

ORIGINAL REPORT

IDENTIFYING SUB-ACUTE REHABILITATION NEEDS AMONG INDIVIDUALS AFTER TRANSIENT ISCHAEMIC ATTACK USING REHAB-COMPASS AS A SIMPLE SCREENING TOOL IN THE OUTPATIENT CLINIC

Gustaf MAGAARD, MSc¹, Britt-Marie STÅLNACKE, MD, PhD¹, Ann SÖRLIN, PhD¹, Fredrik ÖHBERG, PhD², Stina BERGGREN, MD¹, Emma GROLLMUSS, MD¹ and Xiaolei HU, MD, PhD¹

¹Department of Community Medicine and Rehabilitation, Umeå University, Umeå, Sweden

²Department of Radiation Sciences/Biomedical Engineering, University Hospital of Northern Sweden, Umeå, Sweden

Objective: To evaluate comprehensive unmet rehabilitation needs by using a novel graphic screening tool, Rehab-Compass, among individuals in the sub-acute stage after first-ever transient ischaemic attack.

Methods: A pilot prospective cohort study investigated 47 individuals with first-ever transient ischaemic attack in an outpatient clinic setting. By using Rehab-Compass, based on well-validated patient-reported outcome measure questionnaires, this study examined comprehensive unmet rehabilitation needs among individuals at 4-month follow-up after the onset of transient ischaemic attack.

Results: Rehab-Compass identified that most participants were independent in their daily lives (modified Rankin Scale; mRS 0–1) with a relatively good quality of life (median EuroQol 5 dimensions (EQ-5D) 0.85), but certain limitations in participation in their daily lives. Rehab-Compass showed that, at 4 months after transient ischaemic attack, the most common condition affected was mood (reported by 89% of participants), followed by bladder function (70%), sexual life (52%), strength (51%) and fatigue (26%). Symptoms of depression and anxiety were reported by 6% and 17% of participants, respectively.

Conclusion: This pilot study indicates that Rehab-Compass might be a suitable simple screening tool for use in the outpatient clinic setting to identify the multidimensional rehabilitation needs of individuals after transient ischaemic attack.

Key words: transient ischaemic attack; follow-up; sub-acute; needs assessment; outcome and process assessment; quality improvement.

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LAY ABSTRACT

The common definition of transient ischaemic attack is a short duration of stroke, which is symptom-free 24 h after onset. However, many clinical cases do not match this description. This pilot study used Rehab-Compass, a new follow-up instrument based on patient-reported outcome measures questionnaires with graphic illustrations, to evaluate complex problems among 47 patients 4 months after onset of transient ischaemic attack. The results showed that most participants were independent in activities of daily living, with a relatively good quality of life. However, at 4-month follow-up one-quarter of participants reported limitations of participation in daily life, with various hidden symptoms, such as fatigue, sexual life, bladder function, strength and anxiety. Since the Rehab-Compass questionnaire can be completed at home prior to an outpatient visit, it is a simple tool for clinicians to gain an overview of complex problems in patients after transient ischaemic attack.

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Correspondence address: Xiaolei Hu, Department of Community Medicine and Rehabilitation, Umeå University, SE-901 85 Umeå, Sweden. E-mail: xiaolei.hu@umu.se

Transient ischaemic attack (TIA) is a common clinical manifestation of focal neurological deficits, which does not, by definition, last more than 24 h (1, 2). Although a new definition of TIA has been published recently (3, 4), this study uses the original definition for consistency with previous TIA studies. Based on the original definition of TIA, approximately 10,000–12,000 people in Sweden have a TIA every year, although the

actual number may be much higher, since studies indicate that up to half of individuals who experience a TIA do not seek medical attention (5). Since it is known that occurrence of a TIA indicates a high risk of subsequent stroke (6), the active medical prophylaxis treatment of patients with TIA has decreased the incidence of stroke in high-income countries (3, 7, 8). However, little is known about the long-term consequences of TIA.

Some studies show that symptoms following a TIA are similar to those associated with stroke, albeit at an attenuated level (3, 9). For example, an increased risk of incident depressive disorder, anxiety, problems with daily life, cognitive impairment, mental fatigue and communication have been found among patients with TIA (10–15). Commonly, the number of participants in these studies is small, or there is a combination of patients with stroke and TIA, where the main subject of interest is stroke patients (14, 16, 17). The rehabilitation needs of patients with TIA are therefore unknown. Recently, the Swedish National Stroke Guidelines from the National Board of Health and Welfare (17) strongly recommended structured follow-up among TIA and stroke survivors. However, such follow-up after TIA, focussing on rehabilitation needs and long-term care, is largely absent (15, 18, 19).

