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published in
British Journal of Sports Medicine
2006

DOI (link to publisher)
10.1136/bjsm.2005.021139

document version
Publisher's PDF, also known as Version of record

ORIGINAL ARTICLE

Counselling increases physical activity behaviour nine weeks after rehabilitation

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Br J Sports Med 2006;**40**:223–229. doi: 10.1136/bjsm.2005.021139

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Accepted 23 August 2005

Background: For people with disabilities, a physically active lifestyle can reduce the risk of secondary health problems and improve overall functioning.
Objectives: To determine the effects of the sport stimulation programme ''rehabilitation and sports'' (R&S) and R&S combined with the daily physical activity promotion programme ''active after rehabilitation'' (AaR) on sport participation and daily physical activity behaviour nine weeks after inpatient or outpatient rehabilitation.
Methods: Subjects in four intervention rehabilitation centres were randomised to a group receiving R&S only (n = 315) or a group receiving R&S and AaR (n = 284). Subjects in six control rehabilitation centres (n = 603) received the usual care. Most common diagnoses were stroke, neurological disorders, and back disorders. Two sport and two daily physical activity outcomes were assessed with questionnaires seven weeks before and nine weeks after the end of rehabilitation. Data were analysed by intention to treat and on treatment multilevel analyses, comparing both intervention groups with the control group.
Results: The R&S group showed no significant change. Intention to treat analyses of the R&S+AaR group showed significant improvements in one sport ($p = 0.02$) and one physical activity outcome ($p = 0.03$). On treatment analyses in the R&S+AaR group showed significant improvements in both sport outcomes ($p<0.01$ and $p = 0.02$) and one physical activity outcome ($p<0.01$).
Conclusions: Only the combination of R&S and AaR had increased sports participation and daily physical activity behaviour nine weeks after the end of inpatient or outpatient rehabilitation.

The health benefits of a physically active lifestyle are well known in the general population.[1–5] Such a lifestyle is accompanied by lower risks of morbidity and mortality from a great number of chronic diseases, such as coronary artery disease, diabetes, and colon cancer. For people with a physical disability, a physically active lifestyle could improve every day functioning, reduce disability, and decrease the risk of secondary health problems.[6–11] However, people with a disability are in general less physically active than the general population.[12 13] WHO defines disability as problems that an individual may experience in functioning.[14] The relation between functioning, disability, physical activity, and determinants of physical activity is described in more detail in the ''Physical activity for people with a disability model'',[15] which formed the theoretical basis of this study.

In 1997, only 12% of US adults with a disability aged ⩾18 participated in moderate physical activity for at least 30 minutes per occasion for ⩾5 days/week, compared with 16% of people without a disability.[12 13] For leisure time physical activity, the difference between people with and without disabilities is even larger: 56% and 36% respectively did not engage in leisure time physical activity.[12 13] Consequently, persuading people with disabilities to become more physically active is probably even more important than it is for the general population.

For two reasons, rehabilitation provides an excellent opportunity to start promoting a physically active lifestyle. Firstly, for many people, rehabilitation is the start of learning to live with a disability. It may thus be an effective strategy to integrate physical activity into the new everyday routine after rehabilitation. Secondly, sport and other physical activities are often a component of rehabilitation programmes. It is probably easier to integrate these activities directly into everyday life than to become physically active when sedentary. One of the problems with incorporating the physical activities of rehabilitation into daily life is the usual lack of sufficient care, just after rehabilitation. This is why two physical activity promotion programmes were developed that targeted rehabilitation patients just before and just after the end of rehabilitation. The first is a personalised, tailored, counselling sport stimulation programme called ''rehabilitation and sports'' (R&S). The second personalised, tailored, counselling programme is ''active after rehabilitation'' (AaR) and promotes daily physical activity in general. As no data exist on the effectiveness of these programmes, the objective of this study was to determine the effects of the R&S programme and the R&S programme combined with the AaR programme on sports participation and daily physical activity behaviour in people nine weeks after conclusion of their inpatient or outpatient rehabilitation period.

