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Elin Ekbladh, Lena Haglund and Lars-Håkan Thorell

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The Worker Role Interview -Preliminary Data on the Predictive Validity of Return to Work of Clients after an Insurance Medicine Investigation.

Elin Ekbladh,[1,3] Lena Haglund,[1] Lars-Håkan Thorell[2]

Corresponding person:
Elin Ekbladh
Department of Neuroscience and Locomotion
Section of Occupational Therapy
Faculty of Health Sciences
Linköpings universitet
SE-581 83 Linköping
Sweden
e-mail:eliek@inr.liu.se
phone number: +46 13 221685
fax number: + 46 13 227519

[1] Department of Neuroscience and Locomotion, Section of Occupational Therapy, Faculty of Health Sciences, Linköpings universitet, Linköping, Sweden.
[2] Department of Neuroscience and Locomotion, Section of Psychiatry, Faculty of Health Sciences, Linköpings universitet, Linköping, Sweden.
[3] Correspondence should be directed to Elin Ekbladh, Department of Neuroscience and Locomotion, Section of Occupational Therapy, Faculty of Health Sciences, Linköpings universitet, SE-581 83 Linköping, Sweden, e-mail:eliek@inr.liu.se.

ABSTRACT

The aim was to investigate the predictive validity of the Worker Role Interview (WRI) for return to work at a two-year follow up of clients who attended an insurance medicine investigation centre. The WRI identifies psychosocial and environmental factors, that influence a person's abilities to return to work. Forty-eight of 202 consecutively selected clients constituted the study group. The Mann–Whitney *U* test was used to test the statistically significant differences in WRI ratings between those who were working (*n*=6) and those who were not (*n*=42) two years after their investigations. Five of the 17 items in WRI had a tentative predictive validity of return to work. The content area "personal causation" in WRI, had the best predictive validity. The results emphasize the importance of considering the unique individual's beliefs and expectations of his/her effectiveness at work when assessing clients' work ability and planning for further rehabilitation.

KEY WORDS: prediction, return–to-work, assessment, psychosocial, sick-leave, insurance-medicine

INTRODUCTION

Long-term sick-listing entails great costs for the society and suffering for the individual. In Sweden costs for sick–listing longer than one year have increased by about 30% per year during 1998 – 2001 (1). As rehabilitation could decrease these costs (2), valid and reliable methods are then required for assessing work ability and identifying individual rehabilitation needs. In the reviews by Innes and Straker (3,4) of work–related assessments, the authors commented that the shortage of sufficiently reliable and valid assessments is a major concern in relation to the ability to make proper clinical decisions concerning clients' work ability.

The Worker Role Interview (WRI) has been used to identify psychosocial and environmental factors that influence the ability to return to work after sickness or injury. The WRI was developed in 1991 and has been tested for validity and reliability (5-7). The WRI is composed of a semi-structured interview and 17 items (Table I), which are rated on a four-point rating scale. The client is assessed in relation to return to work in general or to a specific job (8). The theoretical base of the WRI is the Model of Human Occupation (MOHO) (9). In the MOHO, humans' occupational behavior is explained as a function of motivation, lifestyle and performance capacity in interaction with the surrounding environment. In the WRI the person's motivation for work is conceptualized by the three content areas; personal causation, values, and interests (item 1-7). Lifestyle and its influence on work is conceptualized by the content areas; roles and habits (item 8-13). The environment content area (item 14-17) conceptualize the person's perception of the physical and social environment in relation to his or her work situation. Performance

capacities are not identified by the WRI since these are better obtained by observation (8,9).

Biernacki (5) examined the reliability of the WRI on clients with hand injuries. She found sound test-retest reliability and an acceptable inter-rater reliability for the overall assessment even though three of the six content areas (values, roles, habits) in the WRI had an inter-rater reliability of 0.46-0.51.

