

A new intervention to improve work participation of young adults with physical disabilities: a feasibility study

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ABBREVIATIONS

COPM	Canadian Occupational Performance Measure
OPHI-II	Occupational Performance History Interview, version 2.0
WAI	Work Ability Index
WLQ	Work Limitations Questionnaire

AIM The aim of the study was to evaluate the feasibility of a new intervention to improve work participation of young adults with physical disabilities, addressing (1) implementation and costs and (2) preliminary effectiveness.

METHOD Twelve young adults with physical disabilities (six males, six females; age 19–28y, median age 21y 6mo) participated in a 1-year multidisciplinary vocational rehabilitation intervention. In a pre–post intervention design, we assessed implementation and costs as well as preliminary effectiveness in terms of employment and occupational performance using questionnaires and interviews. We tested pre–post differences with the McNemar test for proportions and the Wilcoxon signed-rank test for scores on occupational performance; *p*-values less than 0.05 were considered statistically significant. Additionally, we assessed work participation at follow-up after 2 years and 3 years.

RESULTS The intervention was implemented in an outpatient rehabilitation clinic for young adults. The median cost per participant for 1 year was €3128, which is an equivalent to the cost of 72 contact hours per participant. Post intervention, and at 2 years and 3 years follow-up, a significantly higher proportion of participants were employed (8/12 post vs 2/12 pre-intervention; *p*<0.05), with the ratio of those in paid to unpaid employment being 4:4, 5:3, and 7:1 respectively. Participants showed improved occupational performance in work, self-care, and leisure.

INTERPRETATION Feasibility and preliminary effectiveness of the intervention are promising. Employed participants seemed to have achieved suitable and continuous employment.

With increasing numbers of young people with physical disabilities living into adulthood, the focus of health care has moved from survival to adequate treatment to support these young adults to make the transition into adulthood and become autonomous individuals who participate in society and manage their own life. A successful transition to adulthood may reduce lifelong dependency on others, unemployment, lack of achievement, and poor quality of life.^{1–3}

In the process of transition to adulthood one of the challenges is to find employment. Employment provides financial independence and promotes psychological well-being, by structuring the day, providing social interaction and a meaningful contribution to society, and developing self-identity.^{4,5} Although data on the employment situation of people with physical disabilities are not always readily comparable across countries, an employment rate of about 30% is reported in both Europe and the USA.^{6,7} In the Netherlands, the employment rate among young adults (15–25y) with physical disabilities is 39% (26% and 12%

in those with moderate and severe disabilities respectively).⁸

Young adults with physical disabilities may experience substantial difficulties in the area of employment, such as being offered work that is physically too demanding, inadequate transportation facilities, inaccessibility of buildings and toilet space, lack of assistance with personal care, reluctant attitudes among employers, lack of support, and low self-esteem.^{4,5} It is reported that disabled young people would welcome support to help them find suitable employment.² Currently, there is no evidence on the effectiveness interventions to improve work participation of this group of young adults.

Based on the literature,^{9–11} we designed a multidisciplinary intervention aimed at improving the work participation of young adults with physical disabilities by combining rehabilitation and vocational services, with the aim of securing suitable employment that contributes to the young disabled adults' health and well-being. The present study describes the intervention and evaluates its feasibility in

young adults with physical disabilities, addressing (1) implementation and the costs of the intervention and (2) preliminary effectiveness in terms of work participation and the occupational performance of the participants.

METHOD

Participants

Twenty young adults were referred by a rehabilitation physician of the outpatient clinic for young adults of Erasmus MC and Rijndam Rehabilitation Centre to participate in the intervention. They were included in the intervention in three consecutive intervention groups between March 2007 and May 2008. Inclusion criteria were (1) a diagnosis of a chronic condition causing physical disabilities, (2) age between 16 years and 25 years, (3) not, or not suitably, employed, and (4) completed education, or expecting to complete education within 6 months. Participants had adequate understanding of the Dutch language and no intellectual disability. Suitable employment was defined as a job that was consistent with the individual's education and physical abilities. Participants received verbal and written information about the study and signed informed consent. The medical ethics committee of Erasmus MC Rotterdam approved this study.

Intervention 'At work?'

The multidisciplinary vocational rehabilitation intervention 'At work?!' was designed for young adults with physical disabilities entering the labour market, with the aim of improving (abilities to achieve) work participation. The key elements of the 1-year intervention were converging rehabilitation and vocational services and combining a group programme with individual assessments and coaching.

