored interventions

Being able to care for each participant's needs by providing individually tailored interventions was a key strength that was appreciated by participants [6,11,50,57,69,75,83,90] who described feeling seen

[75] and able to participate despite their health limitations [83]. This personalized approach enabled the interventionists to build a stronger connection with the participants, which was particularly significant for patients with limited communication, such as in the Fjellman-Wiklund [11] study of an intervention with dementia patients.

Emotional support

Integral to this personalized approach was the role of the interventionist in providing emotional support to participants [5,6,50,57,87,90]. For some interventionists, this was a by-product of working to build rapport with participants [13], and for many, the emotional connection developed was prioritized to create situations where:

> Instructional aspects became secondary to interpersonal support roles, given the vulnerabilities of the client group. [50,p.7]

Whilst the strong connections built between interventionists and participants are identified as largely positive, there was some concern raised by interventionists about participants becoming dependent on their support. This was considered problematic for the long-term sustainability of the exercise habits they were trying to encourage and also because it risks leaving participants feeling abandoned when the support ends [13,47,50,73]. This is highlighted in an example from Moore et al. [50]:

> Certainly with the older ones, there is a slight dependency trap with them, they do still like to come when you are there. It's quite hard sometimes to get them to exercise on their own. [50,p.8]

Interventionists are the main relationship actors within physical activity interventions (Table 1), and when they are removed, it leaves a gap, which might not be filled by other people in the participant's social network. To mitigate against this, some interventionists took an active role in promoting the social relationships within exercise interventions as key to avoiding the aforementioned 'dependency trap' [50]. For instance, in the study by Haas, Hermanns and Melin-Johansson [75], interventionists described buddying up participants, making explicit efforts to foster interaction during exercise classes.

Peers

The second most referenced relationship ($n = 44$) was with peers who were also participating in the intervention. Peers were highlighted throughout the studies as important in contributing to adherence and increasing scheme effectiveness [50,53,68]. Peers performed a variety of roles reflected in the following sub-themes: (1) opportunity to socialize with people in a similar situation; (2) role models; (3) accountability increases motivation.

Opportunity to socialize with people in a similar situation

Participants appreciated the opportunity to meet and socialize with others who were in a similar situation to them [8,12,46,47,54,68,70,71,85], particularly where their health conditions limited their day-to-day socializing. There was some discussion of the relative merits of interventions that involved meeting online vs. meeting in person in terms of opportunities for socialization [19], and it appears that whilst meeting online still has social value, meeting in person offered extra opportunities to be social. For example, by getting a coffee together after the session. Some interventionists worked to foster socializing opportunities by encouraging paired or team working or social activities after classes, and where this was encouraged, it supported adherence in the short and long term.

> There's almost a social side of the class, as well (…) couple of occasions where they're car-pooling (…) because they're coming in at the same time as Billy, and they can have a chat about whatever, so yeah, so that side of it as well that's a good retention. [60,p.7]

The focus on building up the social side of an intervention helped to foster a sense of belonging for participants, which enabled them to feel safe and to be seen as more than a patient [15,85].

Role models

Being with peers who had the same health condition provided role models for participants with whom they could compare themselves more realistically in terms of their expectations about what their physical limitations might be with their health condition [5,7,12,15,18,47,53,59,60,75,84]. Where interventions involved patients with the same condition, they appreciated being able to reach out to others who had experienced the same thing for information and support [15,84] and to socialize with others who understood their situation.

> You think you're the only one, and then you see somebody else's problems. (CR) And I found the whole process valuable, particularly going along with other people who had similar problems and sharing their problems with them. [54,p.105]

Exercising with other people with similar health conditions was an important basis for the bonds built in the groups and helped participants feel safe

Table 1. Relationships identified within the studies.

