ORIGINAL ARTICLE

Who is not adhering to physical activity referrals, and why?

MATTI E. LEIJON¹, JOHAN FASKUNGER², PREBEN BENDTSEN³, KARIN FESTIN³ & PER NILSEN³

¹Center for Primary Health Care Research, Lund University/Region Skåne Malmö, Sweden, ²Swedish National Institute of Public Health, and ³Department of Medical and Health Sciences, Division of Community Medicine, Social Medicine and Public Health Science, Linköping University, Linköping, Sweden

Abstract

Objective. To analyse patients' self-reported reasons for not adhering to physical activity referrals (PARs). **Design and setting.** Data on 1358 patients who did not adhere to PARs were collected at 38 primary health care (PHC) centres in Sweden. **Intervention.** PHC providers issued formal physical activity prescriptions for home-based activities or referrals for facility-based activities. **Subjects.** Ordinary PHC patients whom regular staff believed would benefit from increased physical activity. **Main outcome measure:** Reasons for non-adherence to PARs: "sickness", "pain", "low motivation", "no time", "economic factors", and "other". **Results.** Sickness and pain were the most common motives for non-adherence among older patients. The youngest patients blamed economic factors and lack of time more frequently than those in the oldest age group. Economic factors was a more common reason for non-adherence among those referred for facility-based activities compared with those prescribed home-based activities. Low motivation was a more frequent cause of non-adherence among those prescribed home-based activities compared with those referred for facility-based activities. Furthermore, lack of time was a more common reason for non-adherence among patients issued with PARs due to high blood pressure than other patients, while low motivation was a more common reason among patients issued with PARs because of a BMI of > 25. **Conclusion.** The reasons for non-adherence differ between patients prescribed home-based activities and referred for facility-based activities, as well as between patients with different specific characteristics. The information obtained may be valuable not only for the professionals working in PHC, but also for those who work to develop PARs for use in different contexts.

Key Words: Adherence, exercise, lifestyle, health promotion, prescription, primary prevention

Introduction

Written prescriptions for physical activity, in Sweden commonly referred to as physical activity referrals (PARs) [1], have increased in popularity in recent years [1–11]. The evaluation of physical activity interventions in health care settings is still a relatively young research field. Studies into the effectiveness of different types of health care-based physical activity interventions have so far reported mixed results [6,7,12–14].

The effects of physical activity interventions in health care settings are often evaluated in terms of self-reported physical activity, energy expenditure, quality of life, or risk factors such as high blood pressure. Their efficacy has mostly been studied in randomized controlled trials and using researcher-assisted study protocols [6].

In contrast, few studies have evaluated patients' self-reported adherence to physical activity interventions, and there is a paucity of knowledge concerning reasons for non-adherence. Adherence has been defined by the WHO as "the extent to which a person's behaviour – taking medication, following a diet, and/or executing lifestyle changes – corresponds with agreed recommendations from a health care provider" [15]. Increased knowledge concerning those who do not adhere to physical activity interventions, and why, would help us to define patient groups with different needs and to optimise the use of PARs in order to improve adherence.

The overall aim of this prospective study was to obtain knowledge about non-adherent patients in a regional PAR scheme implemented in routine primary health care (PHC). The first aim was to identify

Many studies focus on adherence to physical activity referrals (PARs) and present data only for those adhering to such prescriptions. The aim of this study is instead to determine who is not adhering to PARs and why. Reasons for non-adherence differ between groups and the information obtained may be valuable for further improving PARs.

and analyse patients' self-reported reasons for not adhering to PARs. The second aim was to describe and analyse different patient characteristics associated with non-adherence.

Materials and methods

More detailed descriptions of the methods used, and characteristics of the study population and PHC population in the region, can be found elsewhere [16,17].

Study setting

The study was conducted at PHC centres in the county of Östergötland, Sweden. Patients were recruited prospectively from 37 of its 42 PHC centres in 2004 and 38 of 42 centres in 2005.

