J Rehab Med 2001; 33: 71–78

FACTORS ASSOCIATED WITH SUCCESSFUL VOCATIONAL REHABILITATION IN A SWEDISH RURAL AREA

Sven-Uno Marnetoft,[1,2,3] John Selander,[1,2] Alf Bergroth[1,2,4] and Jan Ekholm[1,2]

From the [1]Department of Public Health, Division of Rehabilitation Medicine, Karolinska Institute, Stockholm, [2]Centre for Studies on National Social Insurance, Mid-Sweden University, Östersund, and Social Insurance offices in [3]Östersund and [4]Stockholm, Sweden

The objective of this study was to identify factors associated with a positive outcome of vocational rehabilitation, and to identify groups that have been successfully rehabilitated in a Swedish rural area. In this study vocational rehabilitation is defined as medical multidisciplinary, psychological, social and occupational activities aiming to re-establish, among sick or injured people with previous work history, their working capacity and prerequisites for returning to the labour market. The study was based on 732 people on registered long-term sick-leave who, in a rural area in northern Sweden during 1992–94, became objects for vocational rehabilitation. Bivariate and stepwise logistic regression analysis was used to identify factors associated with the outcome. By successful vocational rehabilitation is meant reporting well (no economical benefit) at all three time-points 6, 12 and 24 months after termination of rehabilitation, or lowered benefit levels. The results indicate that younger, male, employed persons, with an early start on rehabilitation, in a programme entailing education, and partly sick-listed before the start of this programme, had the greatest chance of successful rehabilitation. In contrast, older, female, unemployed people, with a delayed start on rehabilitation, without education, and fully sick-listed before the start, greatly risked being unsuccessful with vocational rehabilitation. The results indicate how to improve the rehabilitation process: several process-related factors shown to be connected with successful vocational rehabilitation include time before the start of rehabilitation, partial instead of full sickness benefit, and education programmes.

Key words: outcome, successful, factors, vocational rehabilitation, return-to-work, rural, logistic regression.

J Rehab Med 2001; 33: 71–78

Correspondence address: Sven-Uno Marnetoft, Department of Public Health, Division of Rehabilitation Medicine, Karolinska Institute, Norrbacka Bldg., SE-171 76 Stockholm, Sweden

(Accepted August 21, 2000)

INTRODUCTION

The increasing number of workers leaving the labour force for a disability pension has led to increasing social costs and worry about a future lack of labour. For this reason the 1990s saw great investment in vocational rehabilitation. In 1991 employers were given increased responsibility for employee rehabilitation. This responsibility included investigation of the need for rehabilitation among their employees. In 1992 the social insurance office became responsible for supervising and co-ordinating all kinds of vocational rehabilitation, including that of the unemployed (29). The investments have, however, not been as successful as intended (1). From 1996 to 1998 the costs of sickness benefit, disability pension and work injury increased from SEK 60 billion to approximately SEK 64 billion (30). In 1963 there were 25 employed persons per disability pensioner. Thirty years later, the proportion was 10 to 1 (1). At the end of 1997 there were 423,000 disability pensioners in Sweden (31).

Since the beginning of the 1990s Sweden has had a high unemployment rate, increasing from 2% at the beginning of 1990 to about 8% in 1995 (32). During the same period the number of unemployed among the long-term sick-listed increased greatly. In rural areas of the county of Jämtland, 15% of the sick-listed were also unemployed (2), and in Stockholm 20% were also unemployed (3). Two previous studies also showed that the unemployed are partly disregarded in the rehabilitation process (4, 5).

An important area that has received limited attention is possible gender differences in vocational rehabilitation. For unemployed women, vocational rehabilitation seems to have no effect on future sick-leave (6). Unemployed women on sick-leave are also more exposed than others to risk factors for disability pension (7). Bäckström (8) has shown that gender is important in vocational rehabilitation. There is a tendency to discriminate against women in vocational rehabilitation. They are usually offered less expensive rehabilitation (8). Andersson & Lidwall (9) found that more resources and more effort are spent on the vocational rehabilitation of men than of women. Such differences might represent a factor contributing to sickness (10).

The northern parts of Sweden have long had a higher incapacity rate and more disability pensioners than in the south (2). In 1996 the four counties in northern Sweden still had more newly granted disability pensions than other regions in Sweden (11). With efficient rehabilitation, about 50,000 of the 423,000 people now receiving these benefits would not have needed disability pension, according to a recently published report (33) Against this background it was considered important to investigate whether factors exist which are related to successful

 ISSN 1650–1977

vocational rehabilitation. The aim of the present study was to identify factors that are associated with a positive outcome of vocational rehabilitation, and to identify groups that have been successfully rehabilitated in a Swedish rural area.

