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Retrospective cohort study of the South Tyneside Exercise Referral scheme 2009-2014: Predictors of dropout and barriers to adherence

Kelly, M.C[1], Rae, G.C[2], Walker, D.[3], Partington, S.[1], Dodd-Reynolds, C.J[4] & Caplan, N[1]

Corresponding author:
Michael C. Kelly.
Graduate Tutor.
Department of Sport, Exercise and Rehabilitation. Faculty of Health and Life Sciences
Northumbria University
Newcastle upon Tyne
NE1 8ST
United Kingdom
Email: Michael4.kelly@northumbria.ac.uk

Co-authors:
Dr. Glen C. Rae: Clinical Lead IMATS service: South Tyneside Foundation Trust
Diane Walker: Senior Support Services Officer: South Tyneside Council
Dr. Sarah Partington: Principal Lecturer in Sport and Exercise Psychology: Northumbria University
Dr. Caroline J. Dodd-Reynolds: Lecturer in Physical Activity and Nutrition: Durham University
Dr. Nick Caplan: Reader in Health and Rehabilitation, Director of Postgraduate research: Northumbria university

1   Faculty of Health and Life Sciences, Northumbria University, Newcastle upon Tyne, NE1 8ST, United Kingdom
2   South Tyneside Foundation Trust, c/o SIMS, Sunderland Royal Hospital, Kayll Road, Sunderland, SR4 7TP.
3   South Tyneside Council, Level 0 Town Hall. Town Hall & Civic Offices, South Shields, N33 2RL.
4   School of Applied Social Sciences & Centre for Health and Inequalities Research, Durham University, Durham, DH1 3HN, United Kingdom

Abstract

Background: Exercise Referral Schemes (ERS) are a prevalent method of increasing physical activity levels. However, they suffer from participant dropout and research predicting dropout or barriers to adherence is limited. This study aimed to focus upon the effect of referral characteristics on dropout, dropout predictors and whether self-reported barriers to exercise predict dropout.

Methods: ERS data from 2009-2014 were retrieved for analysis. Chi squared and t-tests were used to investigate differences between referral characteristics, and logistic regression used to investigate dropout predictors.

Results: Of 6894 participants, 37.8% (n=2608) dropped out within 6 weeks and 50.03% (n=3449) by the final 12th week. More males adhered ($p<0.001$) with dropouts being significantly younger ($p<0.001$). Dropout predictors were smoking (OR=1.58, 95% CI:1.29-1.93) or being a Tier 3 referral (OR=1.47, 95% CI:1.25-1.73). Increasing age (OR=0.98, 95% CI:0.98-0.99), drinking alcohol (OR=0.82, 95% CI:0.71-0.95), secondary care referrals (OR=0.68, 95% CI:0.52-0.90), having a lack of motivation (OR=0.81, 95% CI:0.69-0.95), or a lack of childcare (OR=0.69, 95% CI:0.50-0.95) decreased the likelihood of dropout.

Conclusion: ERS dropout continues to be problematic. Smoking and having moderate-high comorbidities predicted dropout. Increasing age and patient-reported barriers of a lack of time or childcare decreased dropout risk. The reasons for dropout require further investigation.

Introduction

Exercise Referral Schemes (ERS) are used as a method of promoting physical activity (PA) in individuals who are at risk of, or who have developed, health conditions associated with a sedentary lifestyle[1]. Exercise Referral Schemes have been prominent since the 1990s, with up to 89% of primary care organisations running a scheme[2], typically running over 10-12 weeks[3]. Participants are referred following the identification of a need to increase PA by their General Practitioner or another healthcare professional.

Research has so far failed to establish the clinical and cost effectiveness of ERS to the point where the National Institute for Health and Care Excellence (NICE)[4] stated that ERS did not have sufficient evidence to support their use, unless part of a controlled trial. A commonly reported issue is a lack of participant adherence, with recent studies reporting adherence rates ranging from 43-53%[5-8]. NICE[1] recommended future research should focus upon factors encouraging uptake and adherence, and identify any barriers preventing participation, due to the limited research regarding the predictors of adherence/dropout, or analysis of barriers to adherence. This study aimed to analyse data from a local ERS, with particular focus upon participant dropout, the effect of various referral characteristics on dropout, and the predictors of dropout, including self-reported barriers to exercise.