METHODS

Study subjects

All inpatients and outpatients over 18 years of age from 10 Dutch rehabilitation centres were candidates for inclusion in the study if they had one of the following diagnoses: amputation, stroke, neurological disorders, orthopaedic disorders, spinal cord injury, rheumatic related disorders, back disorders, or whiplash. Patients were excluded if one of the following criteria were met: (*a*) insufficient cognitive abilities to participate; (*b*) medical contraindications to participating; (*c*) terminal or very progressive disease; (*d*) insufficient understanding of the Dutch language; (*e*) no interest at all in sport participation. Potential participants were identified by healthcare professionals in the rehabilitation centres and included by the research assistant at the centre, who gave

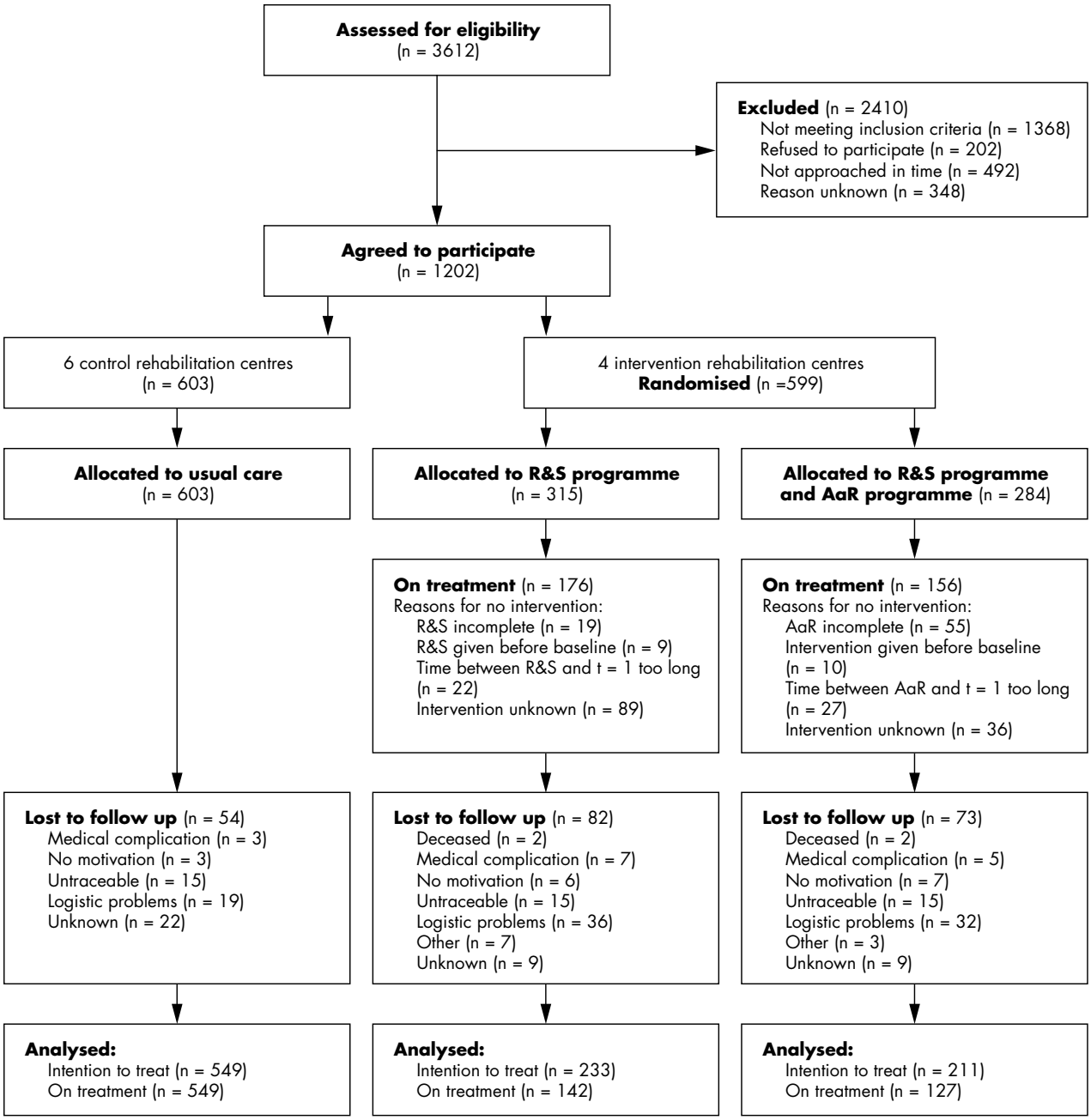

Figure 1 Flow of participants through the study. R&S, rehabilitation and sports programme; AaR, active after rehabilitation programme.

oral information and obtained written informed consent. In January 2001, the medical ethics committee of the rehabilitation centre Het Roessingh in Enschede (the Netherlands) approved the study.

Study design

The study included four intervention rehabilitation centres, in which the R&S intervention programme already existed, and six control rehabilitation centres. Subjects in the control centres received the usual care. Subjects in the intervention centres were randomised to a group receiving R&S only or a group receiving both the R&S and AaR intervention programmes. Randomisation envelopes were made for each intervention centre separately by an independent supervising researcher. After baseline measurements were completed, a research assistant sent every subject to an intervention counsellor with a sealed randomisation envelope, where it was opened. Consequently, research assistants in direct contact with the subjects were blinded to which intervention group the subjects were allocated.

Interventions

The R&S programme aimed at improving sport participation after rehabilitation and consisted of two structured counselling sessions with a sport counsellor. The first R&S session occurred approximately six weeks before the end of rehabilitation in the rehabilitation centre and lasted about 30 minutes. Sport history, wishes, possibilities, facilitators, and barriers were identified using a personalised registration form. This session resulted in tailored sports advice from the sport counsellor, including information on available and appropriate sports locations near the subject's home such as a