The American version of the WRI was translated to Swedish and adapted to Swedish culture in 1996 (10). Haglund and co-workers (6) examined the construct validity of the Swedish WRI (WRI-S) in a psychiatric population. The results showed that the WRI seemed to be a psychometrically sound assessment as all but two items in the environment content area (Perception of boss, Perception of co-workers) assessed psychosocial work ability. The WRI-S was revised in 2000 after further studies of its content validity and inter-rater reliability (11,12). The American and the Swedish WRI manuals include background information and guidelines for gathering and rating information (8,12).

Velozo and co-workers (7) reported three studies on the WRI. Two of them examined the construct validity and the third examined the predictive validity of the WRI for returning to work. The findings showed that the WRI items, except some in the environment content area, constitute a unidimensional construct for assessing psychosocial work ability and that neither the WRI items nor other variables such as chronicity, diagnosis, number of surgeries, attorney involvement or age were useful in predicting return to work.

There is a need to investigate the validity and reliability of work-related assessments (3,4) and to further attempt to determine the predictive value of the WRI for return to work (7). To be able to know whether an assessment is useful for predicting work ability, investigations of the predictive validity of the assessment in relation to some kind of related criterion are required. For assessing that investigates work ability, a highly valued criterion is return to work (4).

AIM

The aim was to investigate the predictive validity of the Worker Role Interview for return to work at a two-year follow up of clients at an insurance medicine investigation centre.

METHODS

Setting and subjects

Insurance medicine investigations of work ability were made at hospitals adherent to the National Social Insurance Board (NSIB) in Sweden. In 2000 the NSIB hospitals were in year 2000 reorganized into Centres of Insurance Medicine. The clients who came to the NSIB hospitals had in general complex problems that were difficult to assess and comprehensive sick-listing periods in behind. The clients had often gone through several investigations before they came to the NSIB hospital. One part of the NSIB hospital activities comprised two weeks of investigations by a team consisting

of a physician, psychologist, occupational therapist, physiotherapist and welfare officer. The team investigated the client's work ability from a holistic point of view (13). The team members from varying professions used different assessment methods to assess the client's work ability. The occupational therapist used the WRI as one method among others to assess work ability.

The clients were consecutively selected from one investigation team's clients during a period of 10 months in the end of the 1990's at a hospital associated to the National Social Insurance Board (NSIB) in Sweden. The clients met the same team during a two-week investigation. On following up the 202 consecutive clients two years (19-24 months) after their investigation period, three had died, two had moved abroad, one had protected information and, seven clients had no addresses available. Thus 189 clients were mailed and asked to participate in the study. In total 61 clients replied; 59 agreed to participate and 2 refused. Of those 59 clients that agreed, 48 had WRI ratings available. Those who did not reply or did not agree and those who did not have a WRI rating were excluded from the primary participant group. Thus, the primary participant group comprised 48 clients, i.e. 25% of the selected group (*n*=189) (Fig 1). A second letter was sent 6 months later to the 128 clients who did not reply. Sixty-three clients replied which, together with the 11 clients who did not have WRI ratings comprise 39% of the selected group. These 74 clients constituted the secondary participant group (Fig 1).

Procedure

Information about the clients' addresses was obtained from the Swedish taxation authorities. In the first letter, the clients were asked to participate in the study by allowing the authors read their case reports and the enclosed WRI ratings from their

investigation at the NSIB hospital. They were also asked to answer a three-item questionnaire, containing following questions; 1) Are you presently employed? 2) What have you been doing since the investigation at the NSIB hospital? 3) What does your work situation look like today? The following alternatives were listed to question 2 and 3: working, rehabilitation, sick-listed, early retirement pension / sickness grant, unemployed, and an open alternative. For how long and to what extent was also asked for for each alternative in question 2 and to what extent were asked for in question 3. The answers to question 3 were dichotomized into "working" or "not working" and used as the target variable for testing the predictive validity of the WRI. Clients who answered that they were working at least 25% of fulltime work were classified as working. One reminder was sent after a month to those who did not reply to this first letter.

