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The effect of professional reintegration of stroke survivors on their quality of life: A scoping review
Professional Integration and QoL after stroke

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ABSTRACT

Background: Professional reintegration is an indicator of recovery and a common goal for many stroke survivors. However, data on the effect of professional reintegration on the quality of life (QoL) of stroke survivors is scarce.
Aims: To assess and synthesize the available evidence, and identify the gaps on the effect of professional reintegration on the QoL of stroke survivors.
Methods: A scoping review was performed, following PRISMA-ScR guidelines. The electronic databases PubMed, ISI Web of Science, PsycINFO, and SciELO were searched for empirical, peer-reviewed, original, and full-length studies on the effect of professional reintegration on QoL of stroke survivors. The main quantitative findings were synthesized and qualitative data was explored by thematic content analysis.
Results: The included studies, 7 quantitative, 1 qualitative, and 1 mixed-methods, were published between 2009 and 2021. The assessment of QoL was highly heterogenic but globally most studies reported a significant and positive association between return to work (RTW) and QoL, 3 to 36 months post-stroke. For some stroke survivors, being able to focus on their rehabilitation was more important for their QoL than RTW.
Conclusions: The results highlight the importance of investing in professional reintegration after stroke to improve survivors' QoL. Further mixed-methods longitudinal research, performed in different countries and settings, with higher, homogeneous, and comparable samples, providing a broader approach to professional reintegration and the use of specific and standardized instruments to assess subjective domains of stroke survivors' QoL, is needed.

Introduction

Worldwide, stroke represents a major health problem, being the second leading cause of death and one of the major causes of disability and incapacity[1,2]. Over the last decades, there has been a decrease in stroke mortality rates along with a rise in the survival rate and functionality among stroke survivors. Such trends were accompanied by an increase in the incidence of stroke at younger and professionally active ages[3,4].

In young stroke survivors (under the age of 65 years old)[5], social and professional reintegration is an indicator of recovery[6], with loss of labour productivity after stroke contributing directly to the negative impact of stroke on the lives of survivors and to the increase in the economic burden of the pathology for the individual and society[7,8]. However, although most young stroke survivors make a positive recovery in performing basic activities of daily living, there are subtle but sometimes persistent losses in other areas such as cognition and mood that affect their complete social and professional reintegration[9,10].

Professional reintegration is defined as the overall process of enabling individuals with either temporary or permanent disability to access, return to, or to remain in employment[11]. Such implies a reorganization of the physical, psychological and social characteristics of survivors, so that they can resume a well-readjusted living[12]. Nevertheless, reintegration studies after stroke do not often include professional outcomes, frequently restricting their analysis to return to work[13,14].

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Literature supports that the rate of return to work (RTW) after a stroke is low[9], with recent data showing that only 7.3% to 75% of the survivors employed before stroke returned to work[9,15]. However, comparisons across studies are hindered by the heterogeneous conceptualization of RTW. In fact, while most studies define return to work as resuming or starting a new job, some use other definitions which include studying or specifically return to full-time/same work[9,10]. Such variations may justify the differences described in previously reported frequencies and predictors of return to work.

Also, the survivor's own inability or reluctance to return to work, despite good physical recovery, is a barrier that stands in the way of recovering pre-stroke functionality, psychological health and quality of life (QoL)[9,15]. In fact, previous studies suggest that return to work may be associated with lower rates of depression and anxiety, and higher levels of social, mental and physical well-being and life satisfaction[3,16]. However, these results are inconsistent as they vary greatly regarding the timing of data collection, the outcomes evaluated, and the instruments used[9,15,16]. Thus, review studies synthetizing the body of knowledge on the association between professional reintegration of stroke survivors on their quality of life are lacking.

Therefore, this scoping review was undertaken to assess and synthesize the available evidence and identify the gaps on the effect of professional reintegration on QoL of stroke survivors, namely regarding the scores of QoL among those who return to work and the direction of the association between RTW and QoL, across the post-stroke trajectory.