fitness club or swimming pool. Recommended sports were usually non-competitive and most commonly consisted of swimming activities, exercising at a fitness club, or exercising in a diagnosis specific group. The second session was a 10 minute telephone check up six weeks after the end of rehabilitation by means of a short questionnaire, which identified sporting status, satisfaction with the given advice, and reasons for not participating in sports. If necessary, the sport counsellor gave additional advice.

The newly developed AaR programme aimed to improve daily physical activity in general after rehabilitation and was based on the stages of change concept of the Transtheoretical model.[16] This concept divides subjects into the precontemplation, contemplation, preparation, action, and maintenance stages of physical activity behaviour change.[16] Subjects received four sessions with a physical activity counsellor. The first AaR session was six weeks before the end of rehabilitation at the rehabilitation centre and lasted 40 minutes. Possibilities, facilitators, and barriers to daily physical activity were identified, leading to tailored physical activity advice. In addition, subjects received an information package including a folder on physical activity from the Dutch Heart Foundation, an empty booklet to start a physical activity diary, a list of possible activities with their energy costs, and the basic AaR folder. The basic AaR folder was discussed during the first session and contained information on the benefits of a physically active lifestyle, stages of physical activity change, and tactics to become more physically active. For each subject, the stage of physical activity change was assessed using a questionnaire,[17] after which subjects received a stage specific folder with assignments and tips to become more physically active. This included, for example, goal setting, rewarding, obtaining social support, and relapse prevention. All folders were based on materials from Health Partners & Io Solutions, Ltd (Minneapolis, Minnesota, USA) and were translated and adjusted for the Dutch population of rehabilitating patients by an expert panel. Three other 15–20 minute counselling sessions were completed by telephone at two, five, and eight weeks after the end of rehabilitation. All three sessions consisted of identifying physical activity status, use of folders, and possible barriers. Furthermore, attention was paid to possible solutions to barriers and to new physical activity possibilities. Stage of physical activity change was also assessed at all three sessions, and subjects who had moved to another stage received the folder specific to the current stage. During all sessions the counsellors used an individual registration form for stages of change, facilitators and barriers, the use of folders, and additional information.

