BMJ open
accessible medical research

Exercise referral for drug users aged 40 and over: results of a pilot study in the UK

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To cite: Beynon CM, Luxton A, Whitaker R, *et al*. Exercise referral for drug users aged 40 and over: results of a pilot study in the UK. *BMJ Open* 2013;**3**: e002619. doi:10.1136/bmjopen-2013-002619

▸ Prepublication history and additional material for this paper are available online. To view these files please visit the journal online (http://dx.doi.org/10.1136/bmjopen-2013-002619).

Received 25 January 2013
Revised 21 March 2013
Accepted 10 April 2013

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ABSTRACT

Objectives: To test whether older drug users (aged 40 and over) could be recruited to an exercise referral (ER) scheme, to evaluate the feasibility and acceptability and measure the impact of participation on health.

Design: Observational pilot.

Setting: Liverpool, UK.

Participants: (1) 12 men and 5 women recruited to ER. (2) 7 specialist gym instructors.

Outcome measures: Logistic feasibility and acceptability of ER and associated research, rate of recruitment, level of participation over 8 weeks and changes in health.

Results: 22 gym inductions were arranged (recruitment time: 5 weeks), 17 inductions were completed and 14 participants began exercising. Attendance at the gym fluctuated with people missing weeks then re-engaging; in week 8, seven participants were in contact with the project and five of these attended the gym. Illness and caring responsibilities affected participation. Participants and gym instructors found the intervention and associated research processes acceptable. In general, participants enjoyed exercising and felt fitter, but would have welcomed more support and the offer of a wider range of activities. Non-significant reductions in blood pressure and heart rate and improvements in metabolic equivalents (METs; a measure of fitness) and general well-being were observed for eight participants who completed baseline and follow-up assessments. The number of weeks of gym attendance was significantly associated with a positive change in METs.

Conclusions: It is feasible to recruit older drug users into a gym-based ER scheme, but multiple health and social challenges affect their ability to participate regularly. The observed changes in health measures, particularly the association between improvements in METs and attendance, suggest further investigation of ER for older drug users is worthwhile. Measures to improve the intervention and its evaluation include: better screening, refined inclusion/exclusion criteria, broader monitoring of physical activity levels, closer tailored support, more flexible exercise options and the use of incentives.

ARTICLE SUMMARY

Article focus

- We examined the feasibility and acceptability of using exercise referral (ER) to improve the health of older drug users (aged 40 or over).
- As a secondary aim, we assessed various health indicators at baseline and follow-up to provide an estimate of possible changes.

Key messages

- We demonstrate that older drug users are keen to participate in ER but multiple health and social challenges impact upon regular attendance.
- Participants found ER and the associated research acceptable; ER instructors reported no problems working with this patient group.
- We observed positive changes in health, including a significant association between fitness (measured by metabolic equivalents) and attendance.

Strengths and limitations of this study

- This is the first study to explore older drug users' perceptions of an ER scheme and the use of physical activity to improve health.
- We have identified the need for: better screening of participants, refined inclusion/exclusion criteria, closer tailored support, more flexible physical activity options, broader monitoring of physical activity levels and the use of incentives to encourage participation at postintervention testing.
- We made no attempt to select participants randomly, nor use a control group.

BACKGROUND

An increasing number of people addicted to illegal drugs are living into old age.[1–4] In Cheshire and Merseyside, UK, the number of older drug users (defined as aged 40 and over[3]) in drug treatment has increased from 750 in 1998[1] to 6500 in 2010/2011 (data available from the Public Health Observatories), a rise of almost 800%.

National figures show that older drug users make up almost a third of the drug-treatment population (n=59 000).[5] While drug users are living longer, their life expectancy averages half that of the general population.[6] Older drug users have considerable health needs, including circulatory, liver and lung problems, cancer and mental health conditions, which occur at a relatively young age.[4 6–8] Managing these conditions and preventing further functional decline currently present a challenge and cost to the National Health Service; strategies to deal with problems resulting from long-term drug use are urgently needed.[9] The focus of UK drug policy is recovery, a key element of which is well-being.[10] For older drug users, who usually have a long history of opiate use and have been in and out of treatment many times,[3 8 11] different options need to be considered in order to improve their health and well-being.