Methods

Population and Measures

Data were provided for the South Tyneside Council ERS between April 2009 and April 2014 for retrospective analysis.

The ERS was delivered within partnership of the local council, National Health Service (NHS) trust and Primary Care Trust, with all those referred being residents of, and registered with a GP within the local council area. ERS inclusion/exclusion criteria are found in Table 1. The ERS lasted 12 weeks, with a consultation before the programme started, and follow-up consultations at 6 and 12 weeks. The initial consultation involved input from an exercise professional and nutritionist.

All exercise professionals employed by the ERS were members of the Register of Exercise Professionals, held at least a level 3 advanced gym instructor qualification/exercise referral qualification, and accreditation in training/fitness testing. Sessions for high-risk participants were delivered exclusively by professionals with the British Association of Cardiac Rehabilitation qualification.

The consultation aimed to identify participants' readiness to change, individual goals, and assesses the participants' health status. Within the consultation, participants' body mass index (BMI), heart rate and blood pressure were measured. Additionally, participants self-reported their smoking status (Cigarettes/day), alcohol intake (Units/week), PA levels (Number of times physically active for ≥ 30mins/week), barriers that could prevent increasing PA levels (participants selected from a list of 9 possible barriers including: Lack of time, Cost, Lack of motivation, Lack of confidence, Lack of support, Child care, Transport, Illness/disability, Don't enjoy) and disability status. This information was re-recorded at 6 and 12 week consultations.

Following the initial consultation, participants obtained a tailored exercise plan facilitating PA increase. Plans varied in terms of exercises and session number, depending on participants' individual needs. Sessions were typically gym-based, however the ERS could offer pool-based sessions for participants that could benefit from non-impact exercise.

The ERS categorised participants by "Tier", with Tiers 2 and 3 eligible for referral. Tier 2 had low-moderate comorbidities and a BMI>28kg/m^2, whereas Tier 3 had moderate-high comorbidities without any BMI restriction. The scheme defines low, moderate and high comorbidities using the National Quality Framework (NQF) for Exercise Referral systems[9].

Within the literature, the term adherence is often cited, yet definitions of this differ. This study defines adherence as "continued participation in the scheme", matching the most recent ERS systematic review[3] and is assessed at 12 weeks. Participants present at 12 weeks were considered as adherent, whereas those not present at either 6 or 12 weeks were considered as dropouts. Ethical approval for the study was obtained from the Northumbria University ethics committee.

Data extraction/management

Permission to use the data was provided by the ERS manager, and following anonymisation, was provided for analysis in electronic format.

All data were error checked, any measures missing information were coded as "not stated", with clearly incorrect entries (e.g. age 121 years) discarded from analysis. For potentially incorrect entries that were at the extremes of normal ranges (e.g. bodyweight of 187kg), data were cross-referenced with other data entries for the same participant, and data not matching was discarded. Instances of data describing the same outcome, but described differently (i.e. "Improved" or "got better") were standardised (i.e. changed to "improved") to increase the consistency of terminology. Following this process, 6894 participants were available for analysis. 98 participants did not start the scheme, however this would not constitute "uptake" as described in recent studies[2][6], therefore statistical analysis was carried out excluding these participants.

Data recorded as "not stated" were not included in the analysis for gender, referral tier, referral source or disability status. Not stated was infrequently recorded, would not provide valuable insight into the relationships between participants, therefore was excluded from analysis. In the case of referral type, "not stated" was included in the analysis due to the high frequency of it being recorded (n=3251), with maternity excluded due to low number of referrals (n=1).

The final aspect of data management involved the grouping of data from each variable into categorical levels appropriate for statistical analysis. This process was carried out for referral reason, alcohol consumption, smoking and BMI. Evidence to support categorisation is limited and heterogeneous. Where possible, all categorical grouping was applied using scales that have been previously used in publications or utilised by health organisations. Referral reasons were divided into "musculoskeletal", "mental health", "cardiovascular/pulmonary/metabolic" and "other". The decision to keep mental health and cardiovascular diseases separate was based upon recent research[5][6][8], which separated mental health and cardiovascular disease, whilst the use of musculoskeletal and "other" categories captured the makeup of referral reasons within the data that were not otherwise categorised. Alcohol consumption[10], smoking levels[11] and BMI[12] were all categorised using previously published guidelines or papers.

