

## INDICATORS FOR RETURN TO WORK AFTER STROKE AND THE IMPORTANCE OF WORK FOR SUBJECTIVE WELL-BEING AND LIFE SATISFACTION

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**Objectives.** This study focuses on the continuation of gainful employment after experiencing stroke, addressing factors indicative of readiness for return to work, subjective well-being and life satisfaction.

**Methods.** The target group comprised 120 patients, studied by means of medical records and postal questionnaires.

**Results.** A total of 41% had returned to work, although there were changes concerning employers, assignments and working hours. Individuals who had returned to work reported a significantly higher level in subjective well-being and life satisfaction. Being able to walk meant the greatest chance of returning to work (odds ratio = 3.98) followed by white-collar worker (odds ratio = 2.99) and having preserved cognitive capacity (odds ratio = 2.64).

**Conclusion.** Returning to work after stroke is a major factor for high subjective well-being and life satisfaction. Three factors indicative of readiness for return to work were identified, providing implications for more efficient vocational rehabilitation programmes.

**Key words:** work, profession, functional ability, subjective well-being, life satisfaction, stroke

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### INTRODUCTION

Stroke is one of the most expensive diseases in modern society. The incidence of stroke is strongly connected to increasing age, but younger individuals can also experience stroke. According to a recent Swedish governmental report, about 15–20% of stroke patients are of working age. Stroke in younger age results not only in impairment and limitation in activity; it also impacts on participation in activities, such as returning to work. Costs arising from reduced production due to sick leave, early retirement and untimely death are estimated to be 25% of the total costs of stroke care (1). This study focuses on the continuation of gainful employment after experiencing a stroke.

According to the Standard Rules adopted by the United Nations General Assembly (2), rehabilitation should be viewed as a process with the objective of making it possible for

individuals with impairments to achieve more independence. For the younger stroke victim it is important that the rehabilitation process includes goals addressing vocation (3–5). As most strokes occur late in life, studies concerning the outcome of stroke rehabilitation seldom focus on return to work. The relatively few studies available (e.g. 6, 7) show a great variety in the percentage of people who are able to work after a stroke; proportions vary from 3% to 84%. For example, Swedish studies from the 1970s (8–10) report a relatively high proportion (64%) returning to work. The variation between studies is explained partly by differences in how the concept of work has been defined and operationalized (6, 7).

Studies focusing on indicators of readiness to return to work following stroke (6, 7, 11–15) show varied results. For example, some studies have shown age, profession, hemisphere of lesion, cognitive impairments and muscle strength to be significant indicators of readiness to return to work whereas others have not. The variation between studies is partly explained by differences in culture and rehabilitation programs.

Quality of life, subjective well-being and life satisfaction are increasingly being used as outcome measures for rehabilitation. Work fulfils basic human needs (16), such as financial, societal and intrinsic needs, and returning to work after stroke is of significant importance for quality of life and life satisfaction (3–5, 15, 17, 18). According to Yerxa (19), work supports health even under poor conditions. Notwithstanding illness or injuries, work is an important part of human life and promotes subjective well-being, but few empirical studies address work and subjective well-being after stroke. In order to further the development of more efficient rehabilitation programs promoting return to work after stroke, more knowledge on factors indicating the likelihood of return to work after stroke and on the relationships between return to work and subjective well-being is needed. This study addresses the following questions: which factors indicate the likelihood of return to work after experiencing a stroke? Are there any differences in different domains of subjective well-being and life satisfaction between individuals who have returned or not returned to work after stroke, respectively? Which factors indicating return to work determine high subjective well-being and life satisfaction?