In recognition that regular physical activity contributes to the prevention and management of many medical conditions,[12] the UK has experienced a proliferation of exercise referral (ER) schemes, defined as a process whereby a health professional: "Directs someone to a service offering an assessment of need, development of a tailored physical activity programme, monitoring of progress and a follow-up. They involve participation by a number of professionals and may require the individual to go to an exercise facility such as a leisure centre" (ref. 13, p.5). Pavey *et al*[14] identified no long-term effect on physical activity from ER schemes, but called for further research on ER for specific clinical groups.

Drug users report being interested in sport and exercise, engage in physical activities, know that participation conveys health benefits and demonstrate a durable commitment to these activities.[15–18] In some countries, physical activity programmes have been an important part of the drug treatment process.[19] We conducted a review of the literature on the use of exercise as an intervention to reduce substance use and/or improve health and identified nine studies, all of which reported benefits of exercise and all called for further investigation into its use as an adjunct to traditional treatment modalities.[20–28] A search of the metaRegister of Control Trials (http://www.controlled-trials.com/mrct/) identified no completed/withdrawn trials on the use of exercise to improve the health/reduce drug use of drug users and we conclude that the positive findings identified in our review were not a result of publication bias. However, the nine studies varied in terms of the intervention, its duration and sample characteristics; the methodological quality/design varied and retention rates were not always reported. Therefore, it was not possible to identify which components of physical activity interventions consistently influenced outcomes (phase I of the process of developing randomised controlled trials (RCTs) of complex interventions).[29] Furthermore, no study evaluated the impact of exercise on health among drug users aged over 40 specifically.

We therefore determined the need for feasibility work into the use of ER for older drug users. The aims of this pilot were to ascertain whether we could identify 20 older drug users willing to take part in ER, to measure the rate of recruitment, to assess the feasibility and acceptability of ER and the associated research processes and to measure the level of participation over 8 weeks. Secondary aims were to measure changes in health and well-being and to inform the power calculation for a pilot RCT.

METHODS

Participants and recruitment

The participating drug service was Addaction Shared Care (Liverpool); Addaction is the largest drug treatment provider in Liverpool and was supportive of the research. At any one time, Liverpool Addaction Shared Care services care for approximately 1000 older drug users. Shared Care services provide specialist treatment (largely opiate substitute prescribing and structured psychosocial interventions) in conjunction with general practitioners (GPs).[30]

Older drug users were recruited via two methods. First, two Service User Representatives (SURs; people with a history of drug use who provide advocacy) introduced the study to eligible peers. Second, drug workers in Addaction discussed the study with eligible patients. People were eligible if they were aged 40 or over, were actively using illicit drugs and/or were in contact with addiction services and their GP consented to them becoming more physically active. Drug workers and SURs gave potential participants an information pack (an information sheet which included a description of what participation would involve and risks/benefits, and a reply form) and answered questions. SURs and drugs workers were given a set number of packs so the rate of recruitment could be measured. The SURs completed a Balke test (described below) so they were able to explain this to participants. People who were interested in taking part sent their contact details to the research team. The research team sought GP consent. Recruitment lasted 5 weeks (27 January 2012 to 5 March 2012). Before starting the study, a researcher went through the information sheet with each participant, answered any remaining questions and recorded consent.

This pilot also included the collection of qualitative data from the ER instructors involved in the programme. They were contacted by email or telephone and invited to participate in a short interview which occurred in May 2012 when all participants had completed the exercise intervention.

Exercise intervention

Participants were asked to attend the gym twice a week for 8 weeks. In recognition that cost is a barrier to ER participation for people from lower socioeconomic groups,[31] participants were given a bus pass, sports

clothing (maximum value £60) and a 2-month gym membership at Lifestyles gyms which are operated by Liverpool City Council. Experienced instructors (Professional Fitness Instructor Level 3, or equivalent, with a recognised ER qualification) delivered ER. SURs accompanied participants to their gym induction so that participants did not have to enter the gym alone.