The intervention started with a group support programme consisting of six 2-hour sessions over 8 weeks, guided by an occupational therapist and a job coach. In addition, a psychologist and a social worker from the multidisciplinary rehabilitation team were involved in some group sessions, as were several experts, including a job interview trainer and 'role models' (employed young adults with a physical disability). A group was made up of 6 to 10 young adults with heterogeneous physical disabilities. Group sessions provided information and discussion about work-related topics and aimed to increase insight into personal (dis)abilities, addressing work objectives, coping strategies, occupational balance, finding a (suitable) job, how to present oneself at a job interview, and employment regulations and social security. In addition, group sessions offered opportunities to develop communication and interaction skills, to share experiences, and to increase group members' self-efficacy. Homework assignments, for example preparing a self-presentation or preparation for a job interview, contributed to active participation and planning.

Along with the group programme, individual assessments by an occupational therapist aimed to explore personal capacities and to determine personal goals for employment, using two semi-structured interviews: the

What this paper adds

- A new intervention to improve work participation among young adults with physical disabilities is described.
- Feasibility, addressing implementation and costs, is evaluated.
- Preliminary results of effectiveness are promising.

Canadian Occupational Performance Measure (COPM),¹² and the Occupational Performance History Interview, version 2.0 (OPHI-II).¹³ Prioritized occupational issues were translated into specific goals, for example finding a job in the catering industry, organizing work tasks, increasing computer skills, or obtaining a driving licence (to travel to work). Following on from the group programme, participants received customized individual coaching by an occupational therapist and a job coach, with the aim of developing vocational skills and work routines, enhancing self-management skills, providing work placement opportunities and work experience, and advising on workplace modifications.

Measurements

In a pre-post intervention design, the feasibility of the intervention was evaluated, addressing implementation and costs and preliminary effectiveness. Assessments were performed at baseline and after the 1-year intervention, using questionnaires and semi-structured interviews. In addition, work participation after 2 years and 3 years was evaluated.

We collected demographic data on the study participants. Educational level was categorized as low (pre-vocational practical education or lower), medium (pre-vocational theoretical education or upper secondary vocational education), or high (general secondary education, higher professional education, or university).² The severity of physical limitations was grouped in three levels, using z-scores on the Physical Functioning scale of the Medical Outcomes Study (MOS) Short-Form General Health Survey (SF-36) derived from a Dutch reference population with a chronic condition:¹⁴ severe limitations (z-score ≤ -2), moderate limitations (z-score between -1 and -2), or no limitations (z-score ≥ -1).

Implementation and costs of the intervention

Implementation of the intervention in an outpatient rehabilitation clinic for young adults was evaluated, addressing recruitment of participants and participants' satisfaction with the intervention. Post intervention, participants rated the overall programme, the group programme, and the individual coaching on a numeric rating scale from 1 (very poor) to 10 (excellent).

The costs of the intervention were determined from the healthcare provider's perspective and were based on the per-protocol principle, in accordance with which persons who participated in the feasibility study but dropped out of the intervention ($n=5$) were excluded from the cost analyses.¹⁵ The costs of the intervention included labour and overhead costs for the first year. Labour costs were calculated by multiplying the number of hours of professionals' time required for individual and group sessions by the

corresponding unit costs. Unit costs were standardized costs per hour, which were obtained by dividing the normative income (based on collective labour agreements) by the number of working hours per year. Overhead costs were allocated to participants using a marginal mark-up percentage of 35.5%. All costs were based on 2010 euro-cost data.

Preliminary effectiveness of the intervention

The primary outcome measure of effectiveness was work participation. In addition, we evaluated work ability, work limitations, occupational performance, and health-related quality of life. We expected that the work participation and occupational performance of the participants would be improved after the intervention, and that health-related quality of life would be similar or increased.

Work participation

Work participation was defined as working 12 or more hours per week, according to Statistics Netherlands (www.cbs.nl/en-GB/menu/themas/arbeid-sociale-zekerheid). We distinguished two categories: (1) employment, including paid and unpaid, for 12 or more hours per week, and (2) no employment, including study. Unpaid employment was included because of its value for social participation and psychological well-being, and because it offers daily rhythm, work experience, and entry to the workforce, which could facilitate achieving paid employment.¹⁶

Work participation was assessed using the PROductivity and DISease Questionnaire (PRODISQ), module B (occupation, income, and work situation).¹⁷ The job coach provided additional data about work participation at the 2- and 3-year follow-up.