### METHODS

The subjects were recruited from the Department of Rehabilitation at the University Hospital of Lund, Sweden. Annually, about 65 persons who

Table I. Distribution of individuals, divided by sex, who had or had not returned to work after stroke, n = 120

	Work		No work		Total	
	n	%	n	%	n	%
Women	17	14	30	25	47	39
Men	32	27	41	35	73	61
Total	49	41	71	59	120	100

have experienced a stroke are admitted to the department. The majority of the patients lived in Malmöhus County or the city of Malmö, although some of them were admitted on a referral from other counties in the southern region of Sweden. The length of admission varied from individual to individual, from 2 weeks to about 3 months, depending on the complexity of the brain damage and the aim of the admission. The number of admission periods per individual varied as well.

For this study, work was explicitly defined as continuing occupation in the production of supplies and services for payment (20). The subjects included corresponded to the following criteria: (i) working before the stroke; (ii) age 60 years or younger when they experienced a stroke; (iii) living in Malmöhus County or the city of Malmö; and (iv) with a minimum time of 6 months post-stroke. The Ethics Committee, Faculty of Medicine at Lund University approved the study.

From the medical records comprising patients admitted successively during a 4-year period, a total of 156 persons corresponding to the criteria were identified. However, 8 individuals were not available or were deceased at the time of the study and 28 individuals were not willing to participate. According to the medical records, 3 or 4 of the drop-outs might have returned to work at the end of or after the admission period. The mean time from experiencing a stroke to data collection was 2.7 years, SD = 2.9. A total of 120 persons, 47 women and 73 men, participated. The median age at the time of experiencing stroke was 50 years, inter-quartile range (Q3 – Q1) = 11.25.

The medical records were searched for individual data documented during the acute rehabilitation period, i.e. over at the most 3 months after onset. Data on sex, marital status, age when stroke occurred, profession, and some variables on functional capacity and disability were gathered for this study. Walking was dichotomously classified as dependent or independent of assistive devices, while grip function and cognitive ability (21) were dichotomously classified as severe/moderate or preserved. Data from "Functional Independent Measure" (FIM; version 3.0) assessments, performed by trained rehabilitation team observers, was used to assess level of dependence in self-care activities. FIM scores rate from 1 to 7, representing total dependence to full independence (22). For this study, only scores for motor activities were used and, following guidelines in the manual, the individual FIM scores were dichotomized as dependence (scores 1–5) or independence (scores 6–7). Professions before the onset of stroke were recorded according to the Swedish socio-economic classification (SEI) (23) and classified as blue-collar workers, white-collar workers, or self-employed. Working hours were dichotomized as full-time or part-time.

Furthermore, a postal questionnaire was constructed including study-specific items concerning working situation prior to the onset of stroke, e.g. contentment with working environment, employer and education. The questionnaire also included items concerning the situation at the time of answering the questionnaire, e.g. working hours and work assignments. In the event that the participant had not returned to work there was an item concerning other daily productive activities. Except for an open question about time elapsed before returning to work, the items were structured with 2–4 response alternatives. Before using the questionnaire for data collection, experienced rehabilitation staff were consulted for viewpoints and ideas, followed by final revisions.

In order to cover current subjective well-being and life satisfaction in different daily life domains, the postal questionnaire constructed especially for this study included 2 separate self-administered, well-validated instruments. (i) "The subjective well-being scale" (24) is one part of "The Göteborg quality of life instrument" (25). The other part assesses symptoms, but was excluded for the present study. The

Table II. Bivariate analyses of possible indicators for returning to work after stroke, n = 120

Variable	p-value
White-collar workers	0.0050
Walking	0.0070
Blue collar workers	0.012
Cognitive ability	0.028
Basic education	0.060
Level of dependence in self-care	0.066
Upper secondary school education	0.11
Grip function	0.12
Private/public sector	0.33
Sex	0.40
Civil status	0.41
Age at stroke	0.42
Working hours	0.57
Contentment with working environment	0.79
Self-employed	0.85
Tertiary education	0.85

subjective well-being scale consists of 18 different items, covering e.g. memory, mood, and housing. For each item the scale is scored from 1 (very bad) to 7 (very good, couldn't be better). (ii) The instrument "Assessment of life satisfaction" (26) includes nine domains of life-related items, covering e.g. leisure, self care, and family life. For each item the scale is scored from 1 (very dissatisfying) to 6 (very satisfying).