Relationship	Description	No. studies ($n = 63$)	References
Interventionists	The person delivering the intervention itself. This could be a physiotherapist, health or sports coach, researchers, or other exercise professionals.	52	[5–9,11–13,17–19,21,46–48,50,52–55,57,59–67,69–90]
Peers	Peers within the intervention group, who may or may not have the same health condition.	44	[4,5,7,8,10,12,15,17–20,45–47,50,53,54,56,59–61,63,64,66,68–71, 73–75,77,79–87,89,90]
Family	Family relationships, including partner/ spouse, parents, children, siblings, or extended family of participants.	39	[4,5,9,12,17,19–21,45,48–55,57–59,65,66,68–75,79,80,83,84,86–91]
Friends and acquaintances	Friends of the participants.	17	[5,20,45,48,49,51,55,58,66,71–73,80,84,87,88]
Health care professionals	Other health care professionals involved in the intervention or with the participants. Often these were the referrers, e.g. GP, nurse, paid carers	21	[10,11,17,18,21,45,48–51,54,55,57,61,70,73,75,78,83,86,90]
Community	Other people who may be around when the intervention is occurring but are not involved in it, e.g. other people using the gym. Also includes a 'sense of community' generated within intervention groups.	19	[5,10,20,50,59,60,62,66,72,73,77–79,81,83,84,88,90,91]
Lack of social interaction	Where loneliness is highlighted, where there is a lack of interaction with peers as part of the intervention, or as a result of the intervention ending.	8	[5,6,49,54,61,65,77,88]
Researchers	Researchers conducting the study.	7	[20,73,74]
Pets	Pets that have interacted with the physical activity intervention, such as taking a dog for a walk.	3	

and not stigmatized for their limitations [8,50]. Furthermore, exercising with people who had the same health conditions enabled a greater degree of knowledge sharing between participants, which helped them feel less worried and encouraged them to try new things [5,7,84].

Accountability increases motivation

Exercising with others was reported to increase motivation in participants through offering a sense of accountability to the group, some degree of competition, and seeing others achieve success, which provided hope and a goal to strive towards [4,8,10,12,15,33,50,68,73,74]. According to Vinson and Parker [62], social interaction was a much stronger motivation for attendance than exercise itself.

The social interaction was reported to help participants overcome their reluctance even if the exercises were difficult. It was also noted when the group support was withdrawn at the end of an intervention, some participants commented on their lack of motivation to exercise by themselves.

> It's challenging. It was helpful when I had the group, especially when we met every week. It was good to get that interaction and reinforcement from the group. So now… it's a little difficult. [55,p.8]

However, not all participants felt comfortable in a group environment. Some felt that being in a group reduced their one-to-one time with the interventionist [84], whilst others described feeling that they were being held back or holding the group back due to exercising at a different level [12,53,73,84]. In addition, poor body image [7,20] meant some participants were not comfortable exercising in a group setting.

Family

In the context of this study, family included spouses or partners, as well as relatives such as parents, children and siblings. The following subthemes emerged when considering family relationships: (1) support; and (2) caring for others as motivation.

Support

Family members were identified as key supporters for participants within the studies examined, with relatives providing practical support such as transport to venues [45,51,84], reminding participants to do exercises, and sometimes taking part in exercise themselves [4,9,19–21,54,55,58,59,65,70,71,75,79,84,87,88].

Table 2. GRADE CERQual assessment of qualitative findings.