Work ability and work limitations

The work ability and work limitations of employed participants were assessed post intervention using the Work Ability Index (WAI) and the Work Limitations Questionnaire (WLQ). The WAI is a valid measure of work ability using seven items.¹⁸ The overall WAI index score is calculated by summing the single-item scores (range 7–49 points), classifying work ability as poor (7–27), moderate (28–36), good (37–43), or excellent (44–49).

The WLQ-25 is a valid measure of the impact of chronic conditions on job performance and work productivity.^{19,20} Scores on 25 items generate four scale scores – time management, physical demands, mental–interpersonal demands, and output demands – which indicate the amount of time during the previous 2 weeks for which the employee's ability to do the job was limited. From the four scale scores a WLQ productivity index is calculated. Higher WLQ scores indicate greater work limitations.

Occupational performance

Occupational performance was assessed using the OPHI-II¹³ and the COPM.¹² The OPHI-II provides both quantitative and qualitative information about occupational performance. Responses from the interview are organized

in three scales: occupational identity (11 items), occupational competence (nine items), and occupational settings (nine items). Item scores range from 1 (extreme occupational dysfunction) to 4 (exceptionally competent occupational functioning); for each scale, sum scores are calculated. The OPHI-II is a valid measure across age, diagnosis, culture, and language.²¹

The COPM is an individualized outcome measure that is designed to detect change over time in a person's self-perception of occupational performance in the areas of self-care, productivity, and leisure. In a semi-structured interview a person selects five prioritized activities that he or she wants, needs, or is expected to perform and rates current performance and satisfaction with performance on a 10-point scale, from 1 (not able to do it/not satisfied at all) to 10 (able to do it extremely well/extremely satisfied). Subscale scores for performance and satisfaction are calculated by dividing the sum of the issue ratings by the number of issues.

Post intervention, the prioritized issues were re-scored; participants were blinded to the previous scoring. The COPM is a valid and reliable measure that is sensitive to change; in addition, it is appropriate for young adults with physical disabilities.² Individual changes of two or more points are considered clinically important.¹²

Health-related quality of life

Health-related quality of life was assessed using the MOS SF-36.²² Responses on the 36 questions are organized into eight subscales. In addition, scores are summarized in the Physical Component Summary (PCS) and Mental Component Summary (MCS), which are normally distributed with a mean of 50 (SD 10).²² The Dutch language version of the SF-36 is well validated for use in populations with chronic diseases.¹⁴

Statistical analyses

Data were analysed using IBM SPSS Statistics software version 16.0 (IBM Corp, Chicago, IL, USA). Individuals who completed the intervention ($n=12$) were included in the analysis; post-intervention data on secondary outcomes were missing for one of these individuals. Because of the small study sample size, non-parametric tests were used; p -values less than 0.05 were considered statistically significant.

Results were summarized using medians and interquartile range (IQR). The number of hours and the costs of the intervention for each participant (median, IQR) were calculated.

We used the McNemar test to compare the proportion of participants employed or unemployed pre and post intervention, and the Wilcoxon signed-rank test to compare pre- and post-intervention scores on the OPHI-II, COPM, and SF-36.

RESULTS

Seventeen persons participated in the feasibility study, including one participant aged 28 years but who fulfilled

Table I: Characteristics of the study participants ($n=12$)

Median age in years (IQR, range)	21.5 (4.0; 19–28)
Male/female (n)	6/6
Chronic condition (n)	
Cerebral palsy	4
Muscular disease	2
Spinal cord injury	1
Traumatic brain injury	2
Multiple sclerosis	1
Spina bifida	1
Chronic obstructive pulmonary disease	1
Onset of chronic condition	
Birth	6
Before age 12y	3
Between age 12y and 18y	1
After 18th birthday	2
Living situation	
Living with parent(s)	8
Living on their own	4
Level of education ^b	
Low	2
Medium	8
High	2
Physical functioning ^a	
Severe limitations	6
Moderate limitations	4
No limitations	2
Period looking for employment	
Not yet	6
<1y	3
1–2y	1
>2y	2

^aDomain scores were compared with a Dutch reference population with a chronic condition from Aaronson et al.¹⁴ ^bSee Measurement section for definitions. IQR, interquartile range.

other inclusion criteria. Three other participants in the intervention did not participate in the feasibility study: one did not complete education within 12 months and two did not provide informed consent.