Tools and measurements

Prior to gym induction, all participants attended Liverpool John Moores University in order to complete a series of assessments: height, weight, resting heart rate, resting blood pressure, Balke test and EQ-5D-3L questionnaire.[32] The Balke test involved walking on a treadmill of increasing incline until self-prescribed exhaustion. Data on the time taken to reach exhaustion and the treadmill speed at that point were used to calculate metabolic equivalents (METs), a measure of oxygen consumption which describes functional capacity (physical fitness).[33] Blood pressure and heart rate were measured using an automated sphygmomanometer and a Polar Heart Rate Monitor, respectively. Body mass index (weight in kg/height in m^2) was calculated in accordance with National Health Service tools (available at: http://www.nhs.uk/livewell/loseweight/pages/bodymassindex.aspx). Mean arterial pressure was calculated as follows: (systolic pressure−diastolic pressure)×0.3333+diastolic pressure. The five domains of the EQ-5D-3L were used to produce a single index using a validated algorithm.[34] We also utilised the EQ-5D-3L Visual Analogue Scale (0=worst imaginable health, 100=best imaginable health). After 8 weeks, participants revisited the laboratory and completed follow-up tests: Balke test, resting heart rate, resting blood pressure, weight and EQ-5D-3L.

Participation in gym sessions were measured electronically in two ways. First, at gym entrances by scanning the membership card and then by preprogrammed keys which participants inserted into gym equipment (the equipment could be operated without the key but with no reference to their gym programme). Additionally an SUR telephoned participants weekly to ask how many times they had attended the gym that week.

Stakeholder perspectives

At baseline, participants completed a brief structured interview where notes were taken; questions focused on their aims, expectations, fears about exercise and current levels of activity. At 8-week follow-up, questions focused on their experiences of ER, the research and how these could be improved.

Semistructured topic-guided telephone interviews were conducted with ER instructors. The topic guide, developed by the research team, explored the key issues raised by the pilot as it was experienced by the instructors (views of working with this client group, feasibility issues, suggestions for what worked well and what could be improved, and perceptions of being involved in the pilot). Interviews were relatively short (average: 15 min, longest: 30 min) to fit into the instructor's working day and were recorded. Interviews focused on obtaining opinions on key aspects of the pilot however opportunity was given for the instructors to add points and elaborate on issues they thought were important. Further probing questions were asked if the researcher deemed it necessary.

Data analysis

Data were collected on participants both before and after the intervention. There were no missing data at baseline. Paired t tests were used to compare the means before and after the intervention; only participants with complete before and after measures are included. Owing to the small study size, no imputation was carried out to estimate the missing values. Analysis of covariance (ANCOVA) was used to explore the factors that may affect the changes of any of the health measures.

The correlation analysis of three approaches to record the attendances used the Pearson's correlation coefficient, with its significant test and a Bland Altman assessment of bias.[35] The purpose was to identify the optimal objective approach to collecting attendance data which minimised the data loss.

For qualitative interviews with the ER instructors, transcripts were grouped into broad themes and interpretative coding was used. The validity of the range of interpretations and suggested relationships between these core themes were explored and tested against the data using the constant comparative method[36] accounting for deviant cases.[37]

Ethics

The study was granted approval by the Liverpool John Moores Research Ethics Committee.

RESULTS

Recruitment

Addaction staff were keen to participate in the study but recruitment was initially slow so a reminder was sent on 22 February 2012. The staff photocopied the information packs in order to distribute to potential participants; as the number of additional packs generated was not recorded, we were unable to accurately estimate the proportion of eligible people who were approached and declined. Recruitment of exercise participants ceased on 5 March 2012 because the research team had received 26 participant reply sheets; nine via the SURs, 16 via the drug service and one was referred through a participant who had been accepted onto the project. Only one GP did not respond to the research team, all GPs that did respond gave consent. In total, 22 baseline testing sessions and gym inductions were arranged and 17 were completed (uptake rate=77%).

Exercise participants

Five women and 12 men participated and baseline measures are detailed in table 1. All but one fulfilled the

eligibility criteria; one participant was not actively using drugs and was not in contact with a drug service having just been released from prison. However, a discussion with this person suggested that she was at a risk of relapse into drug use so was accepted onto the study recognising that drug use is a long-term, relapsing condition.