Within the 6796 participants that started the scheme, 3500 included data regarding barriers to exercise. In order to carryout logistic regression all non-continuous data utilised as predictor variables (gender, age, referral type, referral source, tier, alcohol status, smoking status, PA level, and nine separate barriers) were reduced into binary predictor variables with "not stated" entries removed, leaving 3267 participants.

Statistical analysis

Statistical analysis was carried out using IBM SPSS version 22 for windows (SPSS, Inc., Chicago, IL). Differences in referral or personal characteristics were investigated with chi-square (X^2) analysis and Independent sample t-tests ($p<0.05$ with 95% CI) between participants that adhered to and dropped out of the ERS. Separate binary logistic regressions were used to investigate whether any personal/referral characteristics and patient self-reported barriers to exercise could predict dropout at 6 and 12 weeks using data collected at initial assessment. Cox & Snell R^2, Nagelkerke R^2 and Hosmer & Lemeshow were utilised to investigate the model's goodness of fit.

Results

Descriptive statistics

Between April 2009 and April 2014, a total of 6894 participants were suitable for analysis. 1.4% (n=98) did not start the programme. At 6 week assessment, 37.8% (n=2608) had dropped out, and by the final assessment at 12 weeks, 50.03% (n=3449) had dropped out, leaving 49.97% (n=3445) of the cohort adhering. Table 2 provides a full breakdown for each personal and referral characteristic.

Analysis of dropouts

Nearly 47% of males and 52% of females dropped out, representing a significant difference between gender groups ($x^2(1)=20.113$, $p<0.001$). Age was significantly different between groups ($t(6830)=-14.435$, $p<0.001$), the mean age of those adhering being 51.1±15.3 and dropping out 45.7±15.6 years, respectively.

Primary care referrals had 51.1% dropout compared to 35.1% of secondary care referrals, which was significant (x^2(1)=52.190, p<0.001). Referral type differed significantly (x^2(3)=95.802, p<0.001) as referrals for nutrition had the highest rate of dropout (89.9%), compared to 46.6% of exercise referrals. 57.7% of referrals for a mental health condition dropped out, which was significantly different (x^2(3)=30.090, p<0.001) compared to musculoskeletal (50.9%), cardiovascular (48.1%) and "other" (50.9%) referrals.

Referral tier was significantly different (x^2(1)=15.901, p<0.001) between Tier 2 (51.5% dropout) and Tier 3 (46.5% dropout). Those consuming moderate alcohol levels had significantly (x^2(5)=33.912, p<0.001) lower dropout rates (44.5%), compared to non-drinkers (52.5%), not-stated (51.7%), hazardous (45.2%), harmful (61.2%) and drinkers that did not specify amount (60.6%). Differences in disability status were non-significant (x^2(1)=0.592, p=0.442) between adherers and dropouts.

Predictors of 6 and 12 week dropout

6 week dropout

The full regression model containing all predictors was statistically significant (p<0.001), indicating the model was able to distinguish between participants who did and did not dropout of the ERS by 6 weeks. The model as a whole explained between 4.2% (Cox & Snell R^2) and 5.7% (Nagelkerke R^2) of the variance in attendance, and correctly classified 64.5% of cases. Five independent variables made a unique statistically significant contribution to the model (Age, Alcohol (Drinker), Smoking (Yes), Tier (3), Barrier A (lack of time)). The strongest predictors of dropping out at 6 weeks were smoking (OR=1.7, 95% CI:1.39-2.07) or being a Tier 3 referral (OR=1.24, 95% CI:1.05-1.47), whereas increasing age (OR=0.98, 95% CI:0.98-0.99), drinking alcohol (OR=0.74, 95% CI:0.63-0.85) or having a lack of time (OR=0.82, 95% CI:0.67-0.99) decreased the likelihood of dropout (Table 3).