MATERIAL AND METHODS

The study was based on long-term sick-leave (90 days or more), initiated during 1992, 1993 and 1994, registered at all seven social insurance offices in rural areas of the county of Jämtland. Jämtland is situated approximately 500 km north-west of Stockholm. There were 4394 identified episodes of sick-leave. The 732 people who had undergone vocational rehabilitation during their sickness period were identified from the National Social Insurance Board register. In this study outcome was measured at a defined period after termination of vocational rehabilitation. One definition used for successful vocational rehabilitation was "reported well" (no economical benefit) at all three time-points, 6, 12, and 24 months after the termination of vocational rehabilitation. The second way of defining successful rehabilitation was a lowering of benefit levels (also including lowering to zero = well group), compared with start of rehabilitation, at 6, 12 and 24 months after termination of rehabilitation. Thus, very strict criteria for successful rehabilitation were used to ensure that the measures represented long-term outcome. The following individual variables were examined: age, gender, civil status, nationality, occupation, employment status, income, diagnosis, sick-days 2 years before present sick-leave, levels of benefit at start of rehabilitation, and length of sick-case. Straaton et al. (12) suggest that factors related to the rehabilitation process itself in general may have more prognostic importance than disease-related factors. Since several variables that can relate to the rehabilitation process were available in the present data set, they were examined as well: time before start of rehabilitation, type of vocational measure, length of rehabilitation measure, number of rehabilitation actors that decided about the vocational measure, who paid for the vocational measure and cost of vocational measure. Bivariate logistic regression analyses were used to determine which variables (factors) were related to successful/unsuccessful rehabilitation. In a further analysis stepwise logistic regression was used to develop a model containing significant variables associated with successful vocational rehabilitation. In a logistic regression model one can test how specific variables influence the cases examined at the same time as other variables are under control. The logistic regression analysis requires a dichotomy-dependent variable, i.e. it can only assume one of two values. In this case these were: well (= no economic benefit = successful rehabilitation) or not well (unsuccessful rehabilitation), and lower levels of benefit (successful rehabilitation) or not lowered levels (unsuccessful rehabilitation). Strategies for data analysis using logistic regression are described elsewhere (13). In the bivariate analysis only those variables with p-values <0.25 were included. They were then added one-by-one to the model. Only variables with $p \leq 0.05$ were included. When independent variables correlated with each other, only the variable with the largest estimated explanation value was kept. When the criterion for successful rehabilitation was well (= no economical benefit) at 6, 12 and 24 months after termination of rehabilitation, the model proved to contain six independent variables. With all attempts to add further variables, the model deteriorated. When the requirement for successful rehabilitation was lower levels of benefit at 6, 12 and 24 months after termination of rehabilitation compared with starting levels, only four variables influenced the outcome.

Only vocational rehabilitation periods of 5 days or more were included. Where more than one vocational rehabilitation period had occurred, the length of rehabilitation measure was based on the longest session. Time before start of rehabilitation was based on the first vocational rehabilitation period in the case.

Those with any kind of employment, full or part-time, were classified as employed and those without as unemployed. Self-employed people, who were few, were excluded from the study.

In the bivariate analysis the diagnoses were categorized into musculoskeletal problems, mental problems and other problems. The diagnoses were all the first diagnoses for the sickness period.

Definitions

The difference between a disability pension and long-term sick-leave is that the former involves a permanent reduction in working capacity and regular benefit until a pension becomes payable, whereas when a person is long-term sick-listed the situation is still unsettled and benefits are paid as long as the patient has a sick-leave certificate.

The term rehabilitation is used here to refer to all vocationally orientated measures such as medical multidisciplinary, psychological, social and occupational activities aiming to re-establish, among sick or injured people with a previous work history, their working capacity and prerequisites for returning to the labour market, i.e. to a job or availability for a job. Rehabilitation also involves the receipt of rehabilitation allowance.

Vocational rehabilitation consists largely of work training, vocational guidance at employment institutes, education, functional training and work-oriented rehabilitation at back institutes, and work-oriented rehabilitation which entails both vocational and medical rehabilitation elements. In this study vocational rehabilitation measures were categorized as work training, vocational guidance (at employment institutes), education, and other measures.