Data collection and outcome assessment

Data collection took place from March 2001 until June 2004. At seven weeks before the end of rehabilitation ($t = 0$), baseline questionnaires were administered under the supervision of a research assistant at the rehabilitation centre. Nine weeks after rehabilitation ($t = 1$) subjects completed the same questionnaires at home.

At $t = 0$, personal characteristics were assessed using questionnaires and included questions on age, sex, self reported body height and body weight, diagnosis, time since start of complaints, treatment form, marital status, children living at home, education, and monthly income. Body mass index was calculated from self reported body height and body weight. At $t = 1$, duration of treatment and hours of sport during treatment were obtained from the computerised registration system of each rehabilitation centre.

Two sport participation and two daily physical activity outcomes were assessed at $t = 0$ and $t = 1$ using questionnaires. The first sport participation outcome measure was whether or not subjects participated in sport at that moment (yes/no). The kind of sport, average number of hours spent on each sport a week, and self reported intensity were also recorded. Each sport was allocated to an intensity category using the physical activity compendium.[18] The intensity categories were: 1–3 metabolic equivalents (METs; 1 MET = 4.184 kJ/kg body weight/h), 3–6 METs, 6–9 METs, and 9–12 METs. Activities in these categories were given average intensity scores of 1.5, 4.5, 7.5, and 10.5 METs respectively. The second sport participation outcome was a total sport score expressed in kJ/kg body weight/h, which was calculated from the intensity category and average amount of time a week spent on each sport. For both sport participation

Table 1 Personal characteristics of the subjects in all three groups

Characteristic	Control (n = 549)	R&S (n = 233)	R&S+AaR (n = 211)
Male	280 (51%)	122 (52%)	111 (53%)
Age (years)	46 (14)	47 (14)	47 (13)
Body mass index (kg/m^2)	25.7 (5.0)	25.3 (4.3)	25.1 (4.1)
Treatment form			
Inpatient	15 (3%)	61 (27%)	52 (25%)
Outpatient, first inpatient	133 (24%)	70 (31%)	52 (25%)
Outpatient	398 (73%)	97 (42%)	104 (50%)
Duration of treatment (hours)	84 (89)	167 (159)	176 (194)
Time between t = 0 and end of rehabilitation (days)	71 (71)	103 (106)	117 (118)
Education			
Primary school	59 (11%)	15 (7%)	15 (7%)
Secondary school low	226 (41%)	103 (44%)	70 (33%)
Secondary school high/college low	156 (28%)	68 (29%)	81 (39%)
College high/university	107 (20%)	47 (20%)	44 (21%)
Diagnosis group			
Amputation	28 (5%)	18 (8%)	18 (9%)
Stroke	155 (29%)	58 (25%)	43 (21%)
Neurological disorders	99 (18%)	38 (16%)	26 (12%)
Orthopaedic disorders	55 (10%)	15 (7%)	17 (8%)
Spinal cord injury	18 (3%)	21 (9%)	23 (11%)
Rheumatic disorders	42 (8%)	14 (6%)	23 (11%)
Back disorders	87 (16%)	30 (13%)	21 (10%)
Chronic pain/whiplash	60 (11%)	38 (16%)	37 (18%)

Values are mean (SD) or number (%).
R&S, rehabilitation and sport intervention; AaR, active after rehabilitation intervention; t = 0, baseline measurement seven weeks before the end of rehabilitation.