Together with the questionnaire, the subjects were mailed a written inquiry asking whether they were willing to participate in the study or not. Reminders were given by letter or telephone.

Prior to the statistical analyses, "age when stroke occurred" was dichotomized according to median age (50 years). Bivariate chi-squared tests were performed between current work status, i.e. "work" or "no work", and each of the variables sex, age at stroke, civil status, grip function, walking, cognitive ability, level of dependence in self-care activities, basic education, upper secondary school education, tertiary education, blue-collar worker, white-collar worker, self-employed, contentment with working environment, working hours and whether employed in the private or public sector. Next, a multiple logistic regression model was constructed with variables proven to be significant on the arbitrarily chosen cut-off  $p < 0.1$  in the bivariate analyses. The dependent variable was "work". Furthermore, the Mann-Whitney U test was used to analyse whether level of subjective well-being and life satisfaction, respectively, differed according to whether the subjects had returned to work or not.

In order to analyse whether any of the possible indicators for returning to work were important determinants of higher subjective well-being (24) and life satisfaction (26) the obtainable scores of each scale used were summed. However, the item "Life as a whole" of the "Assessment life satisfaction" scale was excluded, as it did not present as specific a domain as the other 8 items of the scale did (26). Subjects who had scored subjective well-being and life satisfaction as 90% or higher of the total score obtainable in the 2 scales (24, 26) were considered as having "high subjective well-being" and "high life satisfaction". Next, multiple logistic regression analyses were performed, with all the possible indicators for returning to work as independent variables. The dependent variables were "high subjective well-being" and "high life satisfaction", respectively. For all the tests, a significance level of 5% was accepted.

## RESULTS

A total of 41% of the individuals returned to work (Table I). Of those, 35% were women and 65% men. The mean time for returning to work after experiencing stroke was 11.9 months, SD = 9. Four individuals reported that they had changed employers while 20 individuals reported changes concerning work assignments. The majority of the individuals had worked

Table III. Multiple logistic regression analysis with odd ratios of factors predicting return to work after stroke

Variable	Odd ratios	p-value
Walking	3.98	0.0093
White-collar workers	2.99	0.063
Cognitive ability	2.64	0.022
Level of dependence in self-care	2.0020	0.43
Basic education	0.89	0.23
Blue-collar workers	0.59	0.83

full-time prior to the stroke, but 61% of those returning to work had reduced their working hours to part-time. Twenty individuals reported that after the stroke they worked 50% or less of their previous working hours.

A total of 26 persons had tried to return to work but had not succeeded, of which 64% had impaired cognitive ability. Forty percent were dependent on assistive devices for mobility and 60% had impaired grip function. Furthermore, 56% were blue-collar workers, 32% white-collar workers and 12% self-employed prior to the onset of stroke. Twenty-eight persons who were not working reported that they had no daily productive activities. Occupations such as housework, education, day care, or other unspecified occupations were reported by 43 persons.

The bivariate analyses (Table II) showed that the variables white-collar worker, walking, blue-collar worker, cognitive ability, basic education and level of dependence in self-care correlated significantly with return to work. However, the results of the multiple logistic regression analysis showed that walking, profession and cognitive ability were the most important indicators of readiness for returning to work (Table III). That is, individuals who were able to walk without assistive devices had the greatest chance of returning to work, followed by white-collar workers and individuals with preserved cognitive ability.

As shown in Tables IV and V, individuals who had returned to work reported a higher level of subjective well-being and life satisfaction compared to those who had not returned to work, according to the median scores on most of the individual items.