Methods

Protocol

This scoping review was conducted and reported following the preferred reporting items for systematic reviews and meta-analysis extension for scoping reviews (PRISMA-ScR) guidelines[17]. A review protocol was developed in advance but was not registered or published prior to conducting the scoping review.

Search strategy

The main research question of the current scoping review was: "What is the body of knowledge regarding the effect of the professional reintegration of stroke survivors on their quality of life, across the post-stroke period?" The electronic databases PubMed, Isi Web of Science, PsycINFO, and SciELO were searched for original articles, in November 2021, with no restrictions set for language or time of publication, using the following search expression: (("stroke" OR "post-stroke" OR "post stroke" OR "stroke survivor" OR "brain vascular accident" OR "cerebrovascular accident") AND ("young" OR "younger" OR "young adults" OR "working age" OR "adult" OR "middle-aged") AND ("professional" OR "work" OR "return to work" OR "employment" OR "work resumption") AND ("integration" OR "reintegration" OR "rehabilitation") AND ("QoL" OR "quality of life" OR "life quality")). Also, a backward reference tracking was carried out, examining the reference lists of eligible publications based on full-text assessment.

Eligibility criteria allowed only empirical, peer-reviewed, original full-length studies that explored the effect of the professional reintegration of stroke survivors on their quality of life. Articles written in languages other than English, French, Spanish, or Portuguese were excluded.

Selection of sources of evidence

The first (J.M.) and last (E.A.) authors independently screened all the papers retrieved, first based on the title and abstract, and afterwards, based on the full texts. The process was crosschecked in both phases. Disagreements were discussed between authors until consensus was reached or, by the assessment of the second author (F.T.). An almost perfect strength of agreement was achieved [total percentage of agreement=97.4%; Cohen's kappa=0.82; 95% confidence interval (95% CI): 0.71–0.94].

Data extraction

A standardized data extraction sheet was developed and completed independently by the first and last authors. The mean scores of QoL after stroke according to RTW were extracted and registered, as well as the respective Odds Ratio (OR) with 95% CI or the p-value for the association described. Statistically positive or negative associations between RTW and QoL after stroke were retrieved.

The main qualitative findings regarding the RTW related QoL of stroke survivors were retrieved from the qualitative and mixed-methods studies. Qualitative data were inductively synthesized into themes and categories by F.T., according to Braun and Clarke's protocol for thematic content analysis[18]. A triangulation strategy was used to guarantee the rigor and quality of research, with F.T. and E.A. collaborating in the development of the coding framework. The qualitative results were synthesized and were deductively included in the QoL domains assessed by the quantitative analysis.

Results

Selection of sources of evidence

From the 399 records initially retrieved, 344 were screened based on title and abstract, being excluded 318 records (Fig. 1). Of the 26 full-text papers reviewed, 9 were considered eligible for final analysis. A backward reference searching was carried out examining the reference lists of eligible publications based on full-text assessment but no paper was included. Thus, the final scoping review included 9 papers.

Characteristics of sources of evidence

Research design

From the included articles, 5 were cross-sectional[19-23] and 4 were longitudinal[24-27]. The majority (n=7) had a quantitative methodology[19,21-23,25-27], 1 was qualitative[20], and 1 was a mixed-methods study[24] (Table 1). The mixed-methods study only presented qualitative data regarding the effect of RTW on stroke survivors QoL.

Two studies did not provide information regarding the period of data collection[20,23], and among the remaining, this period ranged from approximately one[24] to five years[26]. The timing of data collection was also highly variable across the studies, ranging from within three months of stroke onset[22,24-26] to five years' post-stroke[20].

Country and year of publication

The studies were published between 2009[27] and 2021[24] and were conducted in different countries from Europe, Africa, Asia and North America (Table 1).

Participants and sample

The population study of the included papers were composed by stroke survivors, ranging from 11[20] to 933[19] participants (Table 1). Male participants represented more than half of the samples in all studies (from 50% to 80%). The age of the participants ranged from 18 to 90 years old.