RESULTS

Of the group as a whole ($n = 4394$), 16.8% (18.1% women, 15.0% men) underwent vocational rehabilitation. Of those in

Table I. *Characteristics of 732 people who received vocational rehabilitation during 1992–1994 in a Swedish rural area*

Characteristic	Women (%)	Men (%)
Gender ($n = 732$)	60	40
Civil status ($n = 731$)		
Married	53	48
Unmarried	27	39
Widower	6	0
Separated	15	12
Nationality ($n = 731$)		
Native Swedes	96	95
Foreigners	2	1
Swedes born in another country	2	4
Levels of benefit at start of rehabilitation measure ($n = 730$)		
100%	75	82
75%	3	3
50%	18	14
25%	4	1
Type of rehabilitation measure ($n = 729$)		
Work training	55	49
Vocational guidance	3	7
Education	5	7
Others	37	37
Occupation ($n = 602$)		
Unskilled employees in goods production	59	49
Unskilled employees in service production	15	37
Skilled employees in goods production	14	5
Skilled employees in service production	11	7
Assistant non-manual employees, lower level	1	2
Diagnoses ($n = 732$)		
Musculoskeletal problems	69	57
Mental problems	6	7
Others	26	36

Table II. *Characteristics of 732 people who received vocational rehabilitation during 1992–94 in a Swedish rural area*

	Women		Men	
Characteristics	Mean	*n*	Mean	*n*
Age (years)	43	436	42	296
Length of rehabilitation measure (days)	68	435	76	296
Sickness benefit group income[a] (SEK/year)	135,059	435	169,052	296
Number of sick-days 2 years before present sick-leave	110	298	95	168
Time before start of rehabilitation measure (days)	319	436	314	296
Length of sick-case (days)	570	355	528	251
Cost of rehabilitation measure[b] (SEK)	25,686	160	32,276	111

[a] From yearly income a sum is calculated on which the benefit level is based.
[b] This refers only to rehabilitation services purchased by the social insurance office.

work, 16.8% (18.4% women and 14.7% men) underwent rehabilitation. The corresponding figure for the unemployed was also 16.8% (16.0% women, 17.4% men).

Of those who underwent rehabilitation 64% (69% women, 57% men) had musculoskeletal problems, and 6% (6% women, 7% men) mental problems (Table I). Of the group as a whole 47% had musculoskeletal problems and 8% mental problems (data not shown). There were no significant differences in civil status between those who underwent rehabilitation and the group as a whole (data not shown).

Those who underwent rehabilitation had a lower mean age (42 years; women 43, men 42 years) (Table II) than the group as a whole (45 years) (data not shown).

In the bivariate analysis the following factors are not included in Table III: nationality ($p = 0.722$), occupation ($p = 0.687$), diagnoses ($p = 0.455$), who decided about the vocational measure ($p = 0.666$) and who paid the vocational measure ($p = 0.863$).

Women had a greater risk of unsuccessful rehabilitation than men [odds ratio (OR) 0.64 when men were used as a reference, OR = 1.0; 95% confidence interval (CI) 0.46–0.88, $p = 0.006$] (Table III).

A more expensive rehabilitation measure (change in OR by e.g. SEK 5000) increased the probability of successful rehabilitation by 11% (OR 1.111, 95% CI 1.010–1.221, $p = 0.0293$) (Table IV). Similar changes in OR can also be seen for changes in income, time before start, length of rehabilitation and length of sick-case.

Table III. *Factors associated with successful vocational rehabilitation (well = no benefit) 6, 12 and 24 months after termination of rehabilitation (bivariate logistic regression;* n = *716)*

	Rehabilitation (%)					
	Successful ($n = 216$)	Unsuccessful ($n = 500$)	*n*	OR	95% CI	*p*-value
Gender						
Female	26.3	73.7	426	0.64	0.46–0.88	0.006
Male[a]	35.9	64.1	290	1.00		
Employment status						
Unemployed	23.0	77.0	126	0.64	0.41–1.01	0.054
Employed	31.7	68.3	590	1.00		
Civil status						0.099
Married	28.5	71.5	362	1.31	0.78–2.21	0.303
Unmarried	34.2	65.8	228	1.72	1.00–2.95	0.049
Widowed	42.3	57.7	226	2.42	0.98–6.00	0.056
Divorced	23.2	76.8	99	1.00		
Level of benefit at start of rehabilitation measure						0.008
100%	27.2	72.8	555	0.31	0.12–0.75	0.010
75%	33.3	66.7	21	0.41	0.12–1.45	0.166
50%	38.7	61.3	119	0.52	0.20–2.01	0.174
25%	55.0	45.0	20	1.00		
Type of rehabilitation measure						0.008
Work training	30.2	69.8	377	1.08	0.77–1.53	0.648
Vocational guidance	15.6	84.4	32	0.46	0.17–1.25	0.128
Education	52.6	47.4	38	2.78	1.39–5.54	0.004
Other measure	28.6	71.4	266	1.00		

Only variables with *p*-values < 0.25 are shown.
OR = odds ratio; 95% CI = 95% confidence interval.
[a] Italics mean reference = OR 1.0 (male, employed, divorced, 25% benefit level, other measure).