A second letter with a question about work status was sent six months later to those who did not reply to the first letter or the reminder. The question stated in the second letter was: "Are you presently working? If yes, to what extent?" This information was used to compare whether there were any statistically significant differences in work status for the participant group and the other clients selected for the study. A note in the second letter ensured the participants that the authors were not going to read the case report. A reminder about the second letter was sent after two months.

A stamped and addressed envelope was attached to all letters that were sent. The respondents had also the opportunity to give reply to the question in the second letter by phone, which two clients did.

Case reports

When the NSIB hospitals in Sweden were reorganized to Centres of Insurance Medicine during the follow-up period of the present study, the clients' case reports were moved to the National Archives in Sweden, from which information was retrieved regarding the clients' diagnosis, occupation, country of origin, social status, time since working, employment status and the NSIB hospital team's joint assessment of the clients' work ability. The clients' diagnoses were classified by the physician in the NSIB hospital investigation team, according to the International Classification of Diseases (14). The occupations of the clients were organised into different work areas according to the International Standard Classification of Occupations (15). The clients' nationality of origin was categorized as Swedish or other origin. Social status was organized into having children living at home or not. Time since working was counted in months between the last month working and the time when the NSIB investigation took place. Employment status was categorized as employed or not when the NSIB investigation took place. The team's joint assessment of the clients' work ability was categorized into 0 %, 50 % or 100 % work ability by the authors [EE, LH] independently. For 30 of the clients, work ability was clearly stated as 0%, 50% or 100% in their case reports. The other 18 clients' recorded work ability was more vague. When the authors first compared their categorizations, there was a difference in five clients, but agreement was attained after discussion between the authors.

WRI ratings

This study is based on WRI ratings made during the ongoing revision process of the first version of the WRI-S. The WRI ratings were enclosed with the case reports. The

four-point rating scale was used for each of the 17 WRI items, where a value of "1" implied that the item strongly interferes with returning to work, "2" implies that the item interferes, "3" that the item supports return to work and "4" that the item strongly supports returning to work. All 17 WRI items were not applicable to all persons. For example, when a client did not have a specific job to relate to, items 11,14,16 and 17 were not applicable. The scoring "not applicable" was used when the item was not applicable to the particular client or when information was missing. Thus the number of rated clients varied over the WRI items.

Ethical considerations

The clients were informed in writing in the first and second letter about the aim of the study, that the information would be treated confidentially, and that participation in the study was voluntary. Informed consent was received from the clients via mail. In the first letter the clients were also asked to sign an approval to allow the authors to read their NSIB case reports stored at the National Archives. The ethical research committee at Karolinska Institutet, Sweden, approved the study.

Statistical methods

The predictive validity of the WRI for returning to work was tested using the Mann–Whitney *U* test by investigating statistically significant differences in WRI ratings, age, months since work and work ability between the working group and the non-working group. The Fisher's exact probability test was used to test the differences in gender, origin, employment status and children living at home or not between the working and non-working group. The Student's *t*-test was used to test statistically significant differences in age and the chi-square (χ^2) test was used to test statistically

significant differences in working or not and gender between the primary and the secondary participant groups. The Student's *t*-test was also used to test statistically significant differences in age, and the chi-square (χ^2) test was used to test statistically significant differences in gender between the primary participant group and the secondary participant group together with the non-participants.

The rejection limit of the null hypothesis for the statistical tests was set to $\alpha = 0.05$. All tests were two sided. All data were analysed using the SPSS, version 10.0 (16).

RESULTS

In the primary participant group at the two-years follow-up, 6 clients (13%) were working and 42 (88%) were not working at all. Of the 6 clients that were working 3 clients were working 50% of fulltime and the other three were working 25%, 75% and 95%, respectively. Two clients in the working group were women.