Two studies used control groups of stroke survivors to analyze the impact of an intervention on RTW and RTW related QoL[23,25]. Because the cases and controls were all stroke survivors and the values of the global RTW related QoL were reported, the data was used regardless of the impact of the intervention.

Return to work

The definition of return to work considered in each study was only

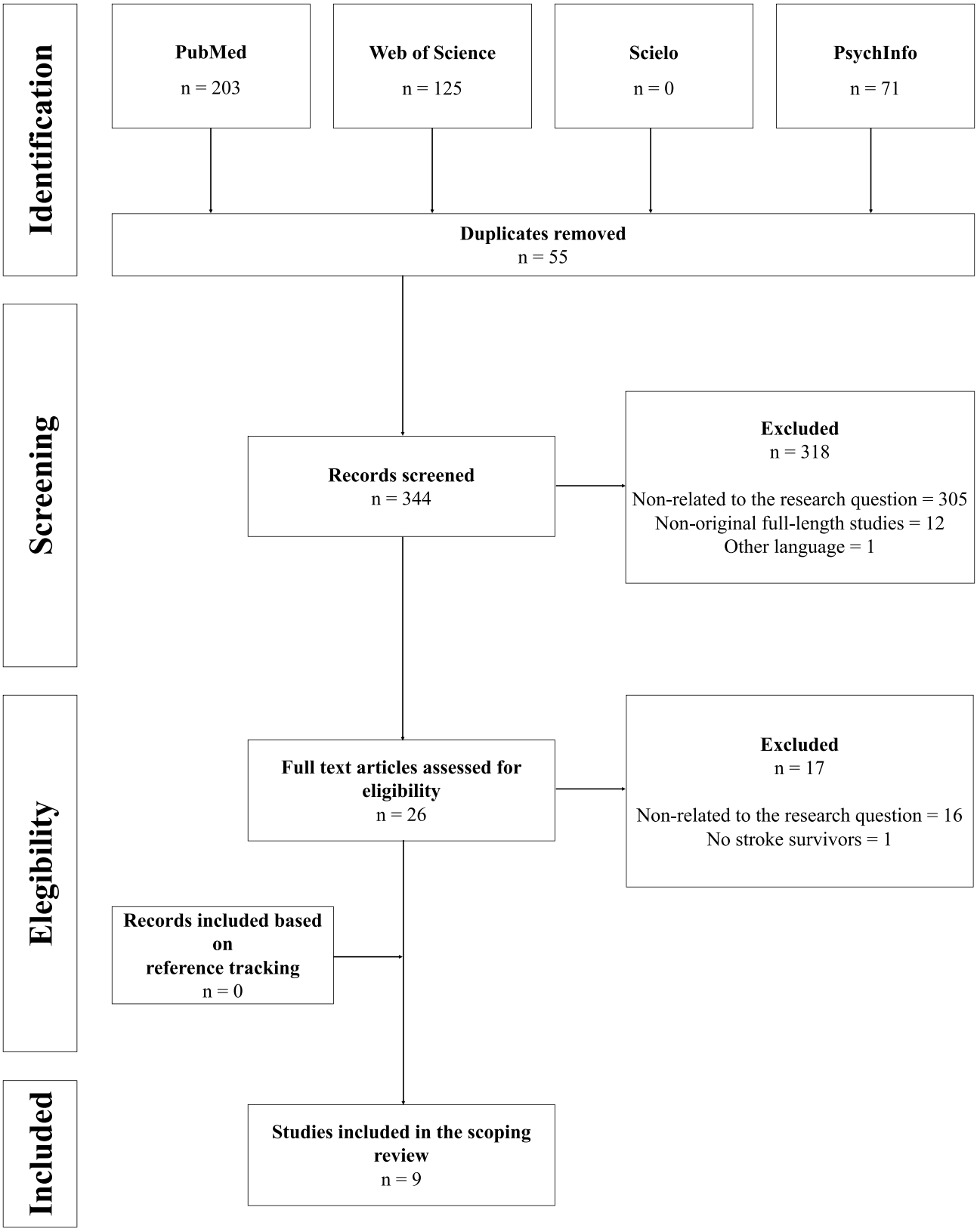


Fig. 1. Scoping review flowchart

presented in four of the nine papers and was highly variable among them. *Fride et al*[22] defined RTW taking into account the answer obtained from the domain "productive work" of the Occupational Questionnaire; *Arwert et al*[21] considered as RTW the positive answer to the domain "currently employed" of the Work Productivity and Activity Impairment Questionnaire; *Han et al*[26] considered as patients who RTW those "who had a stroke and had been continuously working between 3 months and 2 years after stroke"; and *Ntsiea et al*[25] defined RTW as "part time and