Attendance

There was a high correlation between the attendances recorded by membership swipe cards and gym keys (r=0.93, p value<0.001, with a Bland Altman bias of −0.65, 95% limits of agreement=−5.19, 3.89), although there were instances where the key failed to note an attendance recorded by the membership card and visa versa (see online supplementary tables S1 and S2). We created a new attendance variable by combining both these sources of attendance data: 'electronically verifiable' attendances. The verbal reports given to the SURs were higher than the number of electronically verifiable attendances, the mean difference being 7.1 (95% CIs 3.3 to 17.6; range 1–17.5) per week. The correlation coefficient between using the verbal and electronically verifiable method of attendance report is 0.85 (95% CIs 0.62 to 0.94, p value<0.001), with a Bland Altman bias of 3.35 (95% limits of agreement=−5.99, 12.70).

Figure 1 details total attendance by the number of attendances and the number of weeks. Five participants attended the gym in week 8 and a further two (IDs 3 and 18) were keen to continue once their illness and caring responsibilities were resolved (figure 2). The mean weeks of attendance for the 17 participants was 4.8 (SD=3.1, range 0–8) and the mean number of gym attendances was 6.8 (SD=6.5, range 0–24). Three people did not exercise after their gym induction. For the remaining seven participants, reasons cited for terminating contact were: illness (N=2; chronic obstructive pulmonary disease and leg ulcers), caring responsibilities (N=1), entered residential drug detoxification (N=1) and unknown (N=3).

Health measures

Eight participants had premeasures and postmeasures for blood pressure, heart rate and METs, and 12 participants had pre-EQ-5D-3L and post-EQ-5D-3L data because four completed the EQ-5D-3L by phone but did not attend the follow-up laboratory session (table 2). No evidence of significant changes was observed. Both the baseline and the postintervention MET values were high relative to the participants' age-predicted value of 9 METs,[38] a finding accounted for by relatively high levels of physical activity.

To explore the factors that have potential effect on the changes, individual differences were taken between prevalues and postvalues of seven variables (table 3). The changes on each health measure were tested against the six factors separately. Height was a significant factor influencing the diastolic blood pressure, and therefore the mean arterial pressure. Weight and the number of weeks completed were significantly associated with METs, while age and the number of attendances appear to be other potential factors affecting METs changes.

Preintervention interviews with participants (N=17)

Fifteen participants wanted to take part in order to improve their health/fitness/an underlying medical problem. Other reasons included to lose weight, initiate a healthier lifestyle, meet new people, fill time, try something new, increase self-esteem, increase quality of life, provide a break from caring responsibilities and get back into sports. Participants' expectations of what they could achieve were largely related to their reasons for joining the study: improve health/fitness, improve breathing, lose/gain weight, improve appearance/tone up, meet people, improve confidence, extend life expectancy, increase motivation for other things, better

Table 1 Summary of participants' baseline characteristics

	Males N=12		Females N=5		Total N=17	
Variables	**Mean (SD)**	**Range**	**Mean (SD)**	**Range**	**Mean (SD)**	**Range**
Age	47.3 (6.8)	40.5–60.7	43.4 (1.6)	41.6–45.4	46.1 (6.0)	40.5–60.7
Height	174.2 (5.4)	167–186	163.1 (6.9)	156–174.5	171 (7.7)	156–186
BMI	26.7 (5.8)	18.8–36.0	25.5 (5.1)	19.7–31.6	26.3 (5.4)	18.8–36.0
Weight	80.7 (16.2)	56.5–106.4	67.3 (10.9)	52.7–80.9	76.8 (15.8)	52.7–106.4
Exercise a week before baseline (min)	177.7 (147.3)	0–480	328 (315.2)	80–840	221.9 (211.5)	0–840
SBP	144.3 (17.4)	118–172	132.4 (26.8)	108–173	140.8 (20.5)	108–173
DBP	82.7 (8.4)	71–97	81.6 (14.3)	67–101	82.4 (10.0)	67–101
MAP	103.2 (8.5)	88.7–117.3	98.6 (15.7)	80.7–116.0	101.9 (10.8)	80.7–117.3
Rest heart rate	80.6 (10.2)	61–95	86.4 (9.9)	71–98	82.3 (10.2)	61–98
METs	12.0 (3.1)	5.3–15.6	11.6 (3.1)	8.9–15.6	11.9 (3.0)	5.3–15.6
EQ-5D-3L index	0.83 (0.2)	0.52–1	0.68 (0.2)	0.26–0.85	0.8 (0.2)	0.26–1
EQ-5D-3L VAS	65.2 (24.8)	30–100	43.2 (26.9)	5–80	58.1 (26.7)	5–100

BMI, body mass index; DBP, diastolic blood pressure; EQ-5D-3L index and EQ-5D-3L VAS, EQ-5D-3L quality of life index and visual analogue scale scores, respectively; MAP, mean arterial pressure; METs, metabolic equivalents; SBP, systolic blood pressure.