Table IV. *Factors associated with successful vocational rehabilitation (well = no benefit) 6, 12 and 24 months after termination of rehabilitation (bivariate logistic regression;* n = *716)*

Variables	*n*	OR	95% CI	*p*-value
Age (years)	716	0.965	0.949–0.980	0.0000
Sickness benefit group income[a] (SEK/year) (change in OR with 10,000 SEK)	716	1.038	1.003–1.073	0.0289
Sick-days two years before present sick-leave (change in OR with 30 days)	460	0.970	0.931–1.010	0.1440
Time before start of rehabilitation measure (days) (change in OR with 30 days)	716	0.957	0.933–0.982	0.0011
Length of rehabilitation measure (days) (change in OR with 7 days)	715	1.016	1.0007–1.031	0.0400
Length of sick-case (days) (change in OR with 30 days)	595	0.890	0.869–0.913	0.0000
Costs of rehabilitation measure[b] (SEK) (change in OR with 5000 SEK)	265	1.111	1.010–1.221	0.0293

Only variables with *p*-values <0.25 are shown.
OR = odds ratio; 95% CI = 95% confidence interval.
[a] From yearly income a sum is calculated on which the benefit level is based.
[b] This refers only to rehabilitation services purchased by the social insurance office.

Table V. *Factors associated with successful vocational rehabilitation (lowered levels and well = both groups together) 6, 12 and 24 months after termination of rehabilitation (bivariate logistic regression;* n = *713)*

	Rehabilitation (%)					
	Successful (*n* = 338)	Unsuccessful (*n* = 375)	*n*	OR	95% CI	*p*-value
Gender						
Female	44.7	55.3	423	0.76	0.57–1.03	0.078
Male[a]	51.4	48.6	290	1.00		
Employment status						
Unemployed	35.2	64.8	125	0.54	0.36–0.81	0.003
Employed	50.0	50.0	588	1.00		
Civil status						0.168
Married	50.7	49.3	361	1.65	1.05–2.60	0.031
Unmarried	45.8	54.2	227	1.36	0.84–2.20	0.214
Widowed	50.0	50.0	26	1.61	0.67–3.83	0.286
Divorced	38.4	61.6	99	1.00		
Diagnoses						0.005
Musculoskeletal problems	43.6	56.4	461	0.58	0.42–0.81	0.001
Mental problems	42.2	57.8	45	0.55	0.29–1.06	0.074
Other problems	57.0	43.0	207	1.00		
Type of rehabilitation measure						0.002
Work training	51.9	48.1	376	1.57	1.14–2.15	0.006
Vocational guidance	31.3	68.8	32	0.66	0.30–1.45	0.302
Education	63.2	36.8	38	2.49	1.23–5.03	0.011
Other measure	40.8	59.2	265	1.00		
Who decided about the measure						0.154
Social Insurance office	43.9	56.1	305	1.41	0.46–4.31	0.546
Social Insurance office in co-operation	50.5	49.5	392	1.84	0.60–5.58	0.283
Other	35.7	64.3	14	1.00		

Only variables with *p*-values <0.25 are shown.
OR = odds ratio; 95% CI ± 95% confidence interval.
[a] Italics mean reference = OR 1.0 [male, employed, divorced, diagnoses (other problems), other measure, who decided about the measure (other)].

Table VI. *Factors associated with successful vocational rehabilitation (lowered levels and no benefit = both groups together) 6, 12 and 24 months after termination of rehabilitation (bivariate logistic regression;* n = *713)*

Variables	*n*	OR	95% CI	*p*-value
Age (years)	713	0.991	0.977–1.006	0.2481
Time before start of rehabilitation measure (days) (change in OR with 30 days)	713	0.962	0.941–0.984	0.0010
Length of rehabilitation measure (days) (change in OR with 7 days)	712	1.020	1.005–1.035	0.0085
Length of sick-case (days) (change in OR with 30 days)	594	0.937	0.920–0.954	0.0000
Costs of rehabilitation measure[a] (SEK) (change in OR with 5000 SEK)	264	1.056	0.967–1.154	0.2225

Only variables with *p*-values <0.25 are shown.
OR = odds ratio; 96% CI = 95% confidence interval.