Table 1
Main characteristics of the empirical studies assessing the effect of professional reintegration of stroke survivors on their quality of life (n=9).

Publication (Author, year)	Methodology	Country	Period of data collection	Timing of data collection after stroke	Sample size (% male)	Age range / Mean age (SD)	Return to work (RTW) (%)	Assessment of QoL
Cross sectional studies								
Fride et al., 2015[22]	Quantitative	Israel	2008-2012	3 months	163 (71.8%)	50-89 years	69.9%	Stroke Impact Scale Version 2.0
Chang et al., 2016[19]	Quantitative	Korea	2012-2014	6 months	933 (77.1%)	56.99 years*	60.0%	Euro Quality of Life (EQ)-5D
Arwert et al., 2017[21]	Quantitative	Netherlands	2008-2010	2–5 years (mean: 36.0 months)	46 (63.0%)	20–90 years	39.0%	Euro Quality of Life (EQ)-5D
Pedersen et al., 2019[20]	Qualitative	Denmark and Norway	-	1 year	11 (64.0%)	35–66 years	NA	Semi-structured interviews
Ghanbari Ghoshchi et al., 2020[23]	Quantitative (RCT)	Italy	-	Cases - 27.0 months Controls - 21.7 months	23 cases (60.9%) 25 controls (68.0%)	Cases: 51.0 (11.8) years Controls: 52.5 (10.5) years	42.0%	12-Item Short Form Health Survey (SF-12)
Longitudinal studies								
Gabriele et al., 2009[27]	Quantitative	Germany	2001-2004	4.3 months and 1 year	70 (80.0%)	30–65 years (52.4 years)	26.7% after 1 year	WHOQOL BREF
Ntsiea et al., 2015[25]	Quantitative (RCT)	South Africa	2009-2012	3 months and 6 months	40 cases (52.0%) 40 controls (50.0%)	18-60 years	20.0% after 3 months 40.0% after 6 months	Stroke Specific Quality of Life Scale
Han et al., 2019[26]	Quantitative	Korea	2012-2017	3 months and 2 years	193 (84.5%)	<65 years: 61.1% ≥65 years: 38.9%	75,1% after 2 years	Euro Quality of Life (EQ)-5D
Harris Walker et al., 2021[24]	Mixed-methods	USA	2019-2020	0, 1 and 3 months	44 (56.82%)	43-60 years	NA	Semi-structured interviews

NA – non applicable; RCT: Randomized Controlled Trial; *Standard Deviation (SD) value not described

full time work, work done for payment, (…) no limitations on the amount of hours to be worked".

Among quantitative studies, the percentage of RTW ranged between 20.0% at three months' post-stroke[25] and 75,1% after 2 years[26], with higher RTW rates in the Asian countries, namely Korea and Israel.

Assessment of RTW related QoL

Overall, most studies did not include a clear definition of QoL. Thus, different concepts, such as QoL, health-related quality of life (HRQOL), and general health emerged as synonyms to sustain the conceptual, theoretical, and methodological features of the studies. The assessment of the QoL of stroke survivors in the quantitative studies relied on 5 different standard instruments, being Euro Quality of Life (EQ)-5D the most frequent one (n=3) (Table 1). In the qualitative and mixed-methods studies, the perception of QoL after stroke was explored using semi-structured interviews.