Prescription procedure

All persons eligible to receive PARs were ordinary PHC patients whom regular staff believed would benefit from increased physical activity. They either had a sedentary lifestyle or a diagnosis for which increased physical activity could be beneficial (e.g. high blood pressure, diabetes, or a musculoskeletal disorder).

Each patient was provided with a written PAR and a copy was kept in the patient's medical record. The physical activities prescribed were either home-based (e.g. walking) or facility-based (e.g. group gymnastics, aerobics, water aerobics, weight and circuit training) [1,5,18]. If the activity prescribed was facility-based, a copy of the referral was sent to a PAR coordinator in a local physical activity organization, who then contacted the patient by telephone or letter. Patients paid normal entry/membership fees.

Baseline measurements

The prescription form used to collect baseline data contained patient data (e.g. age, sex, address, telephone number) and the prescriber's profession.

Patients were asked to state the number of days in the previous week (seven-day recall) during which they performed "a total of at least 30 minutes of physical activity that made you warm, e.g. brisk walking, gardening, heavy housework, cycling and/or swimming". Self-reported physical activity was classified into four groups: (1) regularly active (30 minutes of moderately intense physical activity on 5–7 days); (2) moderately active (3–4 days); (3) somewhat active (1–2 days); and (4) inactive (0 days).

Reasons for receiving PARs were registered on the prescription form through selection of one or more of eight predefined options. These included sedentary lifestyle and six disease-specific options: musculoskeletal disorder, being overweight ($BMI > 25$), diabetes, high blood pressure, high blood cholesterol, and mental ill-health. Patients issued prescriptions for more than one reason were categorized as "combination of reasons/diagnoses". Patients issued prescriptions for other reasons were assigned to the category "other PAR reasons".

Patients issued both a prescription for home-based activities and a referral for structured facility-based activities were assigned to a combined category.

Follow-up measurements

A three-month follow-up was conducted by personnel at 36 PHC centres in 2004 and 38 centres in 2005. Three different methods were used to collect questionnaire data: telephone interviews (74% of patients), postal questionnaires (14%), and questionnaires provided during routine visits (12%).

Self-reported adherence was assessed by the question: "Have you adhered to your physical activity prescription?" Respondents selected one of the following three alternatives: (1) "I have adhered to the prescription"; (2) "I have been active but in an activity other than the one prescribed"; and (3) "I have not followed my prescription". The results were dichotomized as "Adherence" (alternative (1) or (2)) and "Non-adherence" ((3)).

Patients not adhering to PARs were asked to select one of the following as the main reason for their non-adherence: "sickness", "pain", "low motivation", "lack of time", "economic factors", or "other".

Statistical analyses

In descriptive analyses, differences between proportions were analysed by non-parametric chi-squared test.

Univariate and multiple logistic regression analyses were performed in order to identify possible associations between the outcome variable adherence to PARs (0 = adherence, 1 = non-adherence) and the explaining variables (sex, age, activity level at baseline, referred activity type, referral practitioner occupation, and reason for prescription of physical activity).

Odds ratios (ORs) and 95% confidence intervals (CIs) were calculated. Values of $p < 0.05$ were considered statistically significant. All analyses were performed using SPSS (release 15.0).

Results

During the study period 4867 patients were issued with PARs. Of these, 1358 reported non-adherence

at the three-month follow-up. The mean age of the participants was 54 years (SD 14.2) and 66% were females. Similarly, in all patients receiving PARs in the region during this period, average age was 54 years and the proportion of females was 66%. Furthermore, registry data showed that more females (55%) than males visited PHC centres, that 26% of the patients were aged 45–62 years and 26% aged 65+ years, and that 56% were seen by a physician during the study period [19].

The results of univariate logistic regression analysis (Table I) reveal age-related differences in non-adherence, with the two youngest age groups displaying the highest ORs for non-adherence. The ORs for non-adherence were also high in subjects with the lowest activity levels at baseline and in those issued with referrals for facility-based activities. Prescription due

Table I. Descriptive statistics presenting results of the univariate logistic regression on non-adherence to PARs.

