

Important factors influencing the return to work after stroke

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Abstract.

BACKGROUND: As the field of rehabilitation shifts its focus towards improving functional capacity instead of managing disability, return to work (RTW) and return to the community emerge as key goals in a person's recovery from major disabling illness such as stroke.

OBJECTIVE: To compile important factors believed to influence RTW after a stroke.

METHODS: Based on a comprehensive literature review, we clustered similar factors and organized these factors based on the International Classification of Function, Disability and Health (ICF) framework: body functions or structure, activity participation, environmental factors and personal and psychosocial factors.

RESULTS: Overall, stroke severity, as assessed by the degree of residual disability such as weakness, neurological deficit or impairments (speech, cognition, apraxia, agnosia), has been shown to be the most consistent negative predictor of RTW. Many factors such as the number of working years remaining until retirement, depression, medical history, and occupation need to be taken into consideration for stroke survivors, as they can influence RTW decision making. Stroke survivors who are flexible and realistic in their vocational goal and emotionally accept their disability appear more likely to return to work.

CONCLUSIONS: There are many barriers to employment for stroke survivors ranging from physical and cognitive impairments to psychosocial and environmental factors.

Keywords: Vocational rehabilitation, stroke, employment

1. Introduction

Stroke, also known as a cerebrovascular accident (CVA), is the rapid loss of brain functions due to either ischemic clogged arteries or hemorrhages in the blood vessels of the brain. Stroke is the third leading cause of death in the United States. It is estimated that 15%

of people die shortly after suffering a stroke. For those who survive, common impairments of acute stroke are: weakness on one side of the body typically affecting the upper limb (77% of survivors), urinary incontinence (48%), impaired consciousness (45%), dysphagia (45%), and impaired cognition (44%) [1]. Functional recovery is estimated to be completed within 8 to 20 weeks from stroke onset [2]. However, half of stroke survivors have chronic movement disabilities due to residual hemiparesis in the limbs [3]. A stroke can have a major impact on practically every aspect of a person's life, including their ability to perform the job they held prior to their stroke. Only a small percentage of stroke

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survivors are able to return to full-time work, and continuing disability and depression are believed to prevent them from return to full-time work [4].

According to the American Heart Association [5], approximately 795,000 people experience a new or recurrent stroke each year. More than 7 million people in the U.S. today have survived a stroke. Although often associated with older individuals, 45% of stroke survivors are under the age of 65 and 27% of the individuals are under the age of 55 [6].

According to the current literature, between 22% to 53% of stroke survivors have successfully returned to work between 6 to 12 months post-stroke [7–15]. Saeki et al. [9] found that the proportion of stroke patients returning to work increased nonlinearly and reached a plateau at 18 months after admission, but speculated that results could be associated with the support period allowed by social security. It should be noted that these results represent rate of return to work but do not provide information on employment sustainability (i.e., how long an individual remains at their work). At 5-year follow-up, Howard et al. [16] found merely 19% of stroke survivors remained in the workforce. However, there is a scarcity of scientific studies describing the longitudinal trend of proportion of stroke survivors who return to work and their employment sustainability following stroke and thus the longitudinal trend was unclear.

Factors that act as facilitators or barriers to return to work have been studied by health care professionals and obtained from recent experiences of stroke survivors. The purpose of this paper was to summarize important factors influencing the return to work after stroke.

2. Methodology

Identification of potentially relevant literature began with a search of the PubMed database. A combination of terms was used in the searching process and included: work, return to work, vocational rehabilitation, vocational outcomes, employment, and stroke. Searches were limited to human subjects, and published in the English language. For findings to be included, an article had to describe employment outcomes following stroke and related issues. Relevant literature was abstracted to compile factors associated with employment outcomes following stroke.