Summarised review finding	GRADE-CERQual assessment of confidence	Explanation of GRADE-CERQual assessment	References
Interventionist: The role of an interventionist was shown to be important for participants, its main purpose included: providing encouragement and accountability, creating a sense of safety and developing tailored interventions and providing emotional support.	High confidence	Minor concerns regarding methodological limitations (including defining the role of the researcher and whether or not they were an interventionist), Minor concerns regarding coherence, No/Very minor concerns regarding adequacy, and Minor concerns regarding relevance (what exact role the interventionist played was not always clear).	[5–9,11–13,17–19,21,46–48,50,52–55,57,59–67,69–90]
Peers: Peers who were also participating in the intervention were highlighted throughout the studies as important in contributing to adherence and increasing scheme effectiveness and peers performed a variety of roles reflected in the following sub-themes: (1) opportunity to socialize with people in a similar situation; (2) role models; (3) accountability increases motivation.	High confidence	Minor concerns regarding methodological limitations, No/Very minor concerns regarding coherence, No/Very minor concerns regarding adequacy, and Minor concerns regarding relevance (the level of group interaction within the interventions in the studies varies)	[4,5,7,8,12,15,17–20,45–47,50,53,54,56,59–64,66,68–71,73–75,77,79–87,89,90]
Family: Family included spouses or partners, as well as relatives such as parents, children and siblings. The following subthemes emerged when considering family relationships: (1) support; and (2) caring for others as motivation.	High confidence	Minor concerns regarding methodological limitations, No/Very minor concerns regarding coherence, No/Very minor concerns regarding adequacy, and Minor concerns regarding relevance (given the variety of contexts in which family were involved in the studies)	[4,5,9,12,17,19–21,45,48–55,57–59,65,66,68–75,79,80,83,84,86,88,89,91]
Friends: Friends performed a supportive role for participants, accompanying them during exercise and reflecting back changes seen in the participant as a result of the schemes	Moderate confidence	Minor concerns regarding methodological limitations, Moderate concerns regarding coherence (as not all friends were supportive), Minor concerns regarding adequacy, and Minor concerns regarding relevance	[4,5,13,20,45,48,49,51,55,58,66,71–73,80,87,88]
Healthcare professionals: A variety of healthcare professionals were mentioned in the studies, with doctors, including General Practitioners (GPs) regularly reported to have a significant impact on participant motivation on physical activity interventions.	Low confidence	Minor concerns regarding methodological limitations, Moderate concerns regarding coherence (some contradictory views on the role of HCPs expressed in the underlying data but not reflected in finding), No/Very minor concerns regarding adequacy, and Moderate concerns regarding relevance (the diverse roles of the HCPs mean there is significant variation in the context of the studies).	[10,11,17,18,21,45,48–51,54,55,57,61,70,73,75,78,83,86,90]
Researchers: Some researchers built a connection with the participants due to their involvement in the interventions, and these relationships were reported to be motivational, because participants felt responsible for the quality of the data collected and the research project being able to run.	Moderate confidence	Minor concerns regarding methodological limitations, No/Very minor concerns regarding coherence, Minor concerns regarding adequacy (only 7 studies refer to this relationship), and Minor concerns regarding relevance (the line between researchers and interventionists wasn't always clear)	[9,49,55,65,67,77,83]
Pets: Pets were enablers to physical activity as they accompanied the participants on walks or runs, and had their own physical activity needs which had to be met.	Low confidence	Moderate concerns regarding methodological limitations, No/Very minor concerns regarding coherence, Serious concerns regarding adequacy (only 3 studies were included and the data was superficial), and No/Very minor concerns regarding relevance	[20,73,74]

(*continued*)

Table 2. Continued.

Summarised review finding	GRADE-CERQual assessment of confidence	Explanation of GRADE-CERQual assessment	References
Lack of social interaction: In studies where there was little or no in-person interaction, some participants reported the subsequent sense of loneliness as a barrier to intervention adherence.	Moderate confidence	Minor concerns regarding methodological limitations, No/ Very minor concerns regarding coherence, Moderate concerns regarding adequacy (it is not a theme explored in depth within the studies), and Minor concerns regarding relevance (the isolation described is sometimes prior to the intervention)	[5,6,49,54,61,65,77,88]

> So she [wife] takes an interest in what I have been told and whatever. It's good for us both, 'cause everything I do or am told to do she does. [59,p.7]

Spouses were most frequently mentioned in terms of family members who offer support, as well as children. Some studies actively or unintentionally involved a partner in the intervention [4,20,21,54,65,75,87], and where this occurred, it had a positive impact on adherence and also had positive impacts on the family member who was involved.

Family members also played an important role in reflecting on behaviour and health changes with participants [9,73,79,80,84] which gave them a new perspective on their progress.

On the reverse side of this, when family were not supportive, this acted as a barrier to adherence. If family members were opposed to the exercises, fearing that they might cause harm [45,54,74], this obstructed participant involvement.

Caring for others as motivation

Family also played a broader motivational role, with participants in the studies citing health conditions of family members as motivation to take care of their own health [66,70,79,80]. In addition, some participants mentioned a desire to be available for family members who they care for by improving their health through the physical activity intervention [45,59,83,84].

> My wife had a bleed into her brain … she's still very ill … so one of the motivating features for coming on this [Exercise Referral Scheme] was well getting my back seen to you know … because I can't afford to be ill now … because of carting my wife around in wheelchairs and things. [56,p.119]

However, family members who required care could also act as barriers to adherence, as caring duties took priority over taking part in the intervention for some participants [12,20,54,55,69,71,74,75,84]. Therefore, caring responsibilities proved both a motivating factor and a barrier to adherence, as carers wanted to be as healthy as possible for the people they were caring for, but caring duties sometimes took precedence over exercise [49].

Friends

Much like with family, friends performed a supportive role for participants [48,49,71,72], accompanying them during exercise and reflecting back changes seen in the participant as a result of the schemes [51,55,71,73,80].

Family and friends gave the participants positive feedback: 'Everyone was very curious about what I had started on now' [4,p.9].

'Friends' are often referred to in combination with family but also in reference to peers on the schemes, suggesting that this term covers a diverse range of people. However, they do not figure prominently in the studies, suggesting that their impact on participants is perhaps more removed or interrogated less when evaluating physical activity interventions.