	Adherence		Non-adherence		OR	95% CI	p-value for OR
	n	%	n	(%)			
Total (n = 4867)	3509	72	1358	28			
Sex:							0.531
Female	2368	67	903	67	1.00		
Male	1141	33	454	33	1.04	0.91–1.19	
Age group (years):							0.012
18–29	161	5	70	5	1.22	0.90–1.66	
30–44	639	18	300	22	1.32	1.09–1.59	
45–64	1784	51	658	49	1.03	0.89–1.21	
> 65	925	26	330	24	1.00		
Activity level at baseline (7-day recall) (days):							< 0.001
0	833	28	542	44	2.10	1.75–2.52	
1–2	929	29	330	27	1.21	1.00–1.48	
3–4	604	19	142	12	0.80	0.64–1.02	
5–7	759	24	222	18	1.00		
Activity type:							< 0.001
Home-based activity	1,464	42	412	31	0.76	0.64–0.91	
Facility-based activity	1,291	37	649	49	1.36	1.15–1.61	
Combination of home-based and facility-based activities	715	21	265	20	1.00		
Referral practitioner occupation:							0.260
Physician	1,194	35	488	37	1.18	0.98–1.42	
Nurse	1,031	30	405	31	1.13	0.93–1.38	
Physiotherapist	626	18	223	17	1.03	0.82–1.28	
Other	605	18	210	16	1.00		
Reason for prescription:							< 0.001
Sedentary lifestyle	113	3	48	4	1.09	0.75–1.56	
Musculoskeletal disorder	746	21	292	22	1.00		
Being overweight	292	8	111	8	0.97	0.75–1.26	
Diabetes	365	10	91	7	0.64	0.49–0.83	
High blood pressure	257	7	67	5	0.67	0.49–0.90	
Cholesterol	22	1	10	1	1.16	0.54–2.48	
Mental ill health	114	3	42	3	0.94	0.54–1.38	
Other	124	4	30	2	0.62	0.41–0.94	
Combination of reasons/diagnoses	1,476	42	667	49	1.16	0.98–1.36	

Note: Data are presented as numbers (n) and proportions (%). P-values from the chi-squared test.

to diabetes, high blood pressure, and "other PAR reasons" was associated with reduced odds of non-adherence. ORs for non-adherence did not differ according to referral practitioner occupation.

In multiple logistic regression analysis (Table II), activity level at baseline, activity type, and reason for prescription remained significant predictors of non-adherence. Non-adherence was more frequent among subjects who were less active at baseline and those issued with referrals for facility-based activities.

Of the 1358 patients who reported non-adherence, 619 responded to the question concerning reasons for non-adherence. Of these, 12 were excluded because they provided an invalid answer (e.g. they selected more than one alternative). Reasons for non-adherence were analysed using data from the remaining 609 patients (45% of the initial total of 1358). The main reasons for non-adherence differed according to baseline characteristics (Table III). Significant differences were found in subjects in different age groups, and in those with different activity types and reasons for prescription. Low motivation was a more frequent reason for non-adherence

among men, while sickness and pain seemed to be more frequent among women. Sickness and pain were also more common causes of non-adherence in patients in the oldest age group (> 65 years) than in those in the youngest age group (18–29 years). The youngest patients instead blamed economic factors and lack of time more frequently than those in the oldest age-group. Economic factors was also a more common reason for non-adherence among those referred for facility-based activities compared with those prescribed home-based activities. Low motivation was a common cause among those given home-based activities. Moreover, reasons for non-adherence differed between diagnoses. Lack of time was a common reason given for non-adherence among patients issued with PARs due to high blood pressure, while low motivation was a common reason among patients issued with PARs because they were overweight.

Discussion

This study aimed to evaluate self-reported non-adherence to PARs issued in everyday PHC and to identify characteristics associated with non-adherence. Non-adherence rates were relatively low (28%), but were higher among certain groups, notably those who were inactive at baseline or were referred for facility-based activities. Similar results were previously obtained in studies focusing on adherence, and the findings of these studies suggest that our PAR scheme is a comparatively successful intervention [1,17]. However, there is a need to improve adherence and to determine the reasons for non-adherence. Unfortunately, those who were least active at baseline were overrepresented among the non-adherers. This group has the greatest need and would gain more from increased physical activity level than other groups.