Many factors have been investigated in an effort to demonstrate their prognostic value in returning post-

stroke patients to work. Broadly speaking, RTW depends on the match between a stroke survivor's current capabilities and specific job task requirements. Based on a search of existing literature, we clustered similar factors and organized these factors based on the International Classification of Function, Disability and Health (ICF) [17] framework: body functions or structure, activity participation, environmental factors, and personal and psychosocial factors. The ICF was developed by the World Health Organization (WHO) and published in 2001. The ICF classification system codes "functioning" and is considered a partner to the International Classification of Diseases (ICD) diagnosis code system used in the U.S. We have added two additional categories: (i) demographic variables and (ii) job factors to account for additional important factors during the return-to-work (RTW) process.

Further, these factors were categorized into (a) positively associated with RTW – statistically significant, (b) positively associated with RTW – based on qualitative inference, (c) negatively associated with RTW – statistically significant, (d) negatively associated with RTW – based on qualitative inference, and (e) not a RTW predictor (statistically not significant).

We primarily reported those studies that have used quantitative statistics to examine the factors. Some factors such as psychosocial and environmental factors were examined using semi-structured qualitative interviews [18–21] and thus not all of them were reported.

3. Results

The searching process resulted in 42 relevant articles, published from 1975 to 2011.

Table 1 summarizes factors in predicting stroke survivor's RTW. Some of the predictors under each category are presented below.

Category 1: Demographic variables

- a) Younger age [22] (< 55 years old [13], < 65 years old [16,23]) was positively associated with return to work, although the age factor was not statistically significant in many studies [7,10,12,24–27]. It has been suggested that the number of working years remaining until retirement needs to be taken into consideration in older stroke survivors, as it can influence RTW decision making [28].
- b) The association between gender and vocational outcome is not clear from the literature. A few studies show that females have higher probability

Table 1
Summary of important variables in predicting stroke survivor's return to work

	Positively associated with RTW		Negatively associated with RTW		Not a good RTW predictor
	Statistically significant	Qualitative inference	Statistically significant	Qualitative inference	Statistically not significant
Category 1: Demographic Variables					
Age	< 65 years [16,23]; younger [11,22,32]	< 55 [13]	> 50 years [29]		[7,10,12,24–27]
Gender (male or female)	female [7,11]		female [16,26,29,30]		[10,12,22,24,25,27,31,32]
Marital status					[11,12,25–27]
Race	white [16]				[11,13,32]
Ethnicity	[12]				
Education level	[16,27,30]	[37]			[7,11,12,24,26,31]
Years of working experience		[19]			
Length of stay (LOS) in the hospital			[12,22,27,32]		
Receiving rehabilitation therapy			[16,27]		[32]
Full time job prior to stroke	[12]				
Time since stroke					[7,24]
Main income earner					[12]
Transient ischaemic attack					[32]
Medical history-high blood pressure			[32]		[12,16,26,27]
Medical history-heart disease					[12,32]
Medical history-diabetes			[12,32]		[24]
Medical history-urinary incontinence			[27,32]		
Medical history-bowel incontinence			[27]		
Drinking history			yes [22,25]		[26,27]
Smoking history			yes [22]		[12,27,32]
Discharge location					[11]
Category 2: Body Structures					
Side of the stroke			right [22]		[7,13,16,24,26,31]
Stroke location					[13,33]
Stroke type (hemorrhage vs. infarction)	infarction [24,29,31]		infarction [27]		[12,26]
Category 3: Body Functions					
Stroke severity			[9,16]		
Weakness			[25,31,27,33]		[13]
Neurological deficit				[18]	
Speech/communication impairments (aphasia)			[16,22,25,27,31]		[12,13,26]
Cognition impairments			[7,10,23–25,27,31]		
Apraxia			[9,25,33]		[26]
Agnosia			[25,27]		[26]
Visuospatial neglect			[31]		
Shoulder-hand syndrome					[31]
Shoulder subluxation			[31]		
Fatigability			[31]		
Category 4: Activity and Participation (Functional Abilities)					
Activities of daily living function	[7,12,13,16,22,25–27,31,32]				[10,12,24]
Hand function	[26]				
Grip function					[10]
Ability to walk or run	[10,24,26,31]				
Match between working capabilities and specific job task requirements		[19]			
Category 5: Psychosocial and other Personal Factors					
Depression					[13,31]
Value and meaning of work	[24]				
Not feeling like a sense of burden to others	[24]				