Table VII. *Factors associated with successful vocational rehabilitation (well = no benefit) after termination of rehabilitation (stepwise multiple logistic regression;* n = *713)*

Variable	OR	95% CI	*p*-value
Gender			
Female	0.58	0.41–0.82	0.0018
Male[a]	1.00		
Age			
X + 10 years	0.69	0.59–0.82	0.0000
X years	1.00		
Employment status			
Unemployed	0.54	0.33–0.87	0.0118
Employed	1.00		
Time before start of rehabilitation measure			
X + 30 days	0.96	0.93–0.99	0.0026
X days	1.00		
Benefit			
Partial	1.71	1.16–2.51	0.0066
Full	1.00		
Type of rehabilitation measure			
Other	0.43	0.21–0.88	0.0210
Education	1.00		

OR = odds ratio; 95% CI = 95% confidence interval.
[a] Italics mean reference = OR 1.0. Age *X* represents any chosen age value in an interval from 18 to 62 years minus 10 years. Time factor *X* represents any chosen time value of the number of days before the start of rehabilitation in an interval from 0 to 1457 days minus 30.

In the bivariate analysis the following factors are not included in Table V: nationality ($p = 0.863$), occupation ($p = 0.826$), levels of benefit at start of rehabilitation ($p = 0.785$) and who paid the vocational measure ($p = 0.872$).

An unemployed person had a much lower chance of succeeding with rehabilitation than an employed person (OR 0.54, when employed persons were used as reference, OR = 1.0; 95% CI 0.36–0.81, $p = 0.003$) (Table V).

In the bivariate analysis the following factors are not included in Table VI: sickness benefit group income ($p = 0.610$) and sick-days 2 years before present sick-leave ($p = 0.423$).

Time before start of rehabilitation measure (change in OR by e.g. 30 days) decreased the probability of successful rehabilitation by 4% (OR 0.962, 95% CI 0.941–0.984, $p = 0.0010$) (Table VI). Similar changes in ORs can also be seen for length of rehabilitation and length of sick case.

Tables VII and VIII present the results of the stepwise multiple logistic regression analysis of factors associated with successful vocational rehabilitation.

The women's chances of successful vocational rehabilitation were 42% (1.0–0.58 = 0.42) lower than those of the men (Table VII). The younger, compared with the older people, had better success with their vocational rehabilitation. An unemployed person had a 46% (1.0–0.54 = 0.46) lower chance of successful vocational rehabilitation than an employed person. Interactions between age and the other variables in the model were examined

Table VIII. *Factors associated with successful vocational rehabilitation (lowered levels and well = no benefit) after termination of rehabilitation (stepwise multiple logistic regression;* n = *711)*

Variable	OR	95% CI	*p*-value
Gender			
Female	0.73	0.53–0.99	0.0436
Male[a]	1.00		
Employment status			
Unemployed	0.51	0.34–0.77	0.0015
Employed	1.00		
Time before start of vocational rehabilitation measure			
X + 30 days	0.96	0.94–0.99	0.0016
X days	1.00		
Type of rehabilitation measure			
Other	0.49	0.24–1.00	0.0505
Education	1.00		

OR = odds ratio; 95% CI = 95% confidence interval.
[a] Italics mean reference = OR 1.0. Time factor *X* represents any chosen time value of the number of days before the start of rehabilitation in an interval from 0 to 1457 days minus 30.

(no data shown). There was an interaction between age and employment status and successful rehabilitation. Unemployed persons' chances of successful rehabilitation decreased with age to a greater extent than for employed persons. Every month that passed without rehabilitation reduced the chance of successful rehabilitation by 4% (1.0–0.96 = 0.04). After 6 months the chance had decreased by 22%. A statistically significant interaction was found between age and time before start of rehabilitation. Older people were more sensitive to delay in rehabilitation than younger people regarding outcome. Being partially sick-listed increased the probability of a positive outcome by 71% (1.71–1.0 = 0.71). Compared with education, other types of measure decreased the probability of a positive outcome by 57% (1.0–0.43 = 0.57). There was also an interaction between age and type of rehabilitation measure. Older people who underwent rehabilitation in the form of education were not as successful as those who underwent other measures. No interaction was seen between employment status and the variables included in the model.