Statistically significant differences in the WRI ratings between the working group and the non-working group two years after the NSIB investigation are shown in table II. There were significant differences between the groups for five WRI items: 1 Assesses abilities and limitations; 2 Expectation of job success; 3 Takes responsibility; 9 Appraises work expectations; and 14 Perception of work setting. For the working group these items were generally rated as more supportive for returning to work than for the non-working group.

The mean age of the 48 clients in the primary participant group was 51 with a range from 33 to 64 years. There were no statistically significant differences between the

working and non-working group concerning age, months since the client had been working when the NSIB investigation took place and the clients' work ability assessed by the joint team at the NSIB hospital (Table III).

Twenty-eight (58%) of the primary participants were females. Eleven (23%) of the primary participants were of foreign nationality and 27 (56%) of the primary participants were employed when the NSIB investigation took place and, 18 (38%) had children living at home. No statistically significant differences could be found according to Fisher's exact probability test between the groups concerning gender (male n = 20, female n = 28, p = 0.218), origin (Swedish n = 37, other n = 11, p = 1.000), employed or not when the investigation took place (employed n = 27, not employed n = 21, p = 0.211), or whether the client had children living at home or not (children living at home n = 18, no children living at home n = 26, p = 0.289).

The primary participant group's diagnoses were organized into 16 groups (table IV). Thirty-one clients had one diagnosis, 14 clients had two, 2 clients had three and one client had no diagnosis listed in the case report. The most common diagnoses were diseases of the musculoskeletal system and connective tissue (n = 43). The client's occupations are shown in table V. Service workers, and shop sales workers were the most common occupations (n = 18) in the group.

There were no statistically significant differences between the primary participants (n=48) and the secondary participants (n = 74) concerning whether they were working or not (χ^2 = 0.355, df = 1, p = 0.551). Of the 74 clients in the secondary participant group, 12 clients were working, and 6 clients were women. Six were

working 50%, 4 clients were working less than 50% and 2 clients were working more than 50%. No statistically significant differences between the groups were found concerning age (primary participant group: mean ± SD = 51.23 ± 7.95, n = 48; secondary participant group: mean ± SD = 51.61 ± 8.23, n = 74; t = 0.251, df = 120, p = 0.802) or gender (χ^2 = 0.011, df = 1, p = 0.916).

Further no statistically significant differences were found between the groups of primary participants (A) and secondary participants together with the non-participants (B) concerning age (group A: mean ± SD = 51.23 ± 7.95, n = 48; group B: mean ± SD = 49.63 ± 8.53, n = 141; t = 1.140, df = 187, p = 0.256) or gender (χ^2 = 0.755, df = 1, p = 0.385).

DISCUSSION

The present study investigated on a preliminary level the possible predictive validity of return to work for the WRI. The results at a two-year follow-up suggest that five of the seventeen items in the WRI have a predictive validity for return to work. The content area in WRI, which had the best predictive validity, is personal causation. In that area, all three items (item 1,2,3) discriminated statistically significantly between those who were subsequently working or not. The items were rated as generally more supportive for the working group (Table II). This indicates that personal causation seems to be an important prerequisite for return to work. Personal causation is conceptualized in the MOHO as one part of the human's motivation for occupation, i.e. work, and includes factors such as the individual's capacity to assess his/her work abilities, the individual's belief that he/she will return to work and the responsibility

the individual takes for his/her work situation. According to the MOHO, motivation also includes the client' s values related to work and interests within and outside of work. The client's motivation as explained in the MOHO, has been argued to possess a decisive significance for the result of the treatment process (17).

In the content area roles in the WRI, one item (item 9) "Appraises Work Expectations" was significantly differently rated by the working and non-working group (Table II). This item concerns whether the client knows how he/she expects to perform the worker role. The working group seemed to have a greater ability to internalize general and specific expectations of work, which supports returning to work.