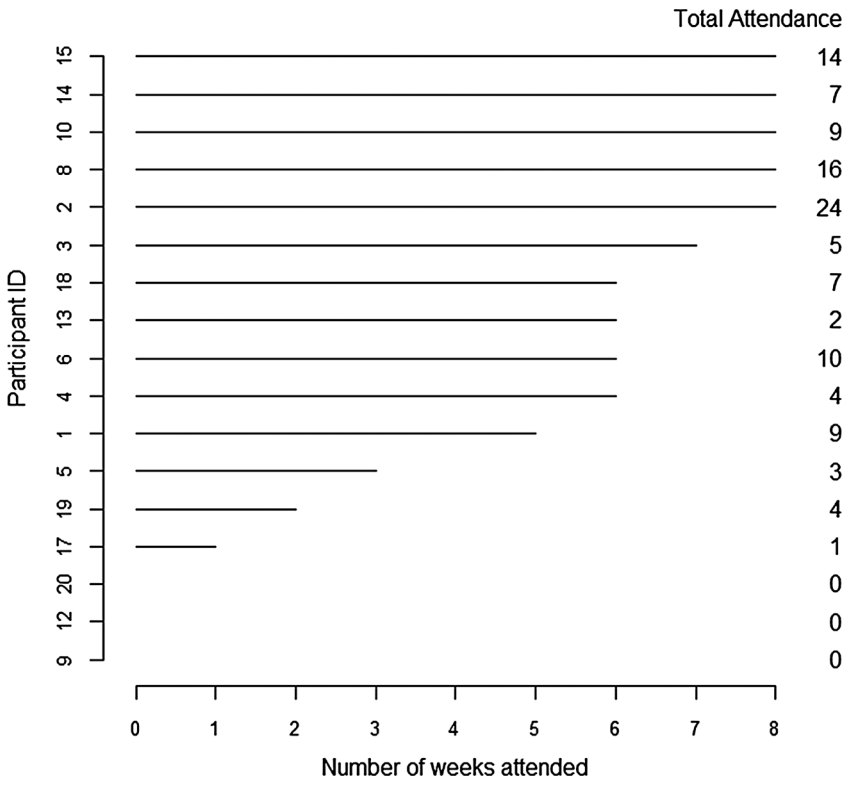

Figure 1 Weeks attended and total number of attendances per participant.

oneself, encourage a healthier lifestyle, reduce anxiety, keep occupied and help reduce drug use. Four participants expressed fears about participation: concern about the perceptions of other gym attendees towards them, lacking motivation and the possibility that underlying medical conditions would be exacerbated or would limit their ability to exercise.

Postintervention interviews with participants (N=12)

Positive feedback

When asked specifically if they felt participating in ER had had a positive impact on health and well-being 11 participants said that they felt fitter/healthier. Other benefits were: mixing with others, overcoming self-consciousness, improving self-esteem and confidence, having a reason to get up and out of the house and providing an opportunity to relieve stress. Two participants said that they had started healthier eating and two stated that they had reduced their smoking. All participants who took part in the follow-up interview, including people that did not attend the gym in week 8, stated that they would like to participate further. All participants found the Balke test acceptable. Participants were generally positive about instructors; the induction had been good and instructors were helpful and approachable and available if needed. Some participants said that their instructor actively sought them out in order to review their programme.

Negative feedback

One participant said that she had overdone it and exacerbated her breathing difficulties, causing her to feel unwell and drop out in week 6. Some participants reported little or no postinduction contact with their instructor and felt they would have benefited from more support. Participants could not always use the key to operate gym equipment.

Facilitators of attendance

Three participants liked the flexibility of not attending at set times. Participants said that they would like to take part in a wider range of activities: classes (yoga, Pilates, Zumba), outdoor activities, boxing training, football, swimming and running.

Barriers to attendance

Barriers included exercising with underlying illnesses, time constraints due to caring responsibilities and motivation. Two participants found the gym environment intimidating.