The chances of successful vocational rehabilitation were 27% (1.0–0.73 = 0.27) smaller for women than for men (Table VIII). Both unemployment and waiting period before rehabilitation decreased the likelihood of successful rehabilitation, while education had the opposite effect.

DISCUSSION

The primary task of state re-employment policy in Sweden is to return sick-leavers to the workforce. This study focused on vocational rehabilitation within a national social insurance system. The term rehabilitation is here used to refer to all vocationally oriented measures such as medical multidisciplinary, psychological, social and occupational activities aiming to re-establish, among sick or injured people with previous work history, their working capacity and prerequisites for returning to the labour market, i.e. to a job or availability for a job. During these measures, sick-listed persons receive rehabilitation allowance. The aim of this type of rehabilitation is to help the sick-leaver to become self-supporting. Against this background it is important that those who are professionally engaged in helping sick-leavers return to work can identify factors that are associated with rehabilitation outcome so that these data can form a basis for a discussion on how to improve the rehabilitation process and decisions on whom to support re-entering the labour market.

An important finding was that women had a lower chance than men in succeeding with their vocational rehabilitation. This applied to both the "well" group and the "lowered benefits" group after termination of rehabilitation. Previous studies have shown differences between men's and women's rehabilitation (8, 9). Women obtain more on-the-job training, while men undergo investigation and education. Bäckström (8) showed that men's rehabilitation starts at an earlier stage than women's and is more extensive. This tendency to discriminate against women in vocational rehabilitation is worrying. One way to try to increase the number of successfully rehabilitated women would be to take gender differences into account when offering rehabilitation measures. A rapidly changing labour market demands new ideas and solutions in vocational rehabilitation, especially that of women, and women are probably in need of more individualized rehabilitation solutions instead of the collective programmes that are common today.

The association between age and successful rehabilitation was strong in the "well" group. A 10-year difference reduces the chance of successful rehabilitation by 31% for the older person. The younger person has a greater chance than the older person of re-entering the labour market or returning to work after vocational rehabilitation (14–19). The present study shows that an unemployed person's chances of successful rehabilitation decrease with age to a greater extent than an employed person's. In the "lowered benefit" group there was no association between age and successful vocational rehabilitation.

Employment status is an important factor for rehabilitation outcome. Earlier studies indicate that unemployed people are partly disregarded in the rehabilitation process (4, 5) and also more difficult to rehabilitate than employed people, especially unemployed women because they are exposed to more risk factors than others (6, 7). The present study shows that an unemployed sick-listed person has a much lower chance of returning to the labour force than an employed person. Poor outcome because of unemployment was also found by Elkayam et al. (20). The negative influence of unemployment on rehabilitation outcome may have several explanations. Gallagher et al. (21) suggest that absence from the job weakens "work identity", which is considered to vitiate return to work. Another explanation is that unemployed sick-listed people lack important support from a number of actors involved in vocational rehabilitation, e.g. employer, workmates and occupational healthcare. They are also seen as a problematic group at the social insurance office (22). This is also reported, to some extent, by the physicians involved in the sick-listing of the unemployed (23). Against this background they might be a group with special needs regarding vocational rehabilitation. The short, limited and low-cost rehabilitation that they are offered today is not enough to affect future sick-leave sufficiently. They may need more individually adjusted measures.

Another hindrance to successful rehabilitation of the unemployed sick-listed can be the uncertainty as to which authority has the responsibility for their vocational rehabilitation (34): the social insurance office or the employment office. The present study shows that a delay before the start of rehabilitative vocational measures has importance for how well the rehabilitation succeeds, especially among older people. For every month without active measures, the chance of success decreases by 4%. For instance, if the waiting period is 6 months the chance of successful vocational rehabilitation decreases by about 22%. The opinion that early vocational rehabilitation is more effective than late is, however, questioned by others (24–26). In a study of those with musculoskeletal problems, Marnetoft et al. (27) showed that early vocational rehabilitation for the employed is,

in the short term, positive for the outcome. In the longer term, however, the positive effect was no longer evident. This was also supported by Selander (14) who, at 36 months after termination of rehabilitation, found no significant differences regarding outcome between those employed and unemployed who received early and delayed vocational rehabilitation, respectively. It could be important from a quality aspect that the rehabilitation counsellor early in the sick-listing period obtains a general picture of the need of rehabilitation, hindrances and possibilities. When this is done, it is essential that the measure starts at the right time in the process. Rehabilitation measures initiated both too early and too late will probably be equally adverse. The initial levels of benefit are important for how the rehabilitation will succeed. A partially sick-listed person has a greater chance of succeeding than one who is fully sick-listed at the start of rehabilitation. The results also suggest that, for a positive outcome, contact should be maintained with one's workplace during the sick-listing period. Part-time sick-listing is probably a useful way for an active sick-leave period to facilitate resuming work, and this is probably a much underutilized tool. The results support the recommendation of part-time sick-listing to rehabilitation instead of full-time sick-leave.