In the environment content area "Perception of work setting" (item 14) was significantly differently rated by the working and non-working groups (Table II). The item concerns the client's perception of the physical work environment, i.e. if it is a support or a hindrance for return to work. The working group perceived the physical environment to be more supportive than the non-working group.

The content areas values, interests and habits in the WRI included no items that seemed to be predictive for returning to work. That only five of the seventeen items in the WRI were predictive for returning to work after the two-years follow-up may be explained by the small sample size of the primary participant group and the imbalance in the distribution of the working and non-working group.

Neither age, gender, origin, employment, children living at home or not, months since work before the NSIB investigation, nor the NSIB team's joint assessment, were statistically significantly different between the working and the non-working group.

The statistical methods applied were univariate and mainly parametric. The reasons for this were the small study group, imbalance in the distribution of the working (n=6) and the non-working group (n=42), missing of complete data for all WRI items due to non-applicable items for the client's situation or to information missing, and that most of the demographic related variables were classifications on a nominal level. The large rate of dropouts may be explained by the design of the study. It was a retrospective study and the clients were asked about participation two years after their investigations at the NSIB –hospitals. A prospective study may have reduced the number of dropouts.

The large rate of dropouts and the imbalance in the distribution of the groups, make a generalization problem. However the most common diagnoses in the primary participant group were those related to the musculoskeletal system and connective tissues; the next most common were those related to mental and behavioural disorders and those diagnoses are also the most common for people in Sweden who are long-time sick listed (more than 60 days). Service workers and shop sales workers are over-represented in the present study and among long-time sick-listed persons in Sweden in general (18). This and the fact that there were no statistically significant age and gender differences between the primary participant group and the secondary participant group together with the non – participants suggest that the primary participant group is similar to the clients selected for the study. This is also supported

by the fact that no statistically significant difference was found between the primary participant group and the secondary participant group concerning working or not after the two-year follow-up. This motivates that preliminary conclusions concerning the predictive validity of WRI could be drawn.

In the present study the working group consisted of 6 clients, and the non-working group consisted of 42 clients. The small sample size of the primary participant group could be explained by the nature of the study group. Most of the clients who were investigated at the NSIB hospitals had gone through several investigations before and were having complex problems related to their work situation (13). This could have made the subjects in the present study tired of being investigated further, and participation in the present study could have been perceived as an additional burden. It seemed to be harder to let an unknown person read the case report than to simply give an answer to a question concerning the current work situation as only 59 of the 189 clients agreed to let us read their case reports. Another 63 clients agreed and answered the work status question. This should be seen in relation to the fact that many of these clients are in a vulnerable situation, where their subsequent working life is dependent on statements made by insurance medicine professionals concerning their work-ability and that some of the clients are in proceedings concerning these judgments.

Item two in the WRI, which concerns the client's belief that he/she will return to work, was found to be predictive for return to work. These findings concerning the client's belief in his/her work ability are in line with the findings from the study by Bergendorff and co-workers (19). They investigated predictors for ending sick-listing

in a larger Swedish study. The sample consisted of 1 575 clients who were sick-listed for 28 days because of low-back or neck problems. The four factors they found predictive for ending sick-listing for the whole group after one year were; the client's belief in his/her work ability, psychological demands at work, occurrence of other diseases and the existence of a rehabilitation plan.

The overall findings of the present study emphasize the importance of considering the unique individual's beliefs and expectations of his/her abilities and perception of the work environment for returning to work. These results are in line with the results from a study by Feuerstein & Thebarge (20), who concluded that patients' perception of the work environment and of their psychosocial and physical abilities and could discriminate between who continues to work and who is work disabled in patients with chronic pain. They highlights the importance of considering patients' perceptions of their physical abilities and their perceptions of the work environment in relation to find out what could be significant barriers to successful work re-entry.

The results of the present study differ from the results Velozo and co-workers (7) found in their study of the predictive validity of the WRI for returning to work. Their results indicated that neither the WRI nor the other variables i.e. chronicity, diagnosis, number of surgeries, attorney involvement and age were predictive for returning to work three months after discharge from rehabilitation. The fact that the result of this study and the study by Velozo et al (7) differs motivates further investigation of the predictive validity of the WRI in larger samples.