Unsurprisingly, sickness and pain were the most common causes of non-adherence among older patients, while younger patients blamed economic factors and lack of time. Economic factors was also a more common reason for non-adherence among those referred for facility-based activities compared with those prescribed home-based activities. Another key finding was that low motivation was a more common cause of non-adherence among those prescribed home-based activities compared with those referred for facility-based activities, implying that that facility-based activity may be particularly effective in subjects with lower motivation. Moreover, reasons for non-adherence differed between diagnoses: lack of time was a more common cause among patients with high blood pressure, and low motivation a more common cause among patients with a BMI > 25.

Table II. Results from the multiple logistic regression analysis on non-adherence to PARs.

	OR	95% CI	p-value
Sex			0.137
Age group			0.412
Activity level at baseline (7-day recall) (days):			<0.001
0	2.01	1.67–2.42	
1–2	1.20	0.98–1.46	
3–4	0.80	0.63–1.02	
5–7	1.00		
Activity type:			<0.001
Home-based activity	0.73	0.60–0.89	
Facility-based activity	1.31	1.09–1.57	
Combination of home-based and facility-based activities	1.00		
Reason for prescription:			0.001
Sedentary lifestyle	1.07	0.71–1.60	
Musculoskeletal disorder	1.00		
Being overweight	1.00	0.76–1.33	
Diabetes	0.85	0.62–1.16	
High blood pressure	0.82	0.59–1.13	
Cholesterol	1.42	0.63–3.20	
Mental ill health	1.00	0.66–1.53	
Other	0.66	0.42–1.04	
Combination of reasons/diagnoses	1.29	1.07–1.55	

Note: Results are adjusted for age and sex. P-values from the chi-squared test.

Table III. Descriptive statistics of reasons for non-adherence to PARs at follow-up, data are presented as numbers (n) and proportions (%).

	n	Main reason for non-adherence to PAR at follow-up (%)						p-value
		Sickness	Pain	Low motivation	No time	Economic factors	Other	
Total	609	19	14	18	12	5	31	0.05
Sex:	608							
Female	402	21	16	15	13	5	31	
Male	206	15	12	24	12	5	32	<0.001
Age group (years):	609							
18–29	38	8	3	18	18	21	32	
30–44	136	17	10	15	18	7	32	
45–64	298	19	14	20	12	4	31	
> 65	137	25	22	16	5	1	31	0.054
Activity level at baseline (7-day recall) (days):	558							
0	289	20	14	22	9	5	30	
1–2	143	14	13	22	15	7	29	
3–4	40	18	15	12	18	2	35	
5–7	86	21	13	7	21	5	34	0.001
Activity type:	597							
Home-based activity	164	22	18	31	11	1	18	
Facility-based activity	345	16	14	13	12	7	38	
Combination of home-based and facility-based activities	88	24	13	15	17	3	28	0.112
Referral practitioner occupation:	585							
Physician	253	17	15	16	16	5	31	
Nurse	185	21	14	23	14	2	26	
Physiotherapist	73	25	16	15	7	7	30	
Other	74	19	12	19	5	9	35	0.007
Reason for prescription:	609							
Sedentary lifestyle	37	11	19	13	11	11	35	
Musculoskeletal disorder	133	21	23	10	7	7	32	
Being overweight	73	12	7	25	11	3	42	
Diabetes	44	18	20	16	14	2	30	
High blood pressure	36	31	8	11	19	3	28	
Cholesterol	6	0	17	17	17	0	50	
Mental ill health	24	4	8	17	17	12	42	
Other	12	25	0	33	0	8	33	
Combination of reasons/diagnoses	244	21	13	22	14	4	25	

Note: Data are presented as numbers (n) and proportions (%). P-values from the chi-squared test.