Education was found to be a successful rehabilitation measure, i.e. it led to a successful rehabilitation to a greater extent than other measures did. Hennessey & Muller (18) concluded that general education has a positive effect on the tendency to return to work. This is supported in previous studies by the National Social Insurance Board (9, 35), which also show that women receive less education than men, with women's rehabilitation consisting generally of workplace training. Since work training is a relatively cheap measure and a less innovative one, this can be interpreted as discriminating against women in vocational rehabilitation. When the labour market is rapidly changing and the demand for skilled labour increasing, improved competence through education could help to retain women at high risk of disability pensions at their workplaces. For an unemployed woman, improved competence through education could also in many cases make the difference between employment and unemployment. Unemployment is significantly higher for those with less training and education (28). However, the present study also shows that education as a vocational measure is not equally successful in all subgroups: it is more powerful for younger than for older people. This could be interpreted in different ways. One explanation could be that the education offered is too brief to increase competence among the older but enough to make the younger people more competitive on the labour market.

The results indicate the need to discuss the effectiveness of vocational rehabilitation management and the ethics of selection for vocational rehabilitation.

The study design raises the question of how representative this sample is compared to all long-term sick-listed people. Random sampling ensures that all subpopulations are represented in the sample in roughly the same mix as in the overall population. Looking at the background data, one can assume that subpopulations are well represented in this sample. However, the study design used limits the analysis reported to subject populations with similar characteristics.

ACKNOWLEDGEMENTS

This study was supported by the Karolinska Institute, Stockholm, Mid-Sweden University, Östersund and the Swedish Medical Research Council, project no. 5720. We wish to thank Jörgen Söderback, Department of Informatics, Mid-Sweden University, for valuable discussion and advice concerning the statistics.

REFERENCES

1. Swedish Government Official Report (SOU). En allmän och aktiv försäkring vid sjukdom och rehabilitering. Slutbetänkande från sjuk-och arbetsskadekommittén (A public and active insurance in illness and rehabilitation). Report from the Sickness and Injury Committee, SOU 1996; 113: 75–120 (in Swedish with English summary).
2. Marnetoft S-U, Selander J, Bergroth A, Ekholm J. Unemployed long-term sicklisted people in rural Jämtland compared with circumstances in the city of Stockholm, Sweden. Work—A Journal of Prevention, Assessment and Rehabilitation 1998; 10: 3–8.
3. Selander J, Marnetoft S- U, Bergroth A, Ekholm J. Unemployment among the long-term sick. Unemployed long-term-sicklisted people compared with employed long-term-sicklisted people in Stockholm, Sweden. Eur J Phys Med Rehabil 1996; 6: 150–153.
4. Marnetoft S-U, Selander J, Bergroth A, Ekholm J. The unemployed sick-listed and their vocational rehabilitation. Int J Rehabil Res 1997; 20: 245–253.
5. Selander J, Marnetoft S-U, Bergroth A, Ekholm J. The process of vocational rehabilitation for employed people on sick-leave: employed vs unemployed people in Stockholm compared with circumstances in rural Jämtland, Sweden. Scand J Rehabil Med 1998; 30: 55–60.
6. Selander J, Marnetoft S-U, Bergroth A, Ekholm J. Vocational rehabilitation and future sick-leave. Disabil Rehabil 1998; 20: 49–54.
7. Selander J, Marnetoft S-U. Risk factors for long-term sick-leave and disability pension among unemployed women. Int J Rehabil Res 1999; 22: 277–282.
8. Bäckström I. Rehabilitering för män. En undersökning om arbetsrehabilitering av långvarigt sjukskrivna kvinnor och män (Rehabilitation for men. Occupational rehabilitation of women and men on long-term sick leave). Report No. 37. Umeå: Institution for Social Work, Umeå University 1994; pp. 48–51 (in Swedish).
9. Andersson C, Lidwall U. Riksförsäkringsverket Redovisar, Risk-frisk-faktorer—sjukskrivning och rehabilitering i Sverige (Who got vocational rehabilitation?). In: Marklund S, ed. Risk-healthy-factors—sicklisting and rehabilitation in Sweden. Stockholm: Riksförsäkringsverket 1997; pp. 89–119 (in Swedish with English summary).
10. Alexanderson K. Indicators for working women. In: Kilbom Å, Messing K, Thorbjörnsson CB, eds. Women's health at work. Stockholm: National Institute for Working Life 1998; pp. 143–144.
11. Karlsson H, Klingstedt M, Rylander O. Utvecklingen av den ersatta ohälsan (The development of paid illness). In: Marklund S, ed. Riksförsäkringsverket Redovisar, Risk-frisk-faktorer—sjukskrivning och rehabilitering i Sverige ("Risk-healthy" factors—sicklisting and rehabilitation in Sweden). Stockholm: Riksförsäkringsverket 1997; pp. 21–29 (in Swedish with English summary).
12. Straaton KV, Harvey M, Maisiak R. Factors associated with successful vocational rehabilitation in persons with arthritis. Arthritis Rheum 1992; 35: 503–510.
13. Ramsey FL, Shafer DW. The statistical sleuth—a course in methods of data analysis. Belmont, CA: Wadsworth; 1997.
14. Selander J. Unemployed sick-leavers and vocational rehabilitation—a person-level study based on a national social insurance