Conclusion

The results of the present study allow the tentative conclusion that WRI to some parts, at least, possesses predictive validity for returning to work of clients at an insurance medicine investigation centre. The findings emphasize the importance of considering the unique individual's beliefs and expectations of his/her effectiveness in relation to work, the individual's knowledge about how to act in a worker role, and the individual's perception of his/her work environment when assessing clients' work ability and planning for further rehabilitation. The small study group makes a problem for generalization of the present results and further research is needed with greater numbers of subjects for investigations of the predictive validity of the WRI for returning to work.

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FIGURE 1. The Process of Client Selection

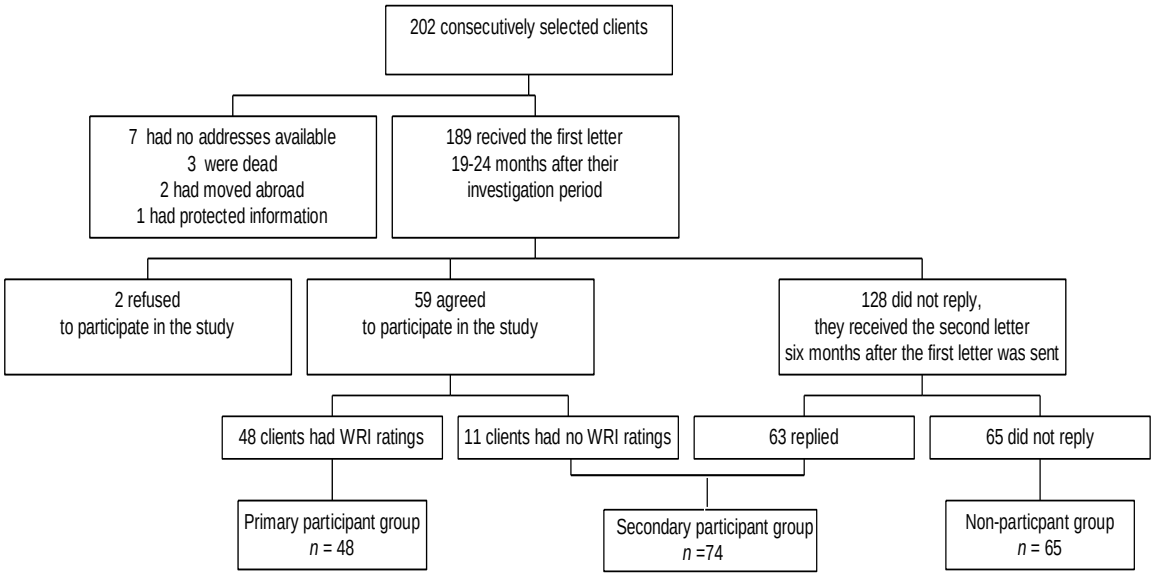

Table I. Items and content areas in Worker Role Interview

Content area	Item
Personal Causation	1. Assesses abilities and limitations
	2. Expectations of job success
	3. Takes responsibility
Values	4. Commitment to work
	5. Work-related goals
Interests	6. Enjoys work
	7. Pursues interests
Roles	8. Identifies with being a worker
	9. Appraises work expectations
	10. Influence of other roles
Habits	11. Work habits
	12. Daily routines
	13. Adapts routine to minimize difficulties
Environment	14. Perception of work setting
	15. Perception of family and peers
	16. Perception of boss
	17. Perception of co-workers

Table II. Frequencies of and differences in WRI ratings between working and non- working clients in the primary participant group. Mann-Whitney U test is used.