Rehab-Compass is a novel follow-up instrument, based on patient-reported outcome measures (PROM) questionnaires with graphic illustrations (20). A previous study showed that Rehab-Compass can elucidate the multidimensional unmet rehabilitation needs among individuals after stroke. The aim of this pilot study is to evaluate whether Rehab-Compass can identify comprehensive rehabilitation needs among individuals in the sub-acute stage after onset of first-ever TIA.

METHODS

This pilot prospective cohort study was conducted at the Department of Neuro-Rehabilitation (an outpatient clinic setting), University Hospital of Northern Sweden, Umeå, Sweden. Ethical approval was obtained from the regional Ethical Review Board in Umeå, Sweden (Dnr 2016-355-32M).

Inclusion criteria were: all patients (> 18 years or older) with a first-ever TIA, admitted to Stroke Center, University Hospital of Umeå, Sweden, from the period 1 July 2016 to 1 July 2017. Exclusion criteria were: recurrence of TIA, early stroke/TIA, or stroke after TIA.

Patient information, consent and Rehab-Compass questionnaires (20) were sent to all 210 identified TIA patients 3 months after the onset of TIA. Rehab-Compass questionnaires included 6 PROM: EuroQol 5 dimensions (EQ-5D), Hospital Anxiety and Depression Scale (HADS), Generalized Anxiety Disorder 7-item scale (GAD-7), Fatigue Assessment Scale with sleep evaluation (FAS), modified Rankin Scale questionnaire (mRSq), and Stroke Impact Scale Plus (SIS), as described in detail in a previous study (20). Most participants returned their consent forms and questionnaires at 4 months after onset of TIA.

Respondents who returned incomplete questionnaires or did not provide written consent were contacted via post and mail to ensure that data collection was as complete as possible. Three

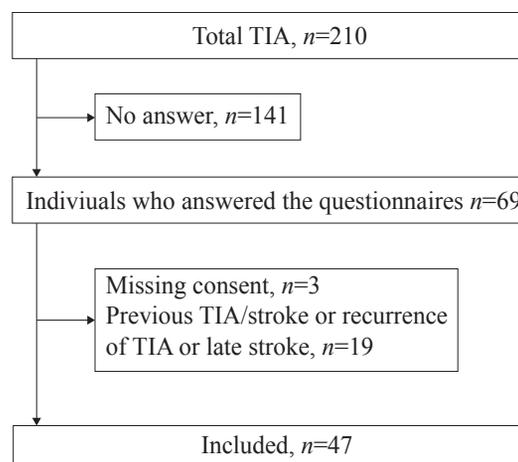


Fig. 1. Flowchart of the recruitment process. TIA: transient ischaemic attack.

patients were excluded due to a lack of written consent despite sending consent forms to them twice. Nineteen patients were excluded according to the exclusion criteria. A final total of 47 out of 210 patients (22%) who met the inclusion criteria consented to participate in the study (Fig. 1).

In order to present the baseline characteristics of the participants in comparison with the whole TIA population within the catchment area, demographic data (Table I) were obtained from Riksstroke Registry. Riksstroke Registry is a Swedish national register for stroke healthcare with approximately 85% coverage rate. Five patients had baseline data collected from their medical records, but their data was missing from the Riksstroke Registry data.

The data obtained from the Rehab-Compass questionnaires are presented as medians with interquartile range (IQR) or means with

Table I. Demographic and clinical characteristics of individuals after transient ischaemic attack (TIA) within the catchment area in one year

Characteristics	TIA participants (n = 47)	Total TIA population (n = 210)	p-value
Age, years, mean (SD)	71 (12)	73 (12)	ns
Men, n (%)	27 (51)	117 (56)	ns
TIA diagnosis, n (%)			
TIA, unspecified	13 (28)	113 (54)	<0.05
Carotid artery syndrome	18 (38)	68 (32)	ns
Amaurosis fugax	9 (19)	20 (10)	ns
Vertebrobasilar artery syndrome	2 (4)	9 (4)	ns
Stroke earlier, n (%)			
Yes	0	40 (19)	
Unknown	0	39 (19)	
TIA earlier n (%)			
Yes	0	28 (13)	
Unknown	0	39 (19)	
Diabetes, n (%)			
Yes	5 (11)	20 (10)	ns
Unknown	20 (43)	75 (36)	ns
Atrial fibrillation, n (%)			
Previous	4 (9)	25 (12)	ns
Recently discovered	0	3 (1)	ns
Unknown	15 (32)	39 (19)	<0.05
Smokers, n (%)			
Smokers	4 (9)	19 (9)	ns
Unknown	17 (36)	57 (27)	<0.05