Four participants dropped out of the intervention after the first group session because of severe health problems ($n=2$), personal problems ($n=1$), or an unknown reason ($n=1$); a fifth person dropped out after completing the group programme owing to non-compliance with agreements.

Table I presents the characteristics of the study sample ($n=12$; six males and six females with a median age of 21y

6mo). Eight out of 12 had a medium level of education and six persons were severely limited in physical functioning, of whom four were wheelchair dependent.

Implementation and costs of the intervention

The intervention was implemented in the outpatient rehabilitation clinic for young adults by starting two new groups per year. The diagnostically heterogeneous intervention groups facilitated the recruitment of participants, and were evaluated as beneficial by participants and professionals. Participants and professionals were very satisfied about the converging of rehabilitation and vocational services within the intervention, and the combination of a group and an individual programme. Participants rated (median [IQR]) the overall programme as 8.0 (1.0), the group programme as 7.3 (1.0), and the individual sessions as 8.8 (1.3). These ratings were not correlated with outcomes on work participation.

Using the per-protocol principle, costs were determined for 12 participants who completed the intervention. Table II gives an overview of the costs of the intervention per participant for the first year. Providing the group programme required a total of 150 hours for three groups for supervision and organization of the sessions by an occupational therapist and job coach (both 19h per group) and other experts (12h per group). In addition to individual pre- and post-intervention assessments (total 73h), six participants needed individual occupational therapy for a total of 103 hours. All participants required individual job coaching on job placement for 1 year (15–90h per person) and additional coaching on the job (about 40h a year). Drop-outs incurred few expenses, as they withdrew very early in the programme.

Individual and group sessions required a total of 858 hours' labour over 1 year, or 72 hours per participant: 59 hours on individual and 13 hours on group sessions. Of these hours, 48 hours were charged to the Dutch Employee Benefits Insurance Authority (UWV) for job coaching, and 24 hours were at the expense of (usual) healthcare insurance.

Table II: Costs of the intervention per participant for the first year ($n=12$; euros, 2010)

Costs		Total number of hours	Median (IQR) number of hours	Unit costs (euros, 2010) ^a	Median (IQR) costs per participant (euros, 2010)
Labour costs					2308.72 (949.29)
Consulting physician	Rehabilitation physician	12	1.00 (–)	88.06	88.06
Assessments (pre– post)	Occupational therapist	73	6.00 (–)	33.64	201.84
Group programme ^b	Total	150			397.80
	Occupational therapist	57	4.75 (–)	33.64	
	Job coach	57	4.75 (–)	30.85	
	Other experts	36	3.00 (–)	30.49	
Individual job coaching	Job coach	520	45.00 (28.5)	30.85	1388.25 (879.23)
Individual occupational therapy	Occupational therapist	103	3.0 (12.0)	33.64	100.92 (403.68)
Overhead costs ¹⁵					819.60 (337.00)
Total costs					3128.32 (1286.30)

^aCollective labour agreements (occupational therapist: Collective Agreement for University Medical Centres [CAO] scale 9; job coach: CAO social work scale 8; for other experts CAO University Medical Centres scale 8 is applied). ^bBased on three groups, and per-protocol analysis ($n=12$). IQR, interquartile range.

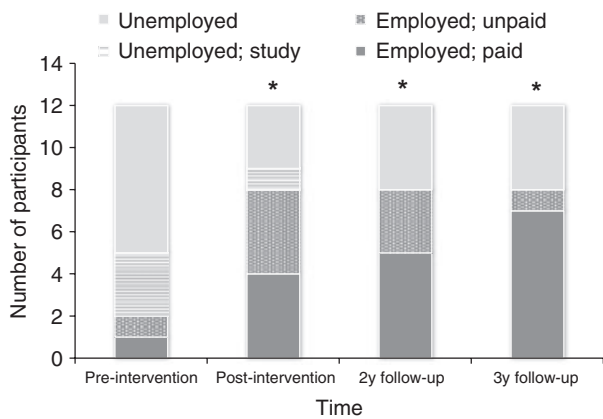


Figure 1: Work participation at pre-intervention, post intervention, and at 2- and 3-year follow-up.

Median (IQR) labour costs were €2308.72 (€949.29) per participant; median overhead costs were determined at €819.60, which summed to total median (IQR) costs of €3128.32 (€1286.30) for the intervention per participant for the first year. Median additional costs for job coaching until the 2-year follow-up were €1380 per participant, equivalent to a median of 33 hours, required by nine participants.