The three studies using the Euro Quality of Life (EQ)-5D scale described mean scores (SD) of QoL ranging from 0.86 (0.12)[21] to 0.917 (0.056)[19] among the survivors who returned to work after stroke (Table 2). The only study using the Stroke Specific Quality of Life Scale presented data regarding 3 and 6 months after stroke, describing a relevant improvement on RTW related QoL between the two moments (177.7 vs. 227.9, respectively)[25] (Table 2). Regarding the study using the WHOQOL-BREF[27], the mean (SD) QoL scores ranged between 70.83 (11.5) on the psychological domain, 12 months after stroke, and 79.55 (14.2) on the environmental domain, 4.3 months after the event. Both the studies using the Stroke Impact Scale and the SF-12 reported reasonable scores of overall QoL among stroke survivors who returned to work[22,23] (Table 2). The mixed-methods and qualitative studies assessed the QoL of stroke survivors, through the exploration of their perceptions regarding the experiences of QoL in the recovery process at the individual, familiar and social levels[20,24].

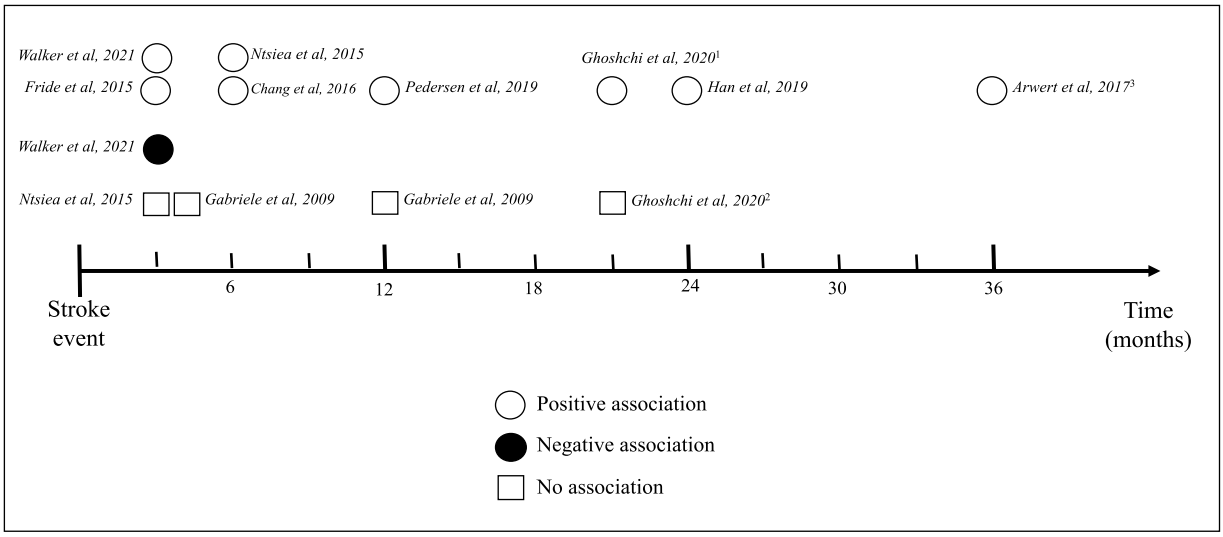
Most studies reported a significant and positive association between RTW and QoL, from 3 to 36 months post-stroke[19-26] (Fig. 2). The positive

Table 2
Mean (SD) return to work related quality of life scores of stroke survivors, according with the instrument used.