Table 1, continued

	Positively associated with RTW		Negatively associated with RTW		Not a good RTW predictor
	Statistically significant	Qualitative inference	Statistically significant	Qualitative inference	Statistically not significant
Family/friend support	[24]	[18]			
Social dysfunctioning			[8]		
Fear inadequately at work				[18]	
Realistic in vocational goal		[19]			
Emotional acceptance of disability		[19,38]			
Category 6: Environmental Factors					
A flexible working environment		[18,20,36]			
Supportive social networks		[20,36]			
Disability or sickness benefits		[18,19]			
Involvement of a vocational counselor		[18]			
Category 7: Job Factors					
Occupation (white- vs. blue-collar)	white [9,10,16,24,25,31,33]				[7,26,27]
Occupation (professionals vs. skills at the basic level)	professional [16,29]				
Position (manager vs. regular employee)	manager [31]				
Employment institution	government [27]				[10]
Being self-employed			[29]		[10]
Income	[7,13,30]				

of RTW [7,11], while others have reported that males have higher probability of RTW [16,26,29,30], and several other studies have found no significant association [10,12,22,24,25,27,31,32].

- c) No association was found between marital status and vocational outcome [11,12,25–27].
- d) A study in 1985 [16] showed that Caucasian patients were twice as likely to return to work. Three later studies in 1999 [13], 2007 [11], and 2009 [32] did not find race to be associated with vocational outcomes.
- e) Years of working experience and employment history might be an important indicator. It has been suggested that number of years at the job improves likelihood of RTW, but this predictor has not been examined quantitatively or statistically [19].
- f) Education level has shown mixed results. While a few studies have found a positive correlation [16,27,30], between level of education and RTW, others have found education level is not an important factor [7,11,12,24,26,31]. It is possible that higher education might be confounded with white-collar employment.
- g) Length of stay (LOS) in the hospital was found to be negatively correlated with RTW; the greater the LOS the lower the percentage of stroke survivors that RTW [12,22,27,32]. This factor could be confounded with severity of stroke.

Category 2: Body structures

- a) The side [7,13,16,24,26,31] and location of the stroke [13,33] have not been shown to be a significant predictor of RTW after stroke.
- b) Impacts of stroke type (hemorrhage versus infarction) on RTW are equivocal [12,24,26,27,29,31].

Category 3: Body functions

- a) Stroke severity, as assessed by the degree of residual disability such as weakness [9,25,27,31,33], neurological deficit or impairments (speech [16,22,25,27,31], cognition [7,10,23–25,27,31], apraxia [9,25,33], agnosia [25,27], visuospatial neglect [31], shoulder subluxation [31], and fatigability [31]), has been shown to be the most consistent negative predictor of RTW.
- b) Subtle cognitive deficits such as impairments in: (i) multi-tasking function, (ii) ability to concentrate, (iii) working memory, (iv) mental speed and flexibility, and (v) visual-spatial ability may compromise performance of high level jobs/tasks [23,34]. The impacts of subtle cognitive factors on RTW have been described qualitatively but have not been statistically examined.

Category 4: Activity participation (functional abilities)

- a) A higher level of activities of daily living function has been shown to be positively associated with RTW [7,12,13,16,22,25–27,31,32].

- b) Being able to walk has been shown to have major significant effect on likelihood of returning to work after stroke [10,26,31]. Retaining the ability to run a short distance has also been shown to be a significant predictor of RTW [24].
- c) The match between stroke survivor's current working capabilities and specific job task requirements is an important factor (e.g., able to do physical requirements of job, able to maintain required pace or speed to perform work tasks, able to meet quality requirements of job) [19].