Table 2 Outcome variables in the year before rehabilitation, at baseline (t = 0) and nine weeks after rehabilitation (t = 1)

Outcome variable at different times	Control (n = 549)	R&S (n = 233)	R&S+AaR (n = 211)
Year before rehabilitation			
Sport participation	325 (60%)	143 (62%)	128 (61%)
Sport score (kJ/kg/day)	10.6 (15.9)	10.1 (14.9)	9.9 (13.5)
Baseline (t = 0)			
Sport participation	222 (41%)	130 (57%)	121 (59%)
Sport score (kJ/kg/day)	3.7 (7.3)	4.1 (5.6)	5.5 (7.7)
Meeting PA recommendation	263 (48%)	129 (57%)	127 (60%)
PASIPD (kJ/kg/day)	67.4 (55.5)	59.9 (49.8)	61.5 (45.8)
Nine weeks after rehabilitation (t = 1)			
Sport participation	282 (52%)	133 (58%)	134 (65%)
Sport score (kJ/kg/day)	6.2 (10.3)	5.9 (8.5)	7.3 (9.4)
Meeting PA recommendation	294 (54%)	119 (52%)	132 (64%)
PASIPD (kJ/kg/day)	67.2 (57.9)	61.9 (49.6)	67.3 (57.7)

Values are mean (SD) or number (%).
R&S, rehabilitation and sport intervention; AaR, active after rehabilitation intervention; PA, physical activity; PASIPD, physical activity scale for individuals with physical disabilities.

outcomes at t = 0, recall of sport participation during an average week in the year before rehabilitation was recorded.

Daily physical activity was assessed using two outcome measures. The first was whether or not the participants met the recommendation of being moderately physically active at least five days a week for 30 minutes a day, either continuously or intermittently in intervals of at least five minutes.[3] This was measured using a stages of change questionnaire.[17] Subjects in the action and maintenance stages were regarded as meeting the recommendation, whereas those in the precontemplation, contemplation, and preparation stages did not. The second outcome was the physical activity scale for individuals with physical disabilities (PASIPD).[19] The Dutch version of the PASIPD is a 12 item, seven day recall questionnaire which consists of questions on leisure time, household, and work related physical activities (Cronbach $\alpha = 0.60$), from which a total physical activity score in kJ/kg body weight/h was calculated. If only one item of the PASIPD was missing for a subject, imputation was performed using the most conservative value (least physically active option) of the missing item to calculate a total physical activity score.

Statistical analysis

Data were analysed in July and August 2004 according to a pre-established analysis plan. For all sport and physical activity outcomes measured at t = 1, a multilevel analysis comparing both intervention groups with the control group was conducted.[20 21] Multilevel analysis was used because patient data could be clustered within rehabilitation centres. To correct for differences at baseline between the groups, in all analyses a correction was used for the value of the particular outcome variable at t = 0. For the two dichotomous outcomes—that is, sport participation and meeting the physical activity recommendation—a binominal second order penalised quasi-likelihood multilevel analysis was performed. For all multilevel analyses, the MLwiN (version 1.1, Institute of Education, London, UK, 2001) statistical computer program was used.

In all analyses, possible confounding effects of age, sex, time between t = 0 and end of rehabilitation, time between end of rehabilitation and t = 1, time since start of complaints, duration of treatment, hours of sport participation during treatment, body mass index at t = 0, diagnosis, treatment form (inpatient, outpatient, or both), sport participation and sport score in the year before rehabilitation, marital status, having children living at home, education, monthly income, and the season of measurement were evaluated. Variables that changed the intervention regression coefficients by at least 10% were identified as confounders and were corrected for in the final analysis. Interaction terms between age or sex and the two intervention variables were also added to investigate possible effect modification ($p<0.05$).

Besides intention to treat analyses, on treatment analyses were performed, in which only the people who actually received their intervention were compared with the control group. For the on treatment analyses, the following definitions were used. The R&S on treatment group contained all subjects who received at least the first session between t = 0 and t = 1, and the time between the second session and t = 1 was not longer than 120 days (because only short term effects were studied). The R&S+AaR group contained all subjects who received at least the first two AaR sessions between t = 0 and t = 1, and the time between the last given session and t = 1 was not longer than 120 days. In all analyses, $p<0.05$ were considered significant.