Instrument	Domain	Range¶	Mean (SD)
Euro Quality of Life (EQ)-5			
Chang et al., 2016[19]	Overall	[0-1]	0.971 (0.056)
Arwert et al., 2017[21]	Overall	[0-1]	0.86 (0.12)
Han et al., 2019[26]	Overall	[0-1]	0.9 (0.1)
Stroke Specific Quality of Life Scale			
Ntsiea et al., 2015[25]			
3 months after stroke	Overall	[49-245]	177.7 (NA)
6 months after stroke	Overall	[49-245]	227.9 (NA)
Stroke Impact Scale Version 2.0			
Fride et al., 2015[22]	Overall	[0-100]	86.61 (16.12)
WHOQOL BREF			
Gabriele et al., 2009[27]			
4.3 months after stroke	Physical	[0-100]	78.57 (13.3)
	Psychological	[0-100]	71.97 (12.9)
	Social	[0-100]	78.03 (17.2)
	Environmental	[0-100]	79.55 (14.2)
12 months after stroke	Physical	[0-100]	76.62 (9.4)
	Psychological	[0-100]	70.83 (11.5)
	Social	[0-100]	74.24 (18.4)
	Environmental	[0-100]	77.56 (10.3)
12-Item Short Form Health Survey (SF-12)			
Ghanbari Ghoshchi et al., 2020[23]	Overall	[0-200]	100 (87-109)*
	Physical	[0-100]	48 (44-55)*
	Mental	[0-100]	53 (41-59)*

NA- Non available; ¶Higher values represent better QoL; *Median (P25-P75)

impact of RTW on mental and emotional dimensions was the main explanation provided by the quantitative studies[19,21] to justify the association between RTW and QoL. The qualitative data described RTW as a sign of normalcy for survivor, central for participants' self-worth and identity, allowing a connection with their "familiar self" after



[1]Physical domain of 12-Item Short Form Health Survey (SF-12); [2]Total and mental domains of 12-Item Short Form Health Survey (SF-12); [3]Mental component of SF-36 and Euro Quality of Life (EQ)-5D.

Fig. 2. Direction of the association between Return to Work and Quality of Life, according to time after stroke.

stroke[20,24,26]. Being able to work was perceived as financially, physically, and mentally positive for survivors and associated with positive feelings, restorage of meaningful relationships and sense of being a valuable and useful member in their family and society[19,24,26]. A negative association between RTW and QoL only emerge in the mixed-methods study, at 3 months' post-stroke[24]. According to the participants, not working after stroke allowed them to focus on themselves and on the recovery process, especially among those with an adequate income.

Discussion

To the best of our knowledge, this is the first scoping review assessing the effect of professional reintegration of stroke survivors on their QoL. This work contributes to identify knowledge gaps, define further research issues, and for the development of evidence-based recommendations and strategies to enhance the importance of professional reintegration on stroke survivors' QoL.

The lack of a clear and theoretically supported conceptualization of professional reintegration across the studies hinders a broader approach that goes beyond RTW. All the studies included restricted their analysis to the proportion of individuals that reassumed an occupation after stroke. In fact, data regarding availability and participation on vocational programs, facilitators and barriers experienced by survivors, and established regulatory frameworks[34,35] is lacking. Thus, medical and social systems should combine efforts to optimize professional reintegration and vocational rehabilitation.

Even regarding data on RTW, none of the studies offered a clear definition of "work", "return to work" and "employment", namely by specifying the occupation, employment type, participation in workshops or educational programs, and full-time or part-time jobs. Such heterogeneity may justify the high variability described on RTW prevalence, ranging from 20% to 75%[25,26]. These findings reinforce the need for a well-defined and standardized definition of both RTW and professional reintegration, to allow for more objective and accurate interpretation and comparison of results between studies.

The majority of the studies reported a direct association between RTW and QoL of stroke survivors, highlighting the positive physical, psychological and social effect of returning to work on QoL perception after stroke. These results were explained through the sense of normalcy, worth, utility and community contributions that being employee means to survivors[20,24,26], the social and family relation it promotes[24,26], the income it generates[24] and the emotional effect that being the responsible for the family income and family support provides to them[19,24,26]. Such emphasizes the need to increase efforts on vocational rehabilitation programs, by understanding how the RTW affects stroke survivors' QoL. Previous literature, described factors related to the person, workplace, and rehabilitation services, as important facilitators and barriers for RTW after stroke[9,28,29]. Thus, the development of interventions designed to promote a RTW adjusted and adequate to each survivor's characteristics and needs may contribute to improve life-satisfaction, well-being and quality of life after stroke.