Health care professionals

A variety of healthcare professionals were mentioned in the studies, with doctors, including General Practitioners (GPs) regularly reported to have a significant impact on participant motivation on physical activity interventions [12,13,50,51,54,55,70,75,83,90]. Both in terms of the schemes relying on enthusiastic GPs to refer patients and the advice of GPs acting as a wake-up call for participants to address their health issues [50,51,54,55,70,75].

> When I got it on prescription, it became a little more serious. Now I have this prescription. It's just like medicine, the doctor prescribes a pill a day, instead the doctor prescribed water exercise once a week and then you have to go. [46,p.5]

Nurses [10,54,57,70,90] and formal carers [11,21] were also identified as important relationships in relation to the physical activity interventions in terms of referring and supporting participants. For participants with formal carers, involving them in the interventions meant that carers were able to support participants and inform interventionists about the participants' wellbeing and mental state. However, they were not as closely involved as family members, and no strong relationships between

formal carers and participants were discussed, suggesting a more utilitarian relationship.

Community

As well as immediate peers, the broader social context in which the interventions occurred also had an impact on participant experiences. For example, some interventions occurred in gyms or leisure centres where people who were not part of the intervention were also using the space [5,20,60,83,84]. This wider community was described largely positively as welcoming and encouraging [5,20,60,73,80,83,84,90].

In terms of the positive aspects, some participants appreciated being around others who did not share their health condition and being made to feel welcome.

> Experiencing social connection with regular gym members assisted the participants in feeling socially included and valued. … 'I like being with other people. So it's not all, um, walkers and oxygen tanks'. [5,p.27]

By contrast, a fear of community exercise venues such as gyms shaped the way some interventions were offered. Some participants feared being around young, fit people who would be exercising at a higher intensity than them and some had misconceptions as to what a gym environment was like. To help assuage these fears interventions were offered in groups with other people with health conditions [48,78], and at quieter times in the gym [50,60].

> They are just worried about what people will think of them, they think the people there, everyone there is going to be fit, in their lycra and looking really smart. [50,p.6]

With ongoing and independent exercise in mind, some interventionists worried about the gap between intervention schemes and the wider gym or leisure centre community, and they made efforts to integrate participants into community exercise before the intervention finished.

Respondents were concerned about patients not being able to continue with behavioural change achieved within a CLI after the intervention was finished. An important facilitator in this respect was creating a good transition to regular sports clubs and facilities; i.e. outside of the health care sector [9,p.4].

For the team sports-based interventions, there was automatically a wider community present, such as with the football clubs in the study by Roed et al. [90], which provided a clubhouse with a café, and non-health condition specific football teams. The degree to which the intervention group interacted with the other football teams available at their clubs was unclear, although it was suggested that the relaxed experience of sharing between the intervention group did not translate well to the general teams, with the same openness about their health conditions not being possible in a mixed group.

Researchers

For some participants, simply taking part in a research study added an extra element of motivation, because they felt responsible for the quality of the data collected and the research project being able to run [9,12,55,65,83].

> Participants reported … they felt a sense of moral obligation to do the exercises. They did not want to waste time or valuable research resources [10,p.4].

For the majority of the studies, the researchers were external to the intervention and had no prior relationship to the participants or interventionists who took part in the research. However, in some studies, researchers become more involved in the intervention due to the way the research was being conducted. For example, in the study by Frensham et al. (2018), the researchers used daily reporting on walking to set step goals for participants and interacted *via* a website set up for the intervention. Participants appreciated this interaction and reported it as a motivating factor.

Pets

In a few studies, pets were mentioned as enablers to physical activity [20,73,74], as they accompanied the participants on walks or runs, and had their own physical activity needs which had to be met.

Lack of social interaction

In some studies where there was little or no in-person interaction, some participants reported the subsequent sense of loneliness as a barrier to intervention adherence [6,65].

> I feel more motivated if I have to go to the centre, it gets lonely having to do exercise by yourself [6,p.10].

Similarly, several studies reported participants felt lonelier after the intervention ended, as a regular social fixture was removed [54,65], and this affected their ongoing adherence to physical activity.