RESULTS

Figure 1 shows the flow of participants through the study. In one intervention centre, the last 18 subjects were not randomised, but had to be allocated to the R&S group because there was no longer an AaR counsellor available in that centre. This explains the lower number of subjects in the R&S+AaR group (n = 284) than the R&S group (n = 315). Fifty five subjects in the R&S on treatment group (39%) received the check up telephone call before t = 1. Seventy five subjects (59%) in the R&S+AaR on treatment group would have met the on treatment rules of the R&S group. Furthermore, in the R&S+AaR on treatment group, 34 (27%), 49 (38%), and 44 (35%) received two, three, and four AaR sessions before t = 1 respectively. Thirty two subjects in the R&S+AaR on treatment group (25%) received both the first R&S session and all four AaR sessions.

Table 1 presents the personal characteristics of the participants for whom t = 0 and t = 1 data were available (n = 993). Table 2 gives the values of the two sport and two physical activity outcomes. At t = 0 and t = 1, imputation for the PASIPD was applied to 33 and 84 subjects respectively. For all other variables, 0–5% of the data were missing. Table 3 shows the results of the intention to treat and on treatment multilevel analyses for all four outcomes. All analyses were corrected for baseline value of the outcome, time between baseline and end of rehabilitation, duration of treatment, age, diagnosis, rehabilitation form, and education. Analyses for both sport outcomes were also corrected for the

Table 3 Multilevel analysis comparing both intervention groups with the control group on physical activity and sport outcomes

		R&S		R&S+AaR	
Outcome	**No**	**Odds ratio (95% CI)**	**p Value**	**Odds ratio (95% CI)**	**p Value**
Sport participation*†					
Intention to treat	932	1.36 (0.88 to 2.10)	0.16	1.72 (1.09 to 2.73)	0.02
On treatment	777	1.59 (0.94 to 2.69)	0.08	2.41 (1.36 to 4.26)	<0.01
PA recommendation*					
Intention to treat	934	0.96 (0.67 to 1.39)	0.85	1.54 (1.04 to 2.28)	0.03
On treatment	779	0.89 (0.58 to 1.37)	0.60	2.16 (1.33 to 3.52)	<0.01
		R&S		**R&S+AaR**	
Outcome	**No**	**Regr coeff (95% CI)**	**p Value**	**Regr coeff (95% CI)**	**p Value**
Sport score*†					
Intention to treat	859	0.62 (−0.88 to 2.12)	0.42	1.16 (−0.44 to 2.77)	0.16
On treatment	718	−0.08 (−1.81 to 1.66)	0.93	2.36 (0.44 to 4.28)	0.02
PASIPD*					
Intention to treat	932	−0.34 (−8.70 to 8.02)	0.94	4.74 (−3.94 to 13.42)	0.28
On treatment	776	−4.29 (−13.97 to 5.40)	0.38	7.31 (−2.76 to 17.39)	0.16

R&S, Rehabilitation and sport intervention; AaR, active after rehabilitation intervention; CI, confidence interval; PA, physical activity; Regr coeff, regression coefficient; PASIPD, physical activity scale for individuals with physical disabilities.
*Data corrected for baseline value, time between baseline and end of rehabilitation, duration of treatment, age, diagnosis, rehabilitation form, and education.
†Data corrected for outcome value in the year before rehabilitation.

value of the outcome in the year before rehabilitation. No other checked variables were identified as confounders and no effect modification was found. The R&S programme showed no significant improvements. Intention to treat analyses in the R&S+AaR group showed significant improvements in one sport ($p = 0.02$) and one physical activity outcome ($p = 0.03$). The on treatment analyses in the R&S+AaR group showed significant improvements in both sport outcomes ($p<0.01$ and $p = 0.02$) and one physical activity outcome ($p<0.01$). An odds ratio of 1.72 means that the odds of participating in sport at $t = 1$ are 1.72 times higher in the intention to treat R&S+AaR group than in the control group. A regression coefficient of 7.31 means that subjects in the on treatment R&S+AaR group improved 7.31 points on the PASIPD score at $t = 1$ compared with the subjects in the control group.