12 week dropout

The full regression model containing all predictors was statistically significant, (p<0.001), indicating the model was able to distinguish between participants who did and did not dropout of the ERS by 12 weeks. The model as a whole explained between 5.2% (Cox & Snell R^2) and 6.9% (Nagelkerke R^2) of the variance in attendance, and correctly classified 60% of cases. Seven independent variables made a unique statistically significant contribution to the model (Age, Alcohol (Drinker), Smoking (Yes), Tier (3), Referral source (secondary care), Barrier C (lack of motivation) and Barrier F (lack of childcare). The strongest predictors of dropping out were smoking (OR=1.58, 95% CI: 1.29-1.93) or being a Tier 3 referral (OR=1.47, 95% CI: 1.25-1.73). Increasing age (OR=0.98, 95% CI: 0.98-0.99), drinking alcohol (OR=0.82, 95% CI: 0.71-0.95), being a secondary care referral (OR=0.68, 95% CI: 0.52-0.90), having a lack of motivation (OR=0.81, 95% CI: 0.69-0.95), or a lack of childcare (OR=0.69, 95% CI: 0.50-0.95) decreased the likelihood of dropout (Table 4).

Discussion

Main findings of this study

Dropout within this ERS was 50%, most of which occurred in the first 6 weeks. Smoking or having moderate-high comorbidities (Tier 3 referrals) were the only predictors of dropout, whereas increasing age, being an alcohol consumer, a secondary care referral and citing barriers to exercise including a lack of motivation or childcare were predictors of not dropping out before programme completion.

Due to the paucity of research using predictor variables other than gender and age, it is difficult to make comparisons regarding individuals with moderate-high comorbidities (i.e. Tier 3 referrals) and those who consume alcohol, in terms of the effects that they have on ERS adherence. Previous studies regarding barriers to PA have either not focused specifically on ERS[13] or have only recorded barriers for participants that have dropped out[14], making comparisons to this study difficult. Further investigation into why a lack of motivation or childcare predict adherence is required, as the findings appear counterintuitive

At present there is no available research regarding secondary care referrals as they have been excluded from most studies and recent systematic reviews[3] [15]. Despite secondary care referrals being in the minority in this study (8% of entire cohort, 9.6% included in the regression), these referrals made a significant contribution to the model, indicating that secondary care referrals were less likely to drop out.

What is already known on this topic

Dropout/adherence

This study supports the notion that ERS suffer from dropout, a consistent finding within the ERS literature. Previous work[5-8] has mirrored this study and reported that ERS adherence lies between 43-53.3%.

In the present study, the largest proportion of dropout occurred in the first half of the ERS. Between initial and 6 week assessment, 37.8% dropped out, compared to an additional 12.1% dropout between weeks 6 and 12 in the second half of the ERS. Although run over 24 weeks as opposed to 12, Hansen et al reported a similar finding whereby the highest dropout rate occurred in the first half of the ERS[5].

Positive and negative predictors of dropout

Smoking was predictive of drop out at weeks 6 and 12, which supports previous ERS literature where smokers have suffered higher dropout[16]. Increasing age has commonly been reported as a predictor of adherence within the literature[3] [5] [6] [8] [14]. Despite increasing age being a predictor of scheme adherence, the whole cohort was only comprised of 36.6% of participants aged over 55 years old. In terms of the 3267 participants included in the regression, 37.7% were 55 years or older. Previous work has reported a similar finding[5], the minority (48%) of a cohort being over 55 years, yet increasing age still predicted adherence. This finding lends support to a previous suggestion[5] which considers that future ERS could focus on those 55 years and older, or that further investigation of, or targeting of ERS for the under 55s is required.

What this study adds

The use of participant self-reported barriers to PA with the aim of predicting dropout/adherence is novel and is a direct attempt to address the lack of knowledge regarding factors and barriers to ERS adherence as identified by NICE[1]. Additionally, the use of predictor variables such as disability status, referral source, smoking and alcohol consumption within a single cohort provides new insight into factors/barriers affecting ERS adherence.

Limitations of this study

A common issue with routinely collected data is missing values or erroneous entries[17]. This study highlights the issue, as only 3267 of 6894 datasets were complete. For some analysis (e.g. gender) this was not an issue, however for referral type, over 3000 cases of "not stated" were recorded. The effect of this is seen in Tier 2/3 analysis. Chi-squared analysis analysed a larger number of participants, suggesting Tier 2 referrals were more likely to dropout. Conversely, logistic regression analysed less participants, but included more variables into the model, suggested Tier 3 referrals increased dropout likelihood. In terms of analysis, this resulted in an inability to draw associations across the many variables involved in this ERS and made interpretation difficult.