Motivation (or behavioural intention) is a key predictor of behaviour change in most cognitive and social-cognitive behaviour change models (e.g. the Theory of Reasoned Action, Social Cognitive Theory, the Theory of Planned Behaviour, the Transtheoretical Model, the Precaution-Adoption Process Model). In these models, motivation is influenced by factors such as a person's self-efficacy, perceived environmental barriers to performing the behaviour, atti-

tudes toward the behaviour, and social support [20–22]. Knowledge of factors that impact on motivation and behaviour change can be valuable when trying to foster the development of PAR schemes.

This study has some limitations that should be taken into consideration. As mentioned previously, patients were prospectively recruited by regular staff in routine PHC, implying that these patients may not be representative of the population as a whole. We

measured adherence using a very simple question regarding whether or not each patient adhered to the prescribed activity. As there is no gold standard self-report measure of adherence [15,23], we used a question that was pragmatic and natural to use in clinical practice, even though it has not been scientifically validated. Using validated instruments in practice is not always easy, as many trials have measured physical activity using instruments whose scales do not easily convert to a pragmatic counselling message, which restricts their clinical usefulness [24].

There is an obvious risk of recall or social desirability bias with the question we used. Self-report always carries the potential risk of bias, including social desirability bias [25]. Self-report tools have, however, usually been found to be accurate and reliable compared with objective quantification of physical activity through monitoring or direct measurement of energy expenditure [24,26,27]. Nevertheless, possible bias must be considered when interpreting the results of this study.

These limitations should be balanced against the study's strengths. It is difficult to achieve high internal and external validity in the same study. We included a large number of patients in a routine care setting, which made it possible to perform statistically sound sub-group analyses. We also believe that many of the results can be generalized to other clinical settings (strong external validity). In addition, the intervention was highly pragmatic and may be employed when the use of simple questions and procedures is a necessity.

In conclusion, reasons for non-adherence differ between patients prescribed home-based activities and referred for facility-based activities, as well as patients with specific characteristics. The information we have obtained may be valuable not only for professionals working in PHC, but also those working to develop PARs for use in other contexts. To further broaden our knowledge concerning adherence and non-adherence to PARs, more qualitative research in the form of patient interviews is needed.

Acknowledgements

The authors would like to thank the PAR coordinators who compiled the data used in the present study. This study was supported by a grant from the Swedish Council for Working Life and Social Research (registration number 2007-1754).

Ethical approval

This was not required since data were collected during the provision of routine health care.

Competing interests

None declared.