Individuals who had returned to work reported a significantly higher life satisfaction concerning their vocational situation (Table IV) and significantly higher subjective well-being concerning work (Table V). Furthermore, individuals who had returned to work reported a significantly higher life satisfaction with life as a whole, financial situation, leisure and friends/acquaintances, but not with their family life (Table V). However, the latter was in contrast to the significant result as concerned higher subjective social well-being concerning family as assessed by means of the subjective well-being scale. In addition, individuals who had returned to work reported a significantly higher level of social well-being as concerned economy, leisure, sense of appreciation outside home and sense of appreciation at home (Table V). Physical well-being concerning health and memory were rated significantly higher by individuals who had returned to work compared with those who had not returned to work (Table V). Mental well-being concerning mood, energy, endurance and self-esteem were also reported to be significantly higher by individuals who had returned to work (Table V). Furthermore, those who had returned to work reported a significantly higher satisfaction with sexual life as well as with self-care (Table IV).

Being a white-collar worker prior to the onset of stroke was the most important determinant for both high life satisfaction ( $p = 0.0040$ ,  $n = 101$ ) and high well-being ( $p = 0.0050$ ,  $n = 84$ ). Furthermore, being employed in the public sector, being self-employed, or being single ( $p < 0.050$ ) were important determinants for high life satisfaction. The result also showed that being employed in the public sector or being self-employed ( $p < 0.050$ ) were important determinants for high subjective well-being.

## DISCUSSION

This is one of the very few studies addressing stroke in individuals of working age and return to work. Recently, Johansson et al. (27) reported that stroke incidence in individuals of working ages is significantly increasing, implying

Table IV. Life satisfaction (26) related to return to or no return to work,  $n = 120$ 

Item	Work		No work		p-value <sup>5</sup>
	Median score <sup>4</sup>	Inter-quartile range	Median score <sup>4</sup>	Inter-quartile range	
Life as a whole	5	1	4	0.5	0.0001
Vocational situation ( $n = 113^1$ )	4	1	1	1	0.0001
Financial situation	5	1	4	2	0.0026
Leisure	5	1	4	2	0.012
Friends/acquaintances	5	2	4	1	0.042
Sexual life ( $n = 118^2$ )	4	3	3	3	0.048
Self care ( $n = 119$ )	6	1	5	1	0.00020
Family life ( $n = 119$ )	5	1	5	2	ns
Partnership relations ( $n = 115^3$ )	5	2	5	3	0.00010

<sup>1</sup> One person who had returned to work did not respond. <sup>2</sup> Two persons who had returned to work did not respond. <sup>3</sup> Three persons who had returned to work did not respond. The rest of the internal drop-outs consisted of persons who had not returned to work. <sup>4</sup> A higher score indicates "more satisfaction" (26). <sup>5</sup> Mann Whitney's U-test.

Table V. Subjective well-being (24) related to return or no return to work, n = 120

Well-being subscale	Well-being item	Work		No work		p-value <sup>3</sup>
		Median score <sup>2</sup>	Inter-quartile range	Median score <sup>2</sup>	Inter-quartile range	
Physical well-being	Health	5	2	4	2	0.0015
	Fitness	4	2	3	3	ns
	Hearing	6	3	5	3	ns
	Vision	5	2	5	3	ns
	Memory	5	2	4	3	0.00040
	Appetite	6	2	6	2	ns
Mental well-being	Mood (n = 119)	5	2	4	3	0.022
	Energy	5	2	4	2	0.0050
	Endurance	5	2	4	2	ns
	Self-esteem	5	2	4	3.5	0.028
	Sleeping (n = 119 <sup>1</sup> )	6	3	6	3	ns
	Work (n = 119)	5	3	2	3	0.00010
Social well-being	Family	6	2	6	2.5	0.0093
	Economy	5	2	4	2	0.028
	Housing	7	1	6	2	ns
	Leisure	5	2	4	2	0.014
	Sense of significance and appreciation, at home	5	2	4	3	0.00090
	Sense of significance and appreciation, outside home (n = 118)	6	1	5	2	0.0034

<sup>1</sup> One person who had returned to work did not respond. The rest of the internal drop-outs consisted of persons who had not returned to work. <sup>2</sup> A higher score indicates "more well-being" (24). <sup>3</sup> Mann Whitney's U-test.