Aside from the difficulties of recall in self-reported measures[18], that may impact on the measurement of alcohol and smoking within this study, the measurement of the barriers to exercise also has limitations. At initial assessment the barriers were recorded as barriers that could prevent increasing PA levels. It is not known what the actual barriers were during the scheme. The ramification of this is that a barrier stated at initial assessment may not actually manifest itself, making it not possible to ascertain if the barriers did indeed impact on adherence, particularly in participants that dropped out. Additionally, it is conceivable (as evidenced in the findings that a lack of confidence or lack of childcare were predictors of adherence) that participants could overcome what they perceived to be barriers that could prevent PA level increases at initial assessment. Future research could measure during each assessment, the actual barriers to exercise to explore the relationships between the

barriers, adherence and changes to barriers during the course of the programme, or within participants that drop out.

If all 6894 participants had full sets of data, the effect this would have had on the logistic regression analysis is unknown. The logistic regression was able to only predict up to 60% of dropouts, as the factors analysed only provided a minimal increase in predictive accuracy, suggesting that other factors may have an influence on the rates of dropout.

Conclusion

Participant dropout within the South Tyneside ERS was 50%, with those who smoke, are younger, or a tier 3 referral, more likely to dropout. This highlights the complexity of ERS adherence, suggesting that different subgroups of participants require different approaches to increase PA levels, or may not be suitable for ERS in isolation. However, further investigation into why these participants are more likely to dropout is required. From this study, it appears citing a lack of motivation or childcare as barriers to exercise predicts ERS adherence; this is unique within the literature and requires further investigation.

Conflict of interest

Diane Walker is the manager of South Tyneside Exercise Referral Scheme. She was not involved in the analysis or interpretation of the data.

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Table 1: Exercise Referral Scheme inclusion and exclusion criteria

Inclusion	Exclusion
Adults 16 +.	People with BMI≤ 28 with no co-morbidities
BMI28≥ with or without a stable co-morbidity.	People who have previously been referred to the scheme
Those with a BMI28≥ with one or more of the following co-morbidities.	People who are already exercising on a regular basis
Osteoporosis.	Less than 16 years old
Arthritis or joint problems.	People who are not motivated and demonstrate no desire to make lifestyle changes
Anxiety, depression or stress.	People whose mental health or ability to learn would not allow them to participate in the programme
Asthma, bronchitis/Emphysema/COPD.	
Angina/Post MI/CABG/PCI/Completed phase III.	
Mild to moderate heart failure.	Those showing symptoms or traits considered absolute contraindications to exercise:
Suffered from or are recovering from a stroke.	-Unstable angina
Claudication	-Unstable to acute heart failure
Balance problems as a result of Parkinson's disease, MS etc.	-Specific cardiac problems
Awaiting or recovering from surgery (not cardiac).	Active myocarditis
Non acute severe mental illness	-Exercise induced ventricular arrhythmias
Family history of heart diseases	-Hypertrophic obstructive cardiomyopathy
Cholesterol levels consistently over 5 total cholesterol	-Significant aortic stenosis
Hypertension (less than 100 diastolic)	-Resting blood pressures above the recommended levels (cardiac patients 180/100, general population and patients diagnosed with hypertension 180/110)
All types of stable diabetes	
Hyperlipidaemia	
Inflammatory bowel disease	-Uncontrolled tachycardia, a resting heart rate ≥100bpm (≥120bpm for COPD)
Food intolerance or allergies	Unstable diabetes
Renal/liver problems	Any unstable condition
Other dietary problems i.e. Coeliac disease	Severe COPD with FEVI <40% with functional limitations disproportionate to the severity of the disease.
Hyperglycaemia-HbAIC level ≤10 at least 15 months	

Table 1: Descriptive statistics of referrals.