Discussion

The role of social relationships has been an area of interest for sociology of health since the time of Emile Durkheim, and his study identifying a link

between social relationships and suicide [92]. More recently, an article by Howick et al. [93] argued that there is evidence of a causal link between social relationships and health, with supportive relationships actively contributing towards better health and greater longevity. Research following this has explored the role of significant relationships, such as those of the spouse [94], and family members [95], in affecting physical activity and health. Whilst the quantitative evidence for the impact of social support on physical health remains mixed [96], it is frequently raised in qualitative research [24], and, given its complex nature, is perhaps more suitable for being explored qualitatively.

This paper has contributed to this discussion by exploring the relationships identified in physical activity interventions as detailed in 54 studies. It focused on the role of nine different relationships between intervention participants and those around them. Including their relationship with the: interventionists, peers, family, friends, healthcare professionals, community, researchers, pets or a lack of social interaction. The relationships identified here start to build a picture of the social networks that exist for participants of physical activity interventions, and the role these networks play.

Looking firstly to the relationship with the interventionist, which is central within many of the interventions examined here, these individuals are key as they provided accountability, encouragement, a sense of physical safety, individually tailored exercises, and emotional support, as discussed above. Building rapport with participants necessarily results in an emotional connection, and it is this personal and emotional element which makes consideration of the role of 'personal relationships' relevant and important for physical activity interventions [24,97]. Whilst the relationship is a professional one, to enhance participation and adherence, it requires something more from interventionists, to be sensitive to the emotional and social needs of participants, as well as their physical needs [53,62,71,97].

The relationship with peers was also a key factor in many studies, with 38 studies reporting on it. However, it should be noted that the distinction between one-to-one and group-based interventions was not always clear-cut. Nine studies consisted of both one-to-one and group sessions [8,12,15,20,22,47,68,73,85]. In the intervention by Lange et al. [73] some of the participants informally organized their own group sessions, which strengthens the argument that group interactions are important in motivating participants on physical activity interventions. The findings from the included studies revealed that being around people who understood their condition helped participants to feel safe in the intervention environment, encouraged bonding between participants and adherence to the intervention. The first-hand experience shared by peers was highlighted as distinct from the technical understanding held by interventionists and healthcare professionals [84] and brought a different dimension to the interventions. To what extent it mattered that their peers were people with the same health condition would be a useful question to explore in more depth. The relationship with peers also helped to scaffold and build on the support offered by interventionists. Peers with the same health condition were particularly valued because they understood the participants' experiences and were able to offer knowledge gained from their own health journey [7,12,15,17,45,47,53,75,84].

However, not all participants appreciated exercising in a group, as some felt that it reduced direct interaction time with the interventionist [84], and feelings of comparison [12] and poor body image acted as a barrier [7,20,23]. Therefore, whilst group exercising has many benefits, it cannot be a one size fits all approach for exercise interventions.

The role of family relationships was also suggested to have an impact on adherence. The study by Scott et al. (2015) described a conflict between the values of family and exercise for participants, with family value taking precedence for unsuccessful maintainers. This reveals the significant role that personal relationships have on an individual's drive and ability to take up new physical activity habits, as well as the practical barriers they may face in making physical activity interventions a part of their everyday life. However, when family members had been involved in the intervention, this allayed any fears the family members had and engaged them as supporters for the participants [63]. Where family members were supportive this positively impacted adherence, and the studies which engaged family members had positive outcomes. This suggests that actively involving family members in exercise interventions could improve adherence, and there is some support for this in the systematic review of spouse-involved physical activity interventions by Richards et al. [36].

Friends fulfilled a similar supportive role to family in the studies which mentioned them [51,55,71,73,80] however, their role was not thoroughly explored, suggesting that they played a less significant role or that they were considered outside the scope of the studies. The extent to which peers became considered friends was not explored, although some studies made it clear that peers fulfilled a particular role in terms of their mutual understanding of the long-term health condition [90].

Health care professionals were often more in the background of the physical activity interventions, but the participants' relationship with them also played a key role in accessing the interventions [18,70]. For example, if they were referred to an intervention by their GP, the enthusiasm and confidence of the GP had an impact on participant motivation and adherence. Having confident and supportive referrers was key for participants attending interventions in the first place [10,45,51,75], and whilst they played little role in the interventions beyond the initial referral, the way this was done was important [70].

In terms of a broader community, this was only lightly touched on in the studies analyzed here [5,10,20,50,60,73,83,84,90], suggesting it forms a more peripheral or contextual factor. However, research suggests that these more tenuous relationships are also important for well-being [98] and in terms of forming a wider social network from which benefits can be drawn [96]. However, the relationship between the size of social networks and the benefits provided is not linear, for example, the research by Dhand et al. [99] found that for patients post-stroke, their social network shrank, but the relationships that remained exhibited better health behaviours, such as not smoking. This highlights the complexity surrounding how social relationships impact upon health and the importance of understanding this when designing health interventions.