material. Thesis, Department of Rehabilitation Medicine, Karolinska Institutet, Stockholm, 1999.
15. Infante-Rivard C, Lortie M. Prognostic factors for return to work after a first compensated episode of back pain. Occup Environ Med 1996; 53: 488–494.
16. Beissner KL, Saunders RL, McManis BG. Factors related to successful work hardening outcomes. Phys Ther 1996; 76: 1188–1201.
17. The National Social Insurance Board Reports. Riksförsäkringsverket Redovisar, Långvarigt sjukskrivna. Arbetslöshet och sammansatta riskfaktorer (Long-term sick-leavers. Unemployment and compound risk factors). Stockholm: National Social Insurance Board 1996; p. 14 (in Swedish: with English summary).
18. Hennessey JC, Muller LS. The effect of vocational rehabilitation and work incentives on helping the disabled-worker beneficiary back to work. Soc Secur Bull 1995; 58: 15–24.
19. Tate DG. Workers' disability and return to work. Am J Phys Med Rehabil 1992; 7: 92–96.
20. Elkayam O, Ben Itzhak S, Avrahami E, Meidan Y, Doron N, Eldar I, et al. Multidisciplinary approach to chronic back pain: prognostic elements of the outcome. Clin Exp Rheumatol 1996; 14: 281–228.
21. Gallagher RM, Rauh V, Haugh LD, Milhous R, Callas PW, Langelier R, et al. Determinants of return-to-work among low back pain patients. Pain 1989; 39: 55–67.
22. Hensing G, Timpka T, Alexandersson K. Dilemmas in the daily work of social insurance officers. Scand J Rehabil Med 1997; 6: 301–309.
23. Timpka T, Hensing G, Alexandersson K. Dilemmas in sickness certification among Swedish physicians. Eur J Publ Health 1995; 3: 215–219.
24. Bergendorf S, Edlund T, Lidwall U, Ljungberg D, Olsson D. Results of vocational rehabilitation and purchased vocational services. In: Marklund S, ed. Riksförsäkringsverket Redovisar, Risk-frisk-faktorer—sjukskrivning och rehabilitering i Sverige (Factors of risk and health—sicklisting and rehabilitation in Sweden). Stockholm: Riksförsäkringsverket 1997; pp. 121–145 (in Swedish with English summary).
25. Ekberg K, Linton S. Tidig rehabilitering inte entydigt positiv (Early rehabilitation not only positive). Läkartidningen 1994; 10: 1969–1972 (in Swedish).
26. Boschen KA. Early intervention in vocational rehabilitation. Rehabil Counsell Bull 1989; 32: 254–265.
27. Marnetoft S-U, Selander J, Bergroth A, Ekholm J. Vocational rehabilitation—early versus delayed. The effect of early vocational rehabilitation compared to delayed vocational rehabilitation among employed and unemployed long-term sicklisted people in a Swedish rural area. Int J Rehabil Res 1999; 3: 161–170.
28. Westberg H. Where are women in today's workplace. In: Kilbom Å, Messing K, Thorbjörnsson CB, eds. Women's health at work. Helsingborg: National Institute for Working Life 1998; pp. 35–40.

References 29–35 are in Swedish and can be obtained on request from the corresponding author.