SD: standard deviation; ns: not significant.

standard deviation (SD), where appropriate. Statistical analyses were performed with GraphPad Prism 6 (La Jolla, CA, USA).

Differences in demographic data between the participants and the whole TIA population were compared using Student's *t*-test or Fisher's exact test, as appropriate. $p < 0.05$ was considered significant.

RESULTS

Demographic data

The majority of demographic and clinical characteristics showed that the study participants were similar to the total TIA population in the catchment area (Table I). However, the study participants included fewer cases of unspecified TIA, but more cases of unknown atrial fibrillation and unknown smokers.

Identifying and graphically visualizing various rehabilitation needs

Fig. 2 shows an example of a patient's rehabilitation needs. This patient reported no problems with cognition, or depression and anxiety, but various disturbances in sleep, sensory, bladder and sexual functions, which led to participation restrictions, even though the patient had no problems with activities of daily living (ADL).

Quality of life

The EQ-5D results demonstrated that the patients with TIA had a relatively good quality of life (median score 0.85, 25–75% percentile 0.73–1).

Global function

The mRSq showed that the majority of patients with TIA (91%) had no symptoms or limitations or no significant disability (mRS 0–1). Four patients had a slight or moderate disability. Their medical records showed that in 3 of the patients these were due to comorbidity.

Rehabilitation needs

The most frequently affected domain was mood (89%), reported by the Rehab-Compass questionnaires using 0 (worst outcome/unmet need) to 100 (best outcome/no need) scale (**Fig. 3**). Impaired bladder function (median score 87.5) was the second most common issue (70%) reported by TIA patients, followed by limited participation in various usual activities (57%). Approximately half of the participants reported impaired function in their sexual life (52%). Surprisingly, strength was affected among half of the participants with limited impairment (51%).

Mental health

Since mood disturbance was the most commonly reported issue, depression and anxiety were further examined using the HADS, where > 8 indicates that anxiety and depression may exist (21). Only 6% of participants experienced possible depressive symptoms (**Fig. 4A**), with a median score of 14. One-fifth of participants (17%) experienced anxiety symptoms, with a median score of 9 (**Fig. 4B**).

Fatigue was assessed by Fatigue Assessment Scale (22) with a cut-off score of 24 (**Fig. 4C**). One-quarter (26%) of