strong incentives for further research concerning return to work after stroke. The results of the current study indicate that ability to walk, preserved cognitive ability and type of profession are major indicators of the possibility of return to work. The results also indicate that work is an important factor in achieving a high level of subjective well-being and life satisfaction, which is in accordance with other studies that address stroke (3–5, 17, 18) and bodily impairment (26), and which focus on return to work. Of course it could be assumed that individuals who have not returned to work are more dependent and have more severe disabilities and therefore lower life satisfaction and subjective well-being. The majority of the 26 individuals who had tried to return to work but not succeeded had impaired cognitive ability and grip function. However, most of them were blue-collar workers, indicating the importance of taking socio-economic factors into account as well. According to the present study, being a participant in different life situations, such as being a white-collar worker, being in the public sector employment or self-employed prior to the onset of stroke were determinants for higher life satisfaction and subjective well-being.

In contrast to this study, self-care ability (6) or functional capacity (11) have been found to be of importance for readiness to return to work after stroke, while cognitive ability and age have been reported to be of varying importance for the possibility of returning to work (6, 11, 12, 15). Valid comparisons between different studies are seldom possible, since definitions of variables and instrumentation vary considerably. The differences between studies are substantial and a detailed comparison with other studies is neither possible nor appropriate.

Given the design of the current study, one limitation is that the results to some extent lead to circles of evidence. For example, it might be self-evident that persons who have working ability and work to go to perceive higher life satisfaction than those who have not. Nevertheless, since the 2 different scales targeting subjective well-being and life satisfaction together cover a wide spectrum of life domains, the results give a differentiated picture showing that the situation for those who had returned to work was not positive in all respects. The analyses of interactions are complex, and this study should be considered an explorative first step, laying the basis for more comprehensive studies. Still, the results are in congruence with the discussion (28) that a successful rehabilitation client is a person who, despite significant impairments or disabilities, is an active, productive member of society and well integrated into the community.

In several ways, the use of a retrospective approach, gathering data from medical records and postal questionnaires might be regarded as a methodological drawback. One aspect is the issue of representativity, since the 3 indicators for return to work identified might have been factors gaining inclusion to the study and this should be kept in mind when interpreting the results. Another aspect is the fact that some respondents might have had difficulties in filling out the questionnaires. In this study significant others were asked to assist if the targeted individual had problems filling out the questionnaire. According to Sneeuw et al. (29), significant others are able to provide useful information on behalf of non-communicative individuals. Yet another weakness concerns the fact that the variables used in the analyses originated from different sources. Some of them concerned the situation prior to the onset of stroke, others the

acute rehabilitation phase, which in combination with data collections at different points in time might distort the results. Obviously, prospective studies applying other data collection methods are needed in order to further demonstrate the reliability, validity and generalizability of our current findings.

Another important consideration is the fact that the time post-stroke varied substantially across the sample. The span after stroke was large, but it was considered important as, to our knowledge gained from experience, returning to work varies in time post-stroke. It was also assumed, in congruence with other studies (e.g. 30) that rehabilitation outcome would not have changed further since the patients addressed were already in a chronic phase. However, it is known that time has a positive influence on quality of life (31). Hence the results on subjective well-being and life satisfaction might have been different if the variation in time post-stroke had been smaller across the sample, but still the differences between the group of individuals who had returned to work and the group who had not are in accordance with other studies (17, 18).

Even though there is a growing consensus on the fact that consequences of diseases, injuries, and impairments vary as a consequence of personal and environmental factors, there is still a considerable lack of knowledge to enable assessments and interventions for targeting these complex relationships in vocational rehabilitation. According to the results of this study it is important that work-related issues are discussed explicitly within the rehabilitation team as well as with the stroke patient, his or her relatives and the employer. In conclusion, return to work after stroke is a major factor in the achievement of high subjective well-being and life satisfaction. This study identified 3 indicators of readiness for return to work, providing implications for the development of more efficient vocational rehabilitation programmes.

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