DISCUSSION

The main findings of this study were that the R&S programme did not have a significant effect on any of the four outcomes, whereas the combination of the R&S and AaR programmes improved both sport participation outcomes and one physical activity outcome, compared with the control group. All four outcomes show larger effects in the on treatment analyses than in the intention to treat analyses. Comparing the reported regression coefficients of the sport score and PASIPD with the absolute scores of these outcomes showed that the improvements in the R&S+AaR group compared with the control group were clinically relevant. The interpretation of the clinical relevance of the odds ratios of sport participation and the physical activity recommendation is difficult, as both outcomes had a high prevalence, and therefore the odds ratios cannot be interpreted as relative risks.[21] The relative risks of these outcomes are lower than the reported odds ratios, but cannot be estimated because no statistical multilevel technique exists to estimate relative risks.

Mechanisms and explanations

There are four potential explanations for our findings. Firstly, the R&S intervention only focused on sport, which probably has a higher participation threshold for ex-rehabilitation patients than trying to improve every day physical activities.

Secondly, the R&S intervention consisted of only two counselling sessions and most subjects received only the first session. However, counselling, especially after rehabilitation, seems to be important. During the first months after rehabilitation, subjects have to resume their everyday lives, usually without the structure provided by the rehabilitation centre or the help of healthcare professionals. Counselling during this period is likely to provide the necessary stimulus and help to start or maintain sport and daily physical activities. The one short, not very interactive, R&S counselling session after rehabilitation appeared to be insufficient to accomplish this, especially as not many subjects received it. One strength of the AaR programme was that people received more extensive counselling sessions after rehabilitation.

Thirdly, a strength of both interventions was the use of personalised tailored counselling, which is applicable to a wide range of different people like this heterogeneous study population, which had different diagnoses, age, severity of disability, and stage of physical activity change. However, the flexibility within this personalised tailored counselling was higher for the AaR programme than for the R&S programme, especially in the session(s) after rehabilitation.

Finally, at the $t = 1$ measurement, all subjects were asked whether they received advice from a healthcare professional to participate in sport. In the control group, 65% of the subjects received such advice, usually from a rehabilitation doctor or a physiotherapist. This was similar to the advice people received in the intervention group, besides their R&S sessions. Thus usual care appears to be similar in the control and intervention centres when it comes to sport advice from health professionals. It could be that the R&S programme did not add enough to this usual care to have an effect on sport and physical activity.

Literature perspective

The findings of this study are similar to those of studies using individualised counselling in a different setting and in populations with different diagnoses. Randomised controlled trials showed that multiple session physical activity individualised counselling improved physical activity in patients with either cardiac rehabilitation and type 2 diabetes.[22–24] In another randomised controlled trial in women with mobility limitations, the group receiving a physical activity promotion programme improved self reported physical activity.[25] However, these data were derived from the weekly physical activity logs that were part of the intervention, and comparable data were not available for the control group.

The present study and those discussed suggest that promoting physical activity in populations of people with a chronic disease or physical disabilities by using individualised tailored counselling in multiple session interventions can be effective in improving physical activity behaviour.

Limitations

In both intervention groups, 26% of the subjects were lost to follow up and only 9% in the control group. Figure 1 shows that the compliance with the interventions in both groups was about 55%. The loss to follow up and low compliance in the intervention groups were mostly due to logistic and personal problems, especially in one of the four intervention centres. Because of the low compliance, on treatment analyses were added to the intention to treat analyses to allow proper evaluation of the interventions.

Both the sport score and the PASIPD score were based on MET values derived from the general population. It is possible that MET values for the same activity differ between the general population and a population of rehabilitating patients, or even within subgroups of the present study population. Consequently, the absolute values of the sport score and the PASIPD may not be completely accurate, and comparison with the general population may be a problem. However, this did not have an effect on our analyses, because we looked at differences between two time points.