Interviews with instructors

Three women and four men were interviewed; most had been instructors for over 10 years (see online supplementary table S3). Generally, instructors had no difficulty working with these participants

> she was fine, she was good, nice to see some enthusiasm.

Instructors saw these participants as any other GP referral client and stressed the importance of ensuring that they were not 'singled out' (stigmatised) for being drug users

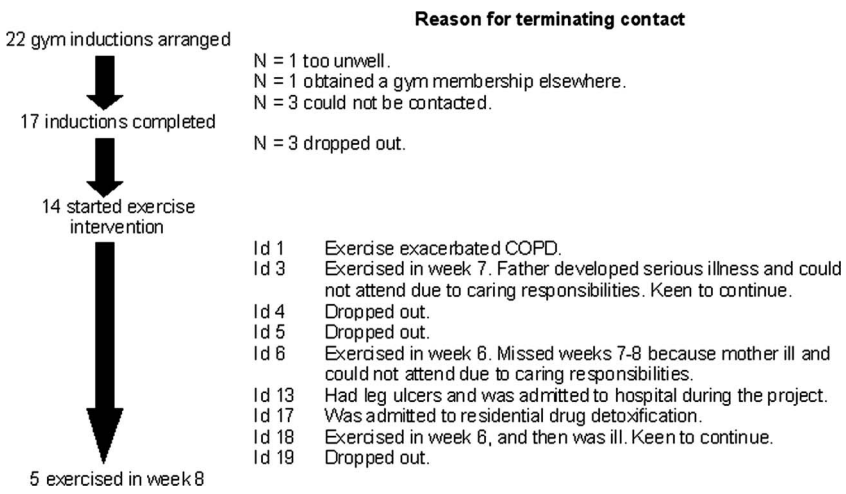

Figure 2 Participant flow diagram.

> no one needs to know or has to know next to them why they are in here they are like everyone else who comes in here'. One instructor expressed initial apprehension: 'I was not sure what to expect obviously we had an idea about the study, but we didn't know what level the clients were actually at. One thing we were unsure about was whether the clients were actively using [drugs].

Some of the instructors said that this group of clients was fitter than the average GP referral client. One instructor noted particularly good progress of one participant

> his fitness levels shot up and he's not even eating unhealthy food now and it makes him feel a lot more better in himself.

However, two instructors said that their clients were not ready to engage in an exercise programme and suggested the need for better pre-exercise screening in order to identify reasons for this.

Instructors said that the inductions lasted 40–60 min. At induction, instructors asked participants about their aims for the programme. Diet and drug use were discussed but not by all instructors.

Postinduction contact varied. Instructors did not organise set sessions to see their clients. Instructor 3 saw his clients frequently in order to discuss their programme as well as 'just general chit chat'. Other instructors saw their clients in passing only, while others reported no contact postinduction. Instructor 7 said that he would have liked more contact. Another commented 'the more interaction the better'.

Suggestions for improvements often mirrored how instructors organised their GP referrals. An instructor who did his referrals on a one-to-one basis thought this approach was best because participants were often self-conscious and organised group sessions might result in them 'being singled out by other members'. Other instructors disagreed, advocating group work or a buddy system so they were not exercising alone, or a more formal programme with goal setting, weekly assessment and greater support. It was also suggested that it would be useful to ask the clients what kind of exercise programme they would like (ie, group sessions, more classes, a more structured programme). Instructors mentioned that some participants were not always using their equipment keys, were using other people's keys or were going to other gyms where their exercise data would not

Table 2 Differences between baseline and follow-up health measures

Variables	Baseline mean (SD)	Postexercise mean (SD)	Difference* (95% CIs)	Paired t (significance)
SBP†	136.6 (15.5)	133.6 (13.3)	−3.0 (−14.6 to 8.6)	−0.61 (0.56)
DBP†	83.6 (9.4)	80.8 (7.4)	−2.9 (−7.2 to 1.4)	−1.59 (0.16)
MAP†	101.3 (9.5)	98.4 (6.8)	−2.9 (−7.4 to 1.5)	−1.56 (0.16)
Heart rate†	85.8 (10.5)	82.1 (14.9)	−3.6 (−13.9 to 6.7)	−0.83 (0.43)
METs†	12.4 (2.4)	12.5 (3.5)	0.1 (−2.6 to 2.7)	0.05 (0.96)
EQ-5D-3L index‡	0.8 (0.2)	0.8 (0.2)	−0.0 (−0.1 to 0.0)	−0.65 (0.53)
EQ-5D-3L VAS‡	65.0 (25.2)	73.8 (19.3)	8.8 (−6.5 to 24.0)	1.27 (0.23)