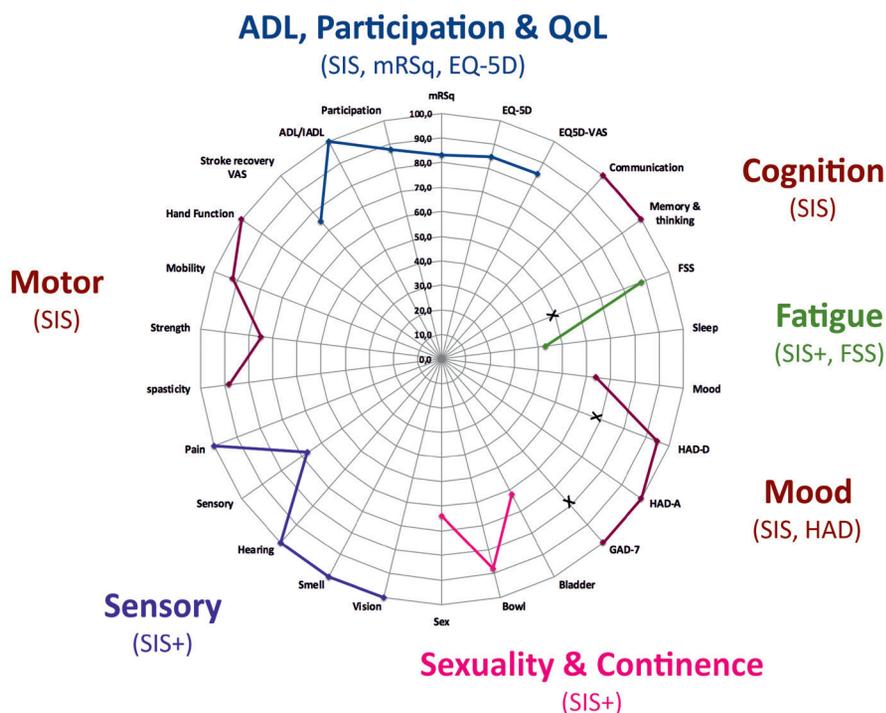


Fig. 2. The Rehab-Compass provides an overall view of a patient's rehabilitation needs (coloured dots and lines) in multiple domains (coloured acronyms in parentheses), where 100 represents the best condition and 0 the worst. ×: location of cut-off value in various instruments. ADL: activity of daily living; SIS: Stroke Impact Scale Plus; mRSq: modified Rankin Scale questionnaire; EQ-5D: EuroQol 5 dimensions; GAD: Generalized Anxiety Disorder; HAD-A: Hospital and Anxiety Scale; HAD-D: Hospital and Depression Scale; FSS: fatigue severity scale; VAS: Visual analogue scale.

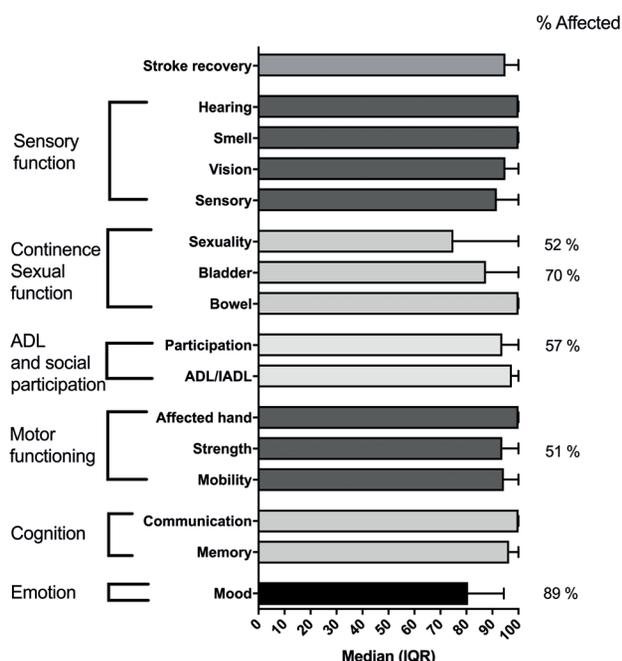


Fig. 3. Extents and frequency of unmet rehabilitation needs identified by the Rehab-Compass questionnaires at 4 months after first-ever transient ischaemic attack (TIA). The bar graph represents extents (median +interquartile range (IQR)) of unmet rehabilitation needs, with 0 (worst outcome/unmet need) to 100 (best outcome/no need). Numbers on right side of graph represent some of the frequencies of various conditions. ADL: activities of daily living.

participants experienced fatigue, with a median score of 27. Those with a score below the cut-off also experienced some symptoms of fatigue, with a median score of 15.

DISCUSSION

This pilot prospective cohort study used Rehab-Compass as a follow-up instrument to evaluate unmet rehabilitation needs among individuals 4 months after onset of first-ever TIA in an outpatient clinic setting. It was found that the instrument could identify multidimensional rehabilitation needs among individuals after TIA. Rehab-Compass showed that most participants in the cohort lived an independent daily life with some limitations in participation, but had a relatively good quality of life. Mood was the most

common condition reported by participants to be affected, followed by sexual life, bladder function and strength.

The graphic instrument Rehab-Compass provides a new way to visualize patients’ rehabilitation needs, by consisting of 5 well-validated instrument (20). The tool presents patient’s multi-dimensional needs on the same graph, covering not only several functional domains, but also information on ADL and instrumental ADL, participation, and quality of life based on the International Classification of Functioning, Disability and Health (ICF). All scores in the tool were converted to a standard score of 0 to 100, where a lower score indicates more rehabilitation needs (20). This provides an opportunity to express the magnitude of the attribute and provides relative comparisons between different domains in terms of mild, moderate and severe impairments or restrictions. The tool may thus help indicate rehabilitation interventions that will not only help eliminate the problems, but also ameliorate and/or compensate for the conditions. However, the Rehab-Compass scores cannot be exactly equalized to the same rehabilitation needs among different individuals, because rehabilitation needs are often prioritized by patients themselves, and may vary from one patient to another.