The timing of the baseline measurement was one of the difficulties in this study. Because the duration of treatment differed so much between subjects, baseline measurement at the start of rehabilitation was not a good option. The chosen time of seven weeks before the end of rehabilitation gave two problems. Firstly, determining the last day of rehabilitation about two months in advance was difficult and led to variations in the actual time between baseline and end of rehabilitation. In the analyses, correction for this time difference appeared to be necessary. Secondly, at this baseline measurement, some people already had been participating in some rehabilitation centre facilitated sport activities, which probably happened more often in the more sport orientated intervention centres. This would explain the higher baseline number of people participating in sport in the intervention groups compared with the control group, whereas the number of people who participated in sport in the year before rehabilitation was the same in all groups. Multilevel analyses with sport participation (or score) in the year before rehabilitation and without sport participation (or score) at baseline showed higher and more significant odds ratios in both intervention groups than the control group. Thus, correcting for baseline values may lead to an underestimation of the effect of both interventions on sport participation and sport score, because baseline values for both sport outcomes were already higher in the intervention groups.

Another limitation of this study was the impossibility to perform a randomised controlled trial. Because of the current quasi-experimental design, the intervention and control population differed in rehabilitation form, duration of treatment, the time between baseline measurement and end of rehabilitation, and to a lesser extent in diagnoses. Correction for these and other variables was necessary and led to loss of statistical power.

Clinical and research implications and generalisability

Taking into account the above limitations, it appears that the combination of the R&S and AaR programme was able to improve sport and daily physical activity in the short term in this population of rehabilitation patients. All the rehabilitation patients who met the inclusion and exclusion criteria of this study would probably benefit from the R&S+AaR intervention. For those who did not meet these criteria, the effects of these interventions are unclear, especially those excluded because they were not interested in sport at all and the small group (5.7%) of precontemplators (physically inactive people, who did not intend to become active in the next six months). These two groups of people are probably the most difficult to persuade to become more physically active. However, because the interventions consisted of personalised tailored counselling and the tested population was already heterogeneous, the results of this study can probably be generalised to a wider population of patients in rehabilitation, including people with other diagnoses.

Another important question concerns the extent to which the R&S and AaR programmes were supplementary to each other. In other words, would the AaR programme on its own have had the same effect as the combination of the two? Although this study was unable to answer this question, it seems wise to integrate both interventions because the combination of sport and daily physical activity gives the subjects a wider range of physical activity options. One way to accomplish this would be to integrate the first session of both programmes into one longer session, and focus on both sport and daily physical activity during three telephone sessions. Further research is required to determine the extent of the results of this study in terms of generalisability to other populations, as well as the dose-response and long term effects of the interventions.

What is already known on this topic

- The recent increase in the number of physically inactive people in the industrial world is a serious public health concern
- People with disabilities are even more sedentary than the general population, and a physically active lifestyle for such people could reduce the risk of secondary health problems and improve overall functioning

What this study adds

- The first large multicentre intervention study that was able to improve physical activity behaviour in a heterogeneous population with physical disabilities after inpatient or outpatient rehabilitation is described

CONCLUSIONS

The sport stimulation programme R&S on its own had no significant effect on sport participation and daily physical activity behaviour nine weeks after inpatient or outpatient rehabilitation. However, a combination of the R&S programme with the daily physical activity promotion programme AaR did improve sports participation and daily physical activity behaviour. It is therefore possible to increase short term physical activity behaviour by using personalised tailored counselling in physical activity promotion programmes, consisting of several sessions during and after rehabilitation.

ACKNOWLEDGEMENTS

This study was supported by the Netherlands Organization for Health Research and Development (ZonMw; project number 2001.0008) and the Netherlands Sports Organization for People with a Disability

(NebasNsg). The following rehabilitation centres participated in this study: RC De Hoogstraat, Heliomare, CR Beatrixoord, Het Roessingh CR, SRC Breda, RC Leijpark, RC Tolbrug, Rijnlands RC, SRG Zeeland, and Kastanjehof CR.

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Competing interests: none declared

Ethics approval: In January 2001, the Medical ethics committee of the Rehabilitation Center Het Roessingh in Enschede (the Netherlands) approved the study. All participants gave written informed consent.

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