Preliminary effectiveness of the intervention

Work participation

Before the intervention, two participants (2/12) were employed in unpaid or unsuitable employment. Post intervention, eight participants (8/12) were employed, meaning that a significantly higher proportion of young adults participated in employment compared to pre-intervention (McNemar test, $p=0.031$; Fig. 1). The ratio of those in paid employment to those in unpaid employment was 4/4. Participants worked 12 to 32 hours per week (median 18 h/wks), and had a broad variety of jobs, mainly low to medium level, corresponding to their educational level, e.g. office clerk, kitchen aid, museum guard, help-desk worker, graphic designer, and shop assistant.

Three persons did not achieve employment because they were undertaking a course of study to improve employment opportunities ($n=1$) or because increased health problems interfered with work performance ($n=2$), e.g. increased fatigue caused by multiple sclerosis.

At the 2-year follow-up, eight participants were employed, with a ratio of paid to unpaid employment of 5:3. Two individuals were no longer pursuing employment because working increased their health problems. At the 3-year follow-up seven participants were in paid employment; one other person was working unpaid. Two of four unemployed participants were looking for a job, one of them after being employed for 18 months. Six of eight participants who achieved employment post intervention were still employed at the 2-year follow-up (paid/unpaid:

Table III: Work ability, work limitations, occupational performance, and health-related quality of life pre and post intervention

	Pre intervention, median (IQR)	Post intervention, median (IQR)
Number of participants	12	11
WAI index ^a	–	31.0 (3.0)
WLO ^a time management	–	25.0 (23.8)
WLO ^a physical demands	–	21.9 (17.1)
WLO ^a mental-interpersonal demands	–	19.4 (45.5)
WLO ^a output demands	–	20.0 (33.8)
WLO ^a index	–	5.8 (11.3)
OPHI-II total score	70.5 (10.8)	82.0 (22.0)*
Occupational identity scale (OIS)	27.0 (7.0)	33.0 (9.0)*
Occupational competence scale (OCS)	22.5 (3.8)	24.0 (5.0)*
Occupational settings scale (OSS)	22.0 (4.5)	30.0 (7.0)
COPM performance subscale	4.9 (2.5)	7.0 (2.4)*
Performance productivity ($n=7$)	5.5 (4.5)	7.0 (3.5)
Performance self-care ($n=6$)	5.0 (2.5)	6.5 (2.2)
Performance leisure ($n=5$)	5.0 (2.5)	7.0 (2.5)
COPM satisfaction subscale	3.6 (3.3)	7.0 (2.5)*
Satisfaction productivity ($n=7$)	5.0 (4.5)	7.0 (3.0)
Satisfaction self-care ($n=6$)	3.8 (3.9)	5.8 (2.4)
Satisfaction leisure ($n=5$)	4.0 (2.5)	7.0 (3.5)
SF-36		
Physical component summary (PCS)	33.7 (19.3)	37.8 (13.3)
Mental component summary (MCS)	50.2 (21.3)	49.5 (13.6)

^a $n=7$; only employed persons completed the WAI and the WLO.

* $p<0.05$; Wilcoxon signed-rank test. WAI, Work Ability Index; WLO, Work Limitations Questionnaire; OPHI-II, Occupational Performance History Interview, version 2.0; COPM, Canadian Occupational Performance Measure; SF-36: Medical Outcomes Study 36-item Short-Form General Health Survey.

4/2) and five were still employed at the 3-year follow-up (paid/unpaid: 5/0). Two of them had been looking for a job for more than 2 years before the intervention. These findings indicate that their work participation seems to be continuous and long term. Two participants no longer received a disability pension; for others, the disability pension was reduced substantially, as a supplement to their work income.

Work ability, work limitations, occupational performance, and health-related quality of life

Post intervention, employed participants showed moderate work ability with median scores on the WAI index of 31.0 (IQR 3.0). They were limited on the job for 20 to 33% of the time, according to their scores on the WLQ scales (see Table III).

Participants showed improved occupational performance, as demonstrated by a significant improvement on OPHI-II total scores (Wilcoxon signed-rank test: $z=-2.6$; $p=0.009$), OPHI-II scales for occupational identity ($z=-2.9$; $p=0.003$), and occupational competence ($z=-2.4$; $p=0.02$), COPM Performance scores ($z=-2.3$; $p=0.02$), and COPM Satisfaction scores ($z=-2.3$; $p=0.02$).