	Referrals (n)	DNA Ax (n)	%	6/52 Drop out (n)	%	12/52 Drop out (n)	%	Started (n)	Completed (n)	Completed (%)
Gender										
Female	4043	65	1.6	1598	39.5	2111	52.2	3978	1932	48.6
Male	2807	29	1.0	986	35.1	1311	46.7	2778	1496	53.9
Not Stated	44	4	9.1	24	54.5	27	61.4	40	17	42.5
Age										
16-24	535	3	0.6	264	49.3	350	65.0	532	185	34.8
25-34	940	8	0.9	436	46.4	574	61.0	932	366	39.3
35-44	1249	16	1.3	493	39.5	668	53.0	1233	581	47.1
45-54	1585	21	1.3	604	38.1	815	51.0	1564	770	49.2
55-64	1346	25	1.9	423	31.4	548	41.0	1321	798	60.4
65-74	900	21	2.3	286	31.8	352	39.0	879	548	62.3
75+	277	3	1.1	77	27.8	101	36.0	274	176	64.2
Not stated	62	1	1.6	25	40.3	41	66.0	61	21	34.4
Referral Source										
Primary care	6276	86	1.4	2421	38.6	3209	51.1	6190	3067	49.5
Secondary care	555	1	0.2	149	26.8	195	35.1	554	360	65
Not stated	63	11	17.5	38	60.3	45	71.4	52	18	34.6
Type of referral										
Exercise	2349	14	0.6	830	35.0	1090	46.0	2335	1259	53.9
Both	1166	8	0.7	467	40.0	614	53.0	1158	552	47.7
Nutrition	127	74	58.3	110	87.0	114	90.0	53	13	24.5
Maternity	1	0	0.0	0	0.0	1	100.0	1	0	0
Not Stated	3251	2	0.1	1201	37.0	1630	50.0	3249	1621	49.9
Reason										
C/P/R/V/M	4534	80	1.8	1639	36.1	2180	48.1	4454	2354	52.9
MSK	1116	7	0.6	424	38.0	568	50.9	1109	548	49.4
Other	212	7	3.3	82	38.7	108	50.9	205	104	50.7
Mental health	1032	4	0.4	463	44.9	593	57.5	1028	439	42.7
Year										
2009-2010	306	0	0.0	135	44.1	169	55.2	306	137	44.8
2010-2011	1570	0	0.0	551	35.1	790	50.3	1570	780	49.7
2011-2012	1368	2	0.1	510	37.3	666	48.7	1366	702	51.4
2012-2013	1546	31	2.0	547	35.4	703	45.5	1515	843	55.6
2013-2014	1244	47	3.8	452	36.3	586	47.1	1197	658	55
2014-2015	860	18	2.1	413	48.0	535	62.2	842	325	38.6
Referral Tier										
Tier 2	3827	62	1.6	1490	38.9	1971	51.5	3765	1856	49.3
Tier 3	2689	34	1.3	949	35.3	1250	46.5	2655	1439	54.2
Maternity	67	0	0.0	29	43.3	54	80.6	67	13	19.4
Not stated	311	2	0.6	140	45.0	174	55.9	309	137	44.3
Disability										
No	5602	5	0.1	2036	36.3	2746	49.0	5597	2856	51.0
Yes	630	1	0.2	237	37.6	319	50.6	629	311	49.4
Not stated	662	92	13.9	335	50.6	384	58.0	570	278	48.8
PA no. times active ≥30mins/week										
0	2955	0	0.0	1178	39.9	1568	53.0	2955	1387	46.9
1	691	0	0.0	239	34.6	321	46.0	691	370	53.5
2	1038	0	0.0	331	31.9	453	44.0	1038	585	56.4
3	754	0	0.0	246	32.6	340	45.0	754	414	54.9
4	369	0	0.0	129	35.0	179	49.0	369	190	51.5
5	350	0	0.0	124	35.4	160	46.0	350	190	54.3
5+	594	0	0.0	235	39.6	299	50.0	594	295	49.7
Not stated	143	98	68.5	126	88.1	129	90.0	45	14	31.1
Alcohol intake (units/day)										
Non drinker	1479	0	0.0	621	42.0	776	52.5	1479	703	47.5
Yes	33	0	0.0	12	36.4	20	60.6	33	13	39.4
Moderate (≤21 M, ≤14 F)	1540	0	0.0	498	32.3	685	44.5	1540	855	55.5
Hazardous (>21-50 M, >14-35 F)	376	0	0.0	129	34.3	170	45.2	376	206	54.8
Harmful (>50 M, >35 F)	49	0	0.0	21	42.9	30	61.2	49	19	38.8
Not stated	3417	98	2.9	1327	38.8	1768	51.7	3319	1649	49.7
Smoking status (Cigarettes/day)										
No	5662	1	0.0	1932	34.1	2628	46.0	5661	3034	53.6
Yes	1061	1	0.1	538	50.7	673	63.0	1060	388	36.6
<9	1	0	0.0	1	100	1	100.0	1	0	0
10>19	9	0	0.0	7	77.8	9	100.0	9	0	0
>20	9	0	0.0	7	77.8	9	100.0	9	0	0
Not stated	152	96	63.2	123	80.9	129	85.0	56	23	41.1
BMI (kg/m²)										
Underweight (<18.5)	22	0	0.0	11	50.0	13	59.1	22	9	40.9
Normal (18.5-24.99)	686	0	0.0	264	38.5	345	50.3	686	341	49.7
Overweight (25-29.9)	1867	0	0.0	628	33.6	840	45	1867	1027	55.0
Obese Class 1 (30-34.99)	2118	0	0.0	777	36.7	1023	48.3	2118	1095	51.7
Obese Class 2 (35-39.99)	1268	0	0.0	493	38.9	656	51.7	1268	612	48.3
Obese Class 3 (>40)	794	0	0.0	319	40.2	451	56.8	794	343	43.2
Not stated	139	98	70.5	116	83.5	121	87.1	41	18	43.9
Total	6894	98	1.4	2608	37.8	3449	50.03	6796	3445	49.97