References

- [1] Leijon M, Bendtsen P, Nilsen P, Festin K, Stahle A. Does a physical activity referral scheme improve the physical activity among routine primary health care patients? *Scand J Med Sci Sports* 2009;19:627–36.
- [2] Gidlow C, Johnston LH, Crone D, James DV. Attendance of exercise referral schemes in the UK: A systematic review. *Health Educ J* [serial on the Internet]. 2005; 64: Available at: <http://www.sagepub.com/cgi/content/abstract/64/2/168>.
- [3] Harrison RA, McNair F, Dugdill L. Access to exercise referral schemes: A population based analysis. *J Public Health (Oxf)* 2005;27:326–30.
- [4] James DV, Johnston LH, Crone D, Sidford AH, Gidlow C, Morris C, et al. Factors associated with physical activity referral uptake and participation. *J Sports Sci* 2008;26:217–24.
- [5] Kallings LV, Leijon M, Hellenius ML, Stahle A. Physical activity on prescription in primary health care: A follow-up of physical activity level and quality of life. *Scand J Med Sci Sports* 2008;18:154–61.
- [6] Morgan O. Approaches to increase physical activity: Reviewing the evidence for exercise-referral schemes. *Public Health* 2005;119:361–70.
- [7] Sorensen JB, Skovgaard T, Puggaard L. Exercise on prescription in general practice: A systematic review. *Scand J Prim Health Care* 2006;24:69–74.
- [8] James D, Mills H, Crone D, Johnston LH, Morris C, Gidlow CJ. Factors associated with physical activity referral completion and health outcomes. *J Sports Sci* 2009;27:1007–17.
- [9] Hellénus M-L. Prescribing exercise in clinical practice. *Current Cardiovascular Risk Reports* 2011;5:331–9.
- [10] Rome A, Persson U, Ekdahl C, Gard G. Physical activity on prescription (PAP): Costs and consequences of a randomized, controlled trial in primary healthcare. *Scand J Prim Health Care* 2009;27:216–22.
- [11] Walseth LT, Abildsnes E, Schei E. Patients' experiences with lifestyle counselling in general practice: A qualitative study. *Scand J Prim Health Care* 2011;29:99–103.
- [12] Hillsdon M, Foster C, Thorogood M. Interventions for promoting physical activity. *Cochrane Database Syst Rev* 2005(1):CD003180.
- [13] National Institute for Health and Clinical Excellence. NICE public health intervention guidance – four commonly used methods to increase physical activity: Brief intervention in primary care, exercise referral schemes, pedometers and community-based exercise programmes for walking and cycling. London: NICE; 2006.
- [14] SBU. Metoder för att främja fysisk aktivitet : en systematisk litteraturoversikt [Methods of promoting physical activity: a systematic review] (in Swedish). Report No.: 9789185413126. Stockholm: Statens beredning för medicinsk utvärdering (SBU) (Swedish Council on Technology Assessment in Health Care); 2007.
- [15] World Health Organisation. Adherence to long-term therapies: Evidence for action. WHO, editor. Geneva: WHO; 2003.
- [16] Leijon ME, Bendtsen P, Nilsen P, Ekberg K, Stahle A. Physical activity referrals in Swedish primary health care: Prescriber and patient characteristics, reasons for prescriptions, and prescribed activities. *BMC Health Serv Res* 2008; 8:201.
- [17] Leijon ME, Bendtsen P, Stahle A, Ekberg K, Festin K, Nilsen P. Factors associated with patients' self-reported adherence

- to prescribed physical activity in routine primary health care. *BMC Fam Pract* 2010;11:38.
- [18] Swedish National Institute of Public Health. Erfarenheter av FaR [Experiences of physical activity on prescription] (in Swedish). Report No.: 2003:53. Stockholm: Statens folkhälsoinstitut; 2003.
 - [19] Leijon ME, Bendtsen P, Nilsen P, Ekberg K, Stahle A. Physical activity referrals in Swedish primary health care: Prescriber and patient characteristics, reasons for prescriptions, and prescribed activities. *BMC Health Serv Res*. 2008;8:201.
 - [20] Conner M, Norman P. Predicting health behaviour: A social cognition approach. In: Conner M, Norman P, editors. *Predicting health behaviour*. Maidenhead: Open University Press; 2005. p 1–27.
 - [21] Ogden J. *Health psychology: A textbook*. Maidenhead: Open University Press; 2004.
 - [22] Schwarzer R. Modeling health behavior change: How to predict and modify the adoption and maintenance of health behavior. *Appl Psychol* 2008;57:1–29.
 - [23] Kallings L, Leijon M, Kowalski J, Hellenius M, Stahle A. Self-reported adherence: A method for evaluating prescribed physical activity in primary health care patients. *J Phys Act Health* 2009;6:483–92.
 - [24] Babor TF, Sciamanna CN, Pronk NP. Assessing multiple risk behaviors in primary care: Screening issues and related concepts. *Am J Prev Med* 2004;27(2 Suppl):42–53.
 - [25] Elley CR, Kerse N, Arroll B, Robinson E. Effectiveness of counselling patients on physical activity in general practice: Cluster randomised controlled trial. *BMJ* 2003; 326:793.
 - [26] Pronk NP, Peek CJ, Goldstein MG. Addressing multiple behavioral risk factors in primary care: A synthesis of current knowledge and stakeholder dialogue sessions. *Am J Prev Med* 2004;27(2 Suppl):4–17.
 - [27] Vanhees L, Lefevre J, Philippaerts R, Martens M, Huygens W, Troosters T, et al. How to assess physical activity? How to assess physical fitness? *Eur J Cardiovasc Prev Rehabil* 2005;12:102–14.