*Negative indicates reduction in value at follow-up.
†N=8 pairs.
‡N=12 pairs.
DBP, diastolic blood pressure; EQ-5D-3L index and EQ-5D-3L VAS, EQ-5D-3L quality of life index and visual analogue scale scores, respectively; MAP, mean arterial pressure; METs, metabolic equivalents; SBP, systolic blood pressure.

Table 3 ANCOVA test results of demographic covariates and attendance data on the changes of each of the health measures (p value) separately

Variables	Age	Height	Weight	Exercise in past week	Number of attendances	Number of weeks completed
Systolic	0.06	0.52	0.74	0.82	0.45	0.78
Diastolic	1.00	0.03*	0.54	0.49	1	0.15
Mean arterial pressure	0.15	0.05*	0.92	0.81	0.52	0.54
Heart rate	0.16	0.26	0.97	0.84	0.16	0.70
METs	0.07	1.00	0.04*	0.76	0.07	0.03*
EQ-5D-3L index	0.35	0.40	0.86	0.74	0.35	0.97
EQ-5D-3L VAS	0.40	0.25	0.49	0.53	0.40	0.96

*Significant at 5% level.
ANCOVA, analysis of covariance; MET, metabolic equivalent.

be recorded. All instructors were keen to take on more clients of this nature.

DISCUSSION

This study investigated the feasibility of using ER to improve the health of older drug users; while older drug users were willing to participate, their attendance fluctuated. In week 8, seven participants were in contact and five of these attended the gym. Owing to the fluctuating nature of attendance, we cannot conclude that all participants not exercising in week 8 had permanently dropped out. Caring responsibilities and illness particularly affected people's ability to participate weekly. Attendance data from the gym keys and membership cards did not always tally. The combined attendances from the two electronically verifiable data sources minimised the loss of attendance recordings. ER instructors reported no difficulties working with this patient group. The level of instructor support varied considerably with some participants having no contact postinduction. Participants reported positive outcomes and generally enjoyed taking part, but not all liked the gym environment and would have preferred to participate in other activities. All participants found the Balke test acceptable. Non-significant reductions in blood pressure and heart rate were observed, while fitness and general well-being also improved. ANCOVA analysis suggests a further investigation on the relationship between weeks of attendance and METs is worthwhile.

In light of claims about self-reporting bias,[39 40] a strength of this study was the use of physiological outcomes measures and data available from gym information systems. The same researchers took premeasurements and postmeasurements so were not blind, but tests were taken 8 weeks apart and researchers were not reminded of preintervention results at postintervention testing. We made no attempt to select participants randomly from a sampling frame, nor introduce a control group. We made no assessment of exercise duration, type or intensity. Activities which participants chose to take part in outside of the gym were not captured; indeed, data show that some participants were already relatively active, with higher than age-predicted METs values at baseline (table 1). A challenge for ER schemes is to recruit people who are least fit and have the most to gain from exercising. We did not specifically recruit people who were less active which could be considered a limitation. However, we were keen to measure the impact of ER participation on a range of outcomes not just changes in physical fitness. The qualitative element of this research suggests that participation facilitated improvements in self-esteem and confidence which are important in terms of health and well-being, particularly for marginalised groups. Moreover, there was considerable variation in the amount of activity participated in at baseline starting from no activity. Furthermore, we did not verify the intensity of activity for those reporting a higher number of minutes in the previous week. The study's eligibility criteria were also broad and we did not record participants' substance use or the treatment they were receiving at baseline (or any change in these postintervention) because the focus of this pilot was largely on acceptability and feasibility and increasing the number of tests or questions may have adversely affected recruitment. However, people actively using illicit drugs may have different motivations to changing behaviour than those who have been stabilised on an opiate subtitle prescription for some time and a pilot RCT would measure the impact of ER participation on substance use. Three participants did not participate in ER postinduction. The fourth participant terminated participation when he entered a (preplanned) residential drug detoxification programme. The fifth had leg ulcers and was possibly unsuitable to take part in exercise. A weakness of this study was therefore the lack of preparticipation screening and appropriate exclusion criteria. Four people took part in a follow-up interview but would not attend the laboratory for testing. Another weakness of the study was not offering incentives to take part in follow-up. Finally, the current study demonstrates that instructors did not adhere to a standardised protocol for ER delivery; a pilot RCT will ensure standardisation and will include measures to record the fidelity of intervention delivery.