	Group A Working *(n=1-6)*				Group B Not working *(n=18-41)*					
WRI item	Rating 1 *n*	Rating 2 *n*	Rating 3 *n*	Rating 4 *n*	Rating 1 *n*	Rating 2 *n*	Rating 3 *n*	Rating 4 *n*	*Z*	*p*-value
1	0	1	3	2	4	18	16	3	-2.021	0.043*
2	1	0	3	2	27	7	6	1	-2.981	0.003**
3	0	1	3	2	5	17	10	2	-2.373	0.018*
4	0	0	3	3	0	1	30	9	-1.437	0.151
5	2	2	0	2	10	12	4	2	-0.577	0.564
6	0	0	5	1	1	3	27	7	-0.351	0.726
7	0	5	0	0	17	7	14	0	-0.302	0.762
8	0	1	3	2	4	13	17	6	-1.422	0.155
9	0	0	2	3	0	5	26	6	-2.123	0.034*
10	0	1	0	0	3	12	3	0	0.000	1.000
11	0	0	3	1	0	1	14	6	0.000	1.000
12	1	3	2	0	3	12	16	2	-1.038	0.299
13	0	1	3	1	5	9	22	1	-1.258	0.208
14	1	1	3	0	14	8	1	0	-2.331	0.020*
15	0	0	4	0	0	6	17	3	-0.454	0.649
16	0	1	3	1	3	2	11	4	-0.264	0.792
17	0	1	3	1	0	0	13	7	-1.132	0.258

* $p < 0.05$; * * $p < 0.01$

Table III. Age, months since work and work ability in the primary participant group and differences between the group who is working and the group who is not. Mann-Whitney U test is used.

	Total group (*n* =47-48)	Working (*n* = 6)	Not working (*n* =41-42)	*Z*	*p*-value
Age	51.23 ± 7.945	47.67 ± 7.394	51.74 ± 7.973	-1.202	0.229
Months since work at the investigation	23.21 ± 24.502	9.50 ± 8.044	25.17 ± 25.473	-1.685	0.092
The NSIB team's joint assessment of work ability in percent	58.51 ± 42.117	58.33 ± 37.639	58.54 ± 43.160	-0.103	0.918

Table IV. The distribution of diagnoses according to the International Classification of Diseases in the primary participant group.

ICD10 diagnoses	All participants *n**	Working *n**	Not working *n**
Diabetes mellitus (E10-E14)	1	1	0
Obesity and other hyperalimentation (E65-E68)	2	1	1
Mood disorders (F30-F39)	2	0	2
Neurotic, stress-related and somatoform disorders (F40-F48)	8	0	8
Behavioural syndromes associated with physiological disturbances and physical factors (F50-F59)	1	0	1
Nerve, nerve root and plexus disorders (G50-G59)	2	1	2
Other disorders of ear (H90-H95)	1	0	1
Other diseases of intestines (K55-K63)	2	0	2
Arthropathies (M00-M25)	8	0	8
Systemic connective tissue disorders (M30-M36)	1	0	1
Dorsopathies (M40-M54)	14	2	12
Soft tissue disorders (M60-M79)	18	2	16
General symptoms and signs (R50-R69)	2	1	1
Sequelae of injuries, of poisoning and of other consequences of external causes (T90-T98)	1	0	1
Persons with potential health hazards related to socio-economic and psychosocial circumstances (Z55-Z65)	1	0	1
Persons encountering health services in other circumstances (Z70-Z76)	1	0	1

* Each client could have more than one diagnosis

Table V. The distribution of occupations according to the International Classification of Occupation (ISCO, 88) in the primary participant group (n=48).

Profession	All participants	Working	Not working
	n	*n*	*n*
Legislators, senior officials and managers	2	0	2
Professionals	0	0	0
Technicians and associate professionals	2	0	2
Clerks	8	1	7
Service workers and shop sales workers	18	2	16
Skilled agricultural and fishery workers	0	0	0
Craft and related trades workers	5	1	4
Plant and machine operators and assemblers	9	2	7
Elementary occupations	4	0	4