Category 5: Psychosocial and other personal factors

- a) Post stroke depression is common (48%) [35]. Depression at the time of follow-up [28] but not a few days after stroke [13] has been suggested as a negative factor for RTW.
- b) Psychological factors such as: (i) value the importance of work [24], (ii) do not perceive themselves as a burden on others [24], and (iii) do not fear failure to perform adequately at work [18] have been suggested as positive factors associated with RTW.
- c) Stroke survivors who are flexible and realistic in their vocational goal, and emotionally accept their disability are more likely to RTW [19].
- d) Strong family or friend support is a useful predictor of successful return to work [24].

Category 6: Environmental factors

- a) A flexible working environment and supportive social networks are cited as facilitators of return to paid employment [18,20,36].
- b) Disability or sickness benefits available from a public fund source for an extended time influence the length of the interval between stroke onset and RTW [18,19].
- c) Vocational rehabilitation services have been shown to be beneficial [18].

Category 7: Job factors

- a) White-collar occupation [9,10,16,24,25,31,33], professionals [16,29], and managers [31] have been shown to be a significant predictor of RTW.
- b) If disability or compensation incomes exceed the potential-earned income, the economic disincentives may prevent individuals from returning to work. In this regard, an income of more than US\$30,000 annually has been reported as a predictor of RTW [13].
- c) Type of employer (e.g., government, private, self-employment) [27] or sector type (public vs. private) [10] influence the likelihood of RTW.

4. Discussion

As the field of rehabilitation shifts its focus towards improving functional capacity instead of managing disability, return to work and return to the community emerge as key goals in a person's recovery from major disabling illnesses. Individuals who have overcome their disability and returned to work have consistently reported feeling better and being more satisfied with their life [7,10,35].

In general, it seems that stroke survivors who had a shorter length of stay in the hospital, with less stroke severity, without severe physical and cognitive impairments, with a higher level of activities of daily living function, with a more supportive social and work environment, were at white-collar and/or professional jobs, had a higher probability of RTW.

Despite having included up-to-date literature, we found that several key factors, important to employment outcomes, have not been explored or statistically examined. For example, years of working experience, walking speed (separate from ability to walk), dexterity, grip strength, lifting strength, computer skills, independent drive, work modifications, assistive technologies/devices and whether having public or para transportation support, etc. have not been or have been poorly studied. There is a need to objectively examine factors that are associated with our modern society and those associated with accessibility and assistive devices/technologies, promoted through the Rehabilitation Act of 1973 together with the Rehabilitation Act Amendments of 1992.

There are several limitations of this review. Some psychosocial factors and environmental factors were examined using qualitative interviews [18–21]. The qualitative nature of these studies made it difficult to summarize their results and thus not all of these studies were included in Table 1. However, many qualitative studies [18–21] have shown that psychosocial and environmental factors played an important role in stroke survivors' RTW process. In addition, we compiled factors influencing RTW after stroke from studies conducted in different countries. While generalization of results from different countries may be logical regarding stroke survivors' demographic variables, body structure and function, as well as functional abilities, generalization of results from different countries may be inappropriate regarding psychosocial, environmental and job factors due to cultural and social differences (e.g., culture background, working environment, transportation, economy, government policy, and so

cial stigma). Further, different countries often have different concentrations of employment (e.g., manufacturing vs. service industry, etc...). Lastly, the objective of this review was to compile factors of potential importance for those studying RTW outcomes. While we considered methodological approach when identifying studies for inclusion, we have made no attempt to critically evaluate the methods used by each study.

5. Conclusion

Understanding key factors influencing a stroke survivor's RTW is a fundamental step to improve employment outcomes after stroke. The information compiled here can be considered in clinical settings for pre-occupational management after stroke. It is clear that additional research quantifying the effects of factors as well as interventions such as assistive technologies and devices are needed. Quantitative research findings will help clinicians and policy makers to understand up-to-date barriers and facilitators of stroke survivors' RTW in modern society. We believe this will be helpful in assisting stroke survivors return to meaningful, sustainable, and gainful employment status. Additional research quantifiable on factors as well as research on evaluation of intervention designed to mitigate or modify the negative effect of barriers to RTW is needed.

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