Regarding the outcome measurement, the variety of different quantitative instruments used to measure QoL hindered a direct comparison of the QoL scores across studies. Although they are all are validated instruments, they measure different components of QoL, with variable score ranges, and not all are stroke specific. Despite these limitations, by assessing the direction of the association, it was possible to understand and describe the main effect of RTW on QoL. In studies where specific domains of QoL were analyzed[23,27], it was possible to observe slightly different scores of QoL after RTW, according to the domains assessed. Previous literature suggests that subjective aspects of work and vocational situation, namely the motivational factors, are related to specific dimensions of quality of life[33], which can be reflected in different perceptions of the domains[32]. Our results demonstrate the need to standardize the instruments and the procedures of evaluation of QoL, allowing the comparison across the literature and the exploration of the effect of RTW across the QoL domains.

Qualitative data suggested that for stroke survivors with an adequate income, being away from work and able to focus on their rehabilitation was more important for their QoL than RTW[24]. Thus, to decrease social inequality, survivors should be socially and economically supported during post-stroke period to maximize their potential of recovery. The inverse association described between RTW and QoL may also be explained by the moment of data collection, three months after stroke, which corresponds to a very early phase of the rehabilitation process. Evidence from literature supports this assumption, stating that not only QoL of stroke survivors increase over time[30], but also that RTW improve the perception of QoL through time among patients with brain injury[31,32]. In fact, Ntsiea *et al.*[25] also found no association between RTW and QoL at three months, but a positive association at six months.

Most of the studies included in this scoping review were published in

the last five years, emphasizing the relevance of this theme and the need to approach it with more robust methodologies, that allow integration and comparison of findings. Our results reflect samples from a wide diversity of geographic locations, stressing the importance of RTW for the stroke survivors' QoL as a common concern across the globe.

Follow-up time is rather important to understand the employment rates. Previous studies support an increase both on RTW rates[9] and QoL of stroke survivors over time[30,36]. Thus, longitudinal studies, with larger sample sizes, are needed to provide a better perception of the effect of professional reintegration on survivors' QoL, considering changes on survivors' needs and experiences throughout time. Also, our results reflect a wide temporal interval since stroke, from subacute to chronic phase, and it seems clear that RTW influences the perception of QoL at any point of post stroke trajectory. Therefore, it is crucial to stress the relevance of implementing vocational rehabilitation programs from short to long-term post-stroke trajectory.

The age of the participants was highly variable across studies, raising a concern about the possibility to compare results. As age is an important and limiting factor for work ability in most countries, being related with both RTW and QoL of participants[37,38], it urges to invest in the design and implementation of studies with robust methodologies, specifically designed to assess the effect of RTW on QoL among young stroke survivors.

A major advantage of our scoping review was the inclusion of quantitative, qualitative and mixed-methods studies. Such contributed to explore in-depth the association between RTW and QoL as well as the reasons that support it[39]. Such contributes to define new lines of research, to guide timely and appropriate interventions and policies, and to promote QoL after RTW among stroke survivors. The emotional sense of normalcy, income issues, social relationships and community contribution, are identified areas that vocational rehabilitation programs should focus.

Conclusions

The current scoping review highlights the importance of investing on professional reintegration after stroke to promote stroke survivors' QoL. Future research, policies, and practices should consider the diversity and complexity of the characteristics influencing both RTW and QoL, to assist stroke survivor's necessities, to empower them and to improve their overall well-being. Thus, mixed-methods longitudinal research, performed in different countries and settings, with higher, homogeneous and comparable samples, providing a broader approach to professional reintegration and the use of specific and standardized instruments to assess subjective domains of stroke survivors' QoL, is needed.

Informed consent

Not applicable due to article type: scoping review.

Ethical approval

Not applicable due to article type: scoping review.

CRediT authorship contribution statement

Joana Isabel Ferreira Matos: Conceptualization, Data curation, Formal analysis, Methodology, Validation, Writing – original draft, Writing – review & editing. **Filipa Teixeira:** Data curation, Funding acquisition, Methodology, Writing – review & editing. **Elisabete Alves:** Conceptualization, Formal analysis, Methodology, Project administration, Supervision, Validation, Writing – review & editing.

Declaration of competing interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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