Albeit in a limited number of studies, it is also interesting to note that researchers were identified as a pertinent relationship within some of the physical activity interventions [9,55,65,67,83]. It is a strength of qualitative research that this relationship could be acknowledged as part of the research process. The role of the researcher appeared to be motivational, with the participants reporting a sense of responsibility towards them and the study [83] and this encouraged compliance with the intervention [55,67].

The supportive role of pets has not been extensively explored in health research, although there are studies that highlight the positive role dog ownership has on walking [100] and mental health [101]. The studies examined here corroborated with these findings, with pets being mentioned as an enabler to physical activity [20,73,74].

A lack of social interaction is just as significant as the relationships explored here, acting as a barrier to adherence [6,65]. The impact of loneliness on poor health outcomes has been widely reported on [30] and the studies examined here have demonstrated how physical activity interventions can become a source of social interaction and support, which is particularly valued by those who suffer from loneliness and isolation [54].

Strengths and limitations

From our knowledge, this is the first qualitative systematic review to synthesize the available evidence concerning the types of relationships involved in physical activity intervention for adults with long-term health conditions. Thus, it addresses a knowledge gap in the emerging literature on the salience of relationships and social networks in health intervention schemes. We performed a comprehensive search in nine databases and performed an update search to ensure all relevant literature was captured in the review process. All team members participated in the screening, critical appraisal and data extraction of the studies to ensure a robust and reflective approach. The review team included academics, practitioners and policymakers, and this diversity of membership was a strength because it brought both a critical research approach and a greater understanding of physical activity interventions to bear on the analysis of the data.

Whilst this study methodology was thorough, it necessarily had some limitations. Studies that were not published in English and grey literature were not included in this review. Furthermore, the JBI Critical Appraisal tool [38] used by the review team was originally designed for qualitative studies, and some studies included in our systematic review had a mixed-methods study design. Nonetheless, we still found it appropriate to examine the studies included using this appraisal tool to ensure the quality of individual studies was given careful consideration.

Implications for future research and practice

This qualitative systematic review highlights the importance of social interaction as a part of physical activity interventions, not only as a supportive component within the schemes but also as part of a wider context in which a participant's personal relationships (or lack of them), can impact on their mental health and motivation to exercise.

However, studies included have not followed up with participants to establish the longer-term experiences of such interventions or to see which relationships remain significant for their ongoing physical activity journey. Our findings suggest that future research should have a more relational focus to enable a better understanding of how participants' social networks support them both during and after taking part in a physical activity intervention. This research could shed new light on the social dimensions of physical activity behaviour change and

ultimately help to explain how to improve its longevity.

Future evaluations could also explore the effect of physical activity interventions more widely, by also examining close family members of participants with long-term health conditions. This would widen the scope of impact for physical activity interventions, revealing new benefits and barriers that exist beyond the participants themselves.

For future practice, a greater consideration of social factors when designing physical activity interventions could help to increase adherence within such interventions. For example, involving family members and carers in the activities could help to overcome barriers to adherence around poor support from family members, and engage supportive family members more actively. Likewise, it could link group activities to the wider community, so participants have a natural transition into community activities once their intervention has finished, helping to overcome the social isolation and subsequent lack of motivation participants felt when the intervention ended. Drawing on the sociological research around relationships and social networks could also bring greater insight into the design of more relationally focused interventions.

Conclusion

In this qualitative systematic review, 54 articles were identified that reported on the qualitative experiences of relationships for participants in physical activity interventions. Nine relationships were identified, including: interventionists, peers, family, friends, healthcare professionals, community, researchers, pets, and a lack of social interaction. An analysis of these relationships showed that social relationships clearly play a key role in motivating participants in physical activity interventions.

Participant's relationships with the interventionists supported their engagement in the schemes, as did interacting with peers on the schemes. Family and friends were also important in supporting and encouraging attendance, but family could also function as a barrier if they were unsupportive, or if participants chose to prioritize caring duties over attendance. As referrers, health care professionals had a great deal of power over who was referred, and how they were referred had an impact on how many referees went on to take part in the interventions. Other relationships, such as with the researchers or the wider community highlighted that each participant is part of a broader social network, and a more holistic view of participants as part of a bigger social network may uncover new insights and approaches to improve physical activity interventions in the future.

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