While preparticipation screening and appropriate exclusion criteria are likely to improve completion rates,

the current study demonstrates that adherence to the intervention and drop out present a challenge. Previous evaluations of ER have reported completion rates of 12–66% but generally over a longer time frame.[40–47] A key challenge for ER schemes is clearly to sustain a participant's initial enthusiasm, especially following a break in attendance.[47] Tailoring the intervention to the person's circumstances is important. For those in the precontemplation or contemplation stages of the Trans-Theoretical Model,[48] the most appropriate intervention may be educational rather than behavioural, with emphasis on the benefits of mild exercise for short durations.[49] Tailoring the intervention also means providing participants with a range of exercise options, an approach that has been advocated to reduce drop out,[50] including among drug users.[17] Providing home-based exercises for those with caring responsibilities may also be advantageous.[25 50] In general, the participants felt well supported; involving SURs was advantageous for recruitment because they were able to explain the research processes to potential participants and attend the gym induction. However, support from gym instructors varied considerably. Participants are likely to understand the importance of exercising but lack the confidence that they have the self-efficacy to achieve sustained change.[51] Supervision, support and structure are powerful motivators and relationships with staff help to develop self-esteem and satisfaction.[31 40 50 52] Supervised ER programmes have better results than non-supervised programmes although they incur additional cost,[53] while monitoring and reviewing progress help to increase motivation and prevent drop out.[54] Exercise accompanied by psychosocial, theory-driven, motivational activities is more effective than exercise alone.[14 39 41] We would therefore recommend that exercise interventions with older drug users include greater support and include theory driven motivational activities.

There is a recognised need to increase evidence around the effectiveness of ER schemes for specific clinical groups using rigorous evaluation designs. A literature review failed to identify research using exercise to improve the health of older drug users and this study has provided an opportunity to understand the practicalities of developing and evaluating an appropriate ER intervention for this hard-to-reach population with multiple health and social challenges. The observed changes in health measures suggest further investigation of ER for older drug users, including an economic evaluation, is worthwhile. This is particularly relevant in light of the protective effect of increased METs and reduced risk of all-cause mortality.[55] This study has tested the acceptability of procedures and provides data which will be useful in terms of determining the rate of recruitment and the sample size of a pilot RCT. The pilot RCT will include additional checks in order to assess recruitment to an RCT and acceptability of randomisation, with refined inclusion/exclusion criteria and a modified intervention which may involve someone such as a health trainer in order to provide greater support and access to gyms and to other forms of physical activity.

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Acknowledgements We would like to thank all the people who participated in this research. We would also like to thank Phil Armitage and key workers at Addaction drug service, Steve Kneale and Sue Neely. Thanks also to the North West NIHR Research and Design service. Finally, thanks to Professor Ana M Abrantes and Dr Jan Davison-Fischer for their helpful comments on the first draft of the manuscript.

Contributors CMB conceived of the study, planned it, was involved in the analysis and interpretation and is guarantor of the paper. AM, PA, SR, DH and SH were involved in data collection and interpretation of the data. LF led and conducted the instructor interviews including analysis. RW and LZ analysed the quantitative data. TNC helped design the study and analyse the data. AHT was involved with design and interpretation. MG helped design and plan the study and was involved with interpretation. All authors were involved in drafting the paper and approved the final version.

Funding This work was supported by the Pfizer UK Foundation (an initiative of Pfizer Limited) (grant number 1457), Liverpool Primary Care Trust and the Liverpool Health Inequalities Research Institute (grant number F&S 2011/12 04).

Competing interests None.

Ethics approval Liverpool John Moores Research Ethics Committee.

Provenance and peer review Not commissioned; externally peer reviewed.

Data sharing statement No additional data are available.

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