Higher occupational identity and occupational competence scores indicated that participants displayed more positive values and interests and had a more positive image

of the future, as well as an increased ability to display productive and satisfying occupational behaviour.

Improved occupational performance and satisfaction with performance of prioritized issues (COPM) addressed issues in all three areas of occupational performance – productivity, self-care, and leisure. Four participants achieved a change of two points or more on performance scores, indicating clinically important change, and seven achieved a change of two or more points on satisfaction scores.

The health-related quality of life of participants did not change after the intervention, based on component summary scores on the physical and mental health domains of the SF-36; this was confirmed for employed participants in a sub-analysis. Post-intervention physical health of participants was significantly worse compared with an age-appropriate Dutch reference sample (20–29y; 37.8 vs 53.1; one-sample Wilcoxon signed rank test; $p=0.006$), indicating that the physical health status of participants was poor.²³

DISCUSSION

It appeared feasible to implement a 1-year multidisciplinary intervention to improve the work participation of young adults with physical disabilities in an outpatient rehabilitation clinic for young adults. Twice a year a new group starts the intervention, combining rehabilitation and vocational services in a group programme and individual coaching. The total median costs of €3128 per participant for the first year, and median additional costs of €1380 until the 2-year follow-up, are lower than the standard amount for an individual reintegration agreement (unemployment assistance/benefit) of €5000 (2008–2010) and are considered reasonable, given the results. Since participants are young, the financial benefits of paid employment may have long-lasting effects, both increasing their autonomy and decreasing the financial burden for society. Preliminary results show that work participation improved substantially after the intervention. In addition to the primary outcome on work participation, we explored some other aspects of employment, such as work ability and work limitations as well as other domains of occupational performance (self-care and leisure). In the absence of a control group, however, we do not know how work participation would have developed without the intervention, considering that young adults might be expected to gain employment as an age-appropriate transition. A further limitation of this study is the small sample size.

Most participants in this study had moderate or severe limitations of physical functioning and some also had a low educational level, both of which are considered to be factors hindering the chance of employment for young disabled individuals.^{5,24} Despite their severe physical limitations, those achieving employment showed moderate work ability and work limitations, indicating that their work tasks and conditions matched their abilities and were not physically too demanding, according to their scores on the WLQ Physical Demands scale. The convergence of rehabilitation, providing insight in their physical skills and capabilities,

and job coaching, providing suitable employment positions and on-the-job training, might have contributed to achieving suitable employment. Thus, a good fit between person (abilities and needs) and environment (job demands and support) seemed to be reached.

Post intervention, improved occupational performance and satisfaction with performance of prioritized issues (COPM) were not restricted to the area of productivity, but also addressed self-care and leisure activities. The goal of employment seemed to motivate participants to resolve problems in other areas which they previously disregarded or refused to address, e.g. ergonomic adjustments of their wheelchair, independent toilet use, or using public transport. Thus, employment can be an important outcome for young adults, and may encourage them to improve their occupational performance in other areas. These results will have to be interpreted with caution, since the number of analyses carried out was large relative to the small sample size. However, the findings are in line with the broad integrated approach of the intervention, and are consistent with others reporting that self-care independence and mobility might be important factors for enabling work participation among young adults with physical disabilities.^{4,24}

To our knowledge, there is no literature on the effectiveness of vocational interventions specifically targeting young adults with physical disabilities. Considering that 25% of the young disabled people receiving disability employment benefit in the Netherlands ('Wajong') achieved employment in 2008, and that the Dutch Employee Benefits Insurance Authority (UWV) considers a rate of 25% achieving paid employment as an indicator of successful job coaching in this population,²⁵ we consider a 34% paid employment rate after 1 year in our sample as a successful result. The long-term results, indicating that employment continued in most cases, and that the number in paid employment further increased, seem to be favourable. A high dropout rate of the intervention should be anticipated, which might be inevitable in the target population given the high burden of their chronic condition and a lower compliance in this age group.

In conclusion, the feasibility and preliminary effectiveness of the intervention, combining rehabilitation and vocational services, are promising. Post intervention, a substantial proportion of the young adults was employed, and they seemed to have achieved suitable and continuous employment, and participants showed improved occupational performance. The goal of employment and the broad integrated approach of the intervention seemed to support young adults to resolve issues in work, as well as in self-care and leisure. Future research in a larger sample and a controlled study design will add to the evidence for the effectiveness of the intervention.

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