DNA: Did not attend. C/P/R/V/M: Cardio pulmonary/respiratory/vascular or metabolic. PA: Physical activity. M: Male, F:Female.

Table 3: Logistic regression to predict drop out at 6 weeks.

Predictor	B	p	OR	95% CI
Gender (Female)	0.005	0.95	1.01	(0.862-1.173)
Age	-0.017	0.00	0.98	(0.978-0.988)
Referral type (Exercise)	-0.141	0.09	0.87	(0.737-1.023)
Referral source (Secondary)	-0.225	0.13	0.8	(0.597-1.066)
Tier (Tier 3)	0.213	0.01	1.24	(1.045-1.466)
Alcohol (Drinker)	-0.308	0.00	0.74	(0.633-0.853)
Smoking (Smoker)	0.528	0.00	1.7	(1.391-2.067)
PA	0.015	0.43	1.02	(0.978-1.054)
BMI	0.004	0.56	1	(0.992-1.016)
Lack of time	-0.202	0.04	0.82	(0.677-0.986)
Cost	-0.194	0.07	0.82	(0.67-1.013)
Lack of motivation	-0.064	0.44	0.94	(0.796-1.105)
Lack of confidence	0.090	0.38	1.09	(0.896-1.336)
Lack of support	0.393	0.10	1.48	(0.929-2.36)
Child care	-0.152	0.37	0.86	(0.616-1.197)
Transport	0.136	0.58	1.15	(0.708-1.853)
Illness/disability	0.022	0.83	1.02	(0.837-1.249)
Don't enjoy	-0.100	0.69	0.91	(0.55-1.488)
Constant	0.235	0.43	1.27	-

Brackets indicate dichotomous variable chosen to code as the variable considered as being present. B:Beta value. OR: Odds Ratio

Table 4: Logistic regression to predict drop out at 12 weeks.

Predictor	B	p	OR	95% CI
Gender (Female)	0.073	0.33	1.08	(0.927-1.249)
Age	-0.02	0.00	0.98	(0.975-0.985)
Referral type (Exercise)	-0.16	0.05	0.85	(0.727-1)
Referral source (Secondary)	-0.39	0.01	0.68	(0.517-0.895)
Tier (Tier 3)	0.384	0.00	1.47	(1.245-1.731)
Alcohol (Drinker)	-0.19	0.01	0.82	(0.712-0.953)
Smoking (Smoker)	0.458	0.00	1.58	(1.294-1.932)
PA	0.031	0.09	1.03	(0.995-1.07)
BMI	0.01	0.09	1.01	(0.999-1.022)
Lack of time	-0.18	0.06	0.84	(0.702-1.005)
Cost	-0.05	0.62	0.95	(0.779-1.162)
Lack of motivation	-0.22	0.01	0.81	(0.687-0.945)
Lack of confidence	0.162	0.11	1.18	(0.967-1.432)
Lack of support	0.08	0.74	1.08	(0.678-1.731)
Child care	-0.37	0.03	0.69	(0.499-0.953)
Transport	0.089	0.71	1.09	(0.681-1.755)
Illness/disability	0.019	0.85	1.02	(0.839-1.238)
Don't enjoy	-0.21	0.40	0.81	(0.201-1.314)
Constant	0.46	0.11	1.58	-

Brackets indicate dichotomous variable chosen to code as the variable considered as being present. B:Beta value. OR: Odds Ratio