Since the Rehab-Compass provides an overall view of the patient’s condition, it could help generate a more patient-centred rehabilitation plan for patients and their families. Moreover, data in the tool are collected from patient-centred questionnaires that are completed in the patient’s home before the outpatient visit (20). The Rehab-Compass is thus a time-saving tool for the physician; since it facilitates rapid capture of the patient’s multidimensional rehabilitation needs.

The Rehab-Compass demonstrated that more than 90% of participants were independent in their daily life with a relatively good quality of life, which is consistent with previous studies (11). However, more than half of participants reported some limitations in participation. Limitation in participation is commonly observed among stroke patients (23), but has seldom been reported among patients with TIA. In line with many other previous studies, the tool also identified that 6% of participants had scores that indicated mild or moderate depression (13, 24). Almost 20% of participants reported anxiety (10, 13, 15, 25). Moreover, fatigue was affected in one-quarter of

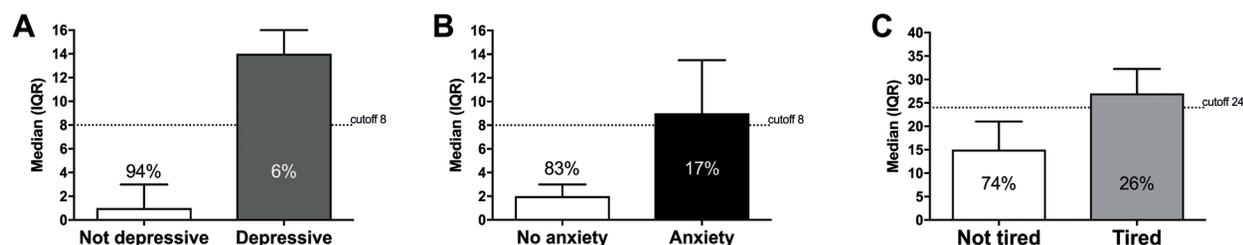


Fig. 4. Frequencies of various mental health conditions. (A) Depression, (B) anxiety, (C) fatigue. Dotted lines indicate cut-off values. IQR: interquartile range.

participants (11, 15, 26). The results of the current study indicate that the Rehab-Compass can be used to identify multidimensional disturbances in individuals after onset of TIA. This suggests that the tool may be useful in clinical follow-up among patients with TIA.

Furthermore, the Rehab-Compass revealed some unexpected symptoms among participants with TIA. Impairment of bladder function was reported among one-third of participants, which is comparable with stroke patients (27). This may be because of the high mean age (71 years) of the participants. Lower urinary tract symptoms (LUTS) occurred in as many as 60% of elderly patients, although another study found that this occurred in 20–24% when using a definition of nocturia as “more than one” void per night (28). Meanwhile, TIA may contribute to this high prevalence, since TIA is an independent risk factor for urinary urge incontinence (29). Half of the participants in this study reported a high degree of problems with their sexual life. This problem has not been addressed previously among patients with TIA, although it is well-known among stroke survivors (30) with sexual rehabilitation needs (31). A cautious conclusion from the current study, due to limited sample size, is that this area needs further research and the problems should be addressed at follow-up with proper treatment and rehabilitation.

It is notable that the Rehab-Compass is based on patient-reported questionnaires, which have their own weaknesses with respect to the limitations of subjective reports (32). Thus, this tool is intended to be used as part of a structured follow-up and as an assistance tool during long-term follow-up. Clinicians must add their knowledge and more objective assessments to the information gained from the tool before finalizing the rehabilitation goals and initiating rehabilitation.

A further limitation of this study is the low response rate and limited sample size; thus caution is needed in interpreting these results. The current findings should be replicated in a large-scale study. However, together with the results of previous studies (9, 11, 13, 14, 16), these results may indicate that many individuals were not symptom-free; and had various hidden symptoms in the sub-acute stage after onset of TIA. This emphasizes the importance of structured follow-up for individuals with TIA, which is currently largely lacking.

In conclusion, this pilot study indicates that the Rehab-Compass could be used as a simple screening tool to identify the multidimensional rehabilitation needs of individuals after TIA in an outpatient clinic setting. Further research is needed to identify the longitudinal alterations in rehabilitation needs among large numbers of patients with TIA.

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