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Factors predicting community participation in patients living with stroke, in the Western Cape, South Africa

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Abstract

Purpose: An important focus of poststroke rehabilitation is the attainment of community participation. However, several factors may influence participation some of which vary from setting to setting. The aim of this study is to investigate the factors influencing community participation among community-dwelling stroke survivors in the Western Cape, South Africa.

Materials and methods: The World Health Organization Disability Assessment Schedule 2.0 (WHODAS 2.0) and the Social Support Questionnaire 6 (SSQ6) were the instruments used to collect data. Participant demographics, clinical features and domain-specific scores of the WHODAS 2.0 were used as potential predictors. Correlation analysis and multiple regression models were used to examine determinants of community participation. All assessments were conducted using face-to-face interviews.

Results: One hundred and six stroke survivors enrolled in this cross-sectional study. Risk factors, cognition, mobility, self-care, getting along with people, household activities and total WHODAS 2.0 score were associated with participation. Four predictors of community participation were identified from multiple regression, namely mobility (38%), cognition (11%), life activities (4%) and stroke risk factors (1%). Determinants varied by gender and age group. Mobility predominated in males and younger adults, while cognition was more pronounced in females and the elderly. Lastly, the influence of social support on community participation was largely defined by the gender and age of stroke survivors.

Conclusion: The findings suggest focusing stroke rehabilitation on important factors such as mobility, cognition, life activities and risk factors to advance patients' participation. It also emphasizes giving
specific consideration to key factors specific for gender and age of stroke survivors.

_ Implications for rehabilitation

_ Community participation in the general population of stroke survivors' is largely determined by their mobility function.

_ Determinants of community participation among stroke survivors essentially vary according to age and gender.

_ Clinically, this study suggests that focusing on specific determinants of improved community participation according to stroke patients' demographic categories (gender and age) may be an important impetus to enhance rehabilitation outcome.

Introduction

Cerebrovascular accidents or stroke is the second primary cause of death worldwide, and the social and financial consequences accompanying the disease are insightful. It is the third major cause of disease burden in high-income countries and also affects low- to middle-income countries [1]. In Africa, case fatalities from stroke are largely hospital based with figures ranging from 27% to 46% [2]; of which 25.5% of deaths occur just 3 months after hospital discharge, and 30% at 12-month follow-up periods [3]. These scary fatality figures can be attributed to limitations in health care resources including cost of facilities, human resources, poor acute and rehabilitation care system and the characteristic of social support available after discharge from institutional facilities [2]. Due to financial constraints associated with access to stroke-specific services, support services and rehabilitation, the burden of care often becomes the responsibility of the family members [4].

Stroke has a profound impact on survivors' social functioning and as the leading cause of adult disability globally, a substantial amount of stroke survivors undergo physical, cognitive and psychosocial restrictions [5]. This plethora of problems often leave the stroke survivor and their caregivers with the burden of disability, and the ill-defined future of the survivor's health and social well-being, particularly in the area of community participation [6].

The World Health Organization (WHO) International Classification of Functioning, Disability and Health (ICF) categorizes health conditions such as stroke into three components namely, body structure/function, activity limitation and participation restriction [7]. This framework emphasizes the importance of functioning in society for persons with health limiting conditions. The aspect of poor functioning lies in the third category, termed participation restrictions. Participation encompasses social and community integration as well as the potential for returning to work [8]. Evaluation of stroke survivors' level of community integration is defined as the most objective yardstick to estimate functional recovery [9]. Thus, it is imperative for a rehabilitation plan to be directed towards accomplishing reintegration of stroke survivors into the community as this has been identified as one of the most debilitating consequences of a stroke.

Community participation is influenced by several aspects, including both personal and environmental factors. Identification of such factors will aid the planning of community rehabilitation processes. Additionally, literature and intervention in stroke has often been dedicated to outcomes of functional recovery. Despite the mounting emphasis on community reintegration to social roles, this area of study remains largely unexplored in low-resource settings such as South Africa. Previous research has shown that factors including household work, social interaction, leisure activities and mobility have relationships with community participation; but in this study, predictors of community participation is the main focus as it is essential to understand the social impact of stroke on both the personal and environmental life, and tailoring support accordingly. Furthermore, publications in South Africa tend to focus its attention on a subsection of participation, such as employment [10] or provide information on outcomes at a point in time [11]. There seems

to be paucity in studies assessing factors predicting participation in patients living with stroke. Mudzi et al. [12] highlighted barriers and facilitators to community participation but not predictive factors. Therefore, the purpose of this study is to investigate predictors of community participation among community-dwelling stroke survivors in the Western Cape, South Africa.

Materials and methods

Setting

The Community Health Centers (CHCs) in the Metro District Health Service (MDHS) of the Western Cape comprised the setting for this study. CHCs in the Western Cape are primarily located in peri-urban towns and have been found to be the best resourced primary care institutions in the country [13]. These services are predominantly utilized by individuals from disadvantaged communities, with low socio-economic class and poor knowledge of health [13]. A total of eight CHCs were randomly selected from a specific region in the MDHS, for data collection.

Design

We employed a quantitative cross-sectional study design to determine predictors of community participation among the study sample. This specific design was appropriate because focus was on viewing the functional status of a given sample, without manipulating the study environment [14].

Population and sampling

Sampling of participants was done through convenience. This sampling method was adopted due to the availability of participants during the course of the study [15]. A brief review of the CHCs was conducted prior to data collection and it was established that an estimated 580 new patients were being treated for rehabilitation services annually, 12% of which made up the stroke population. Thus, an average of 72 new stroke patients was seen at the physiotherapy department annually, with majority being female. We also checked contacts of all eligible participants who were seen at one time or another at any of the CHCs and discarded all eligible but inaccessible participants. Based on the review of records, we arrived at a sample size of 432 stroke survivors within a period of six months. Using the Yamane formula developed by Yamane [16], a total of 207 participants constituted the calculated representative sample to be approached for participation in this study. Of this, 106 individuals agreed to participate, yielding a 51% response rate (Figure 1 below). This response rate is still deemed acceptable as literature suggests that a sample size of 20% is sufficient for a population of 500 [17]. Participants were included if they were diagnosed as having a stroke by a Medical Officer who screened all participants for eligibility according to the World Health Organization [18] definition of stroke; and were residing in the community for at least six months post-stroke. Participants were excluded if they suffered from severe cognitive deficits as measured by the Mini Mental State Examination (MMSE) (a score of <24 suggests cognitive deficits) or speech impairments such as dysarthria and receptive or expressive aphasia. The severity of the disorder was measured by the participants ability to communicate with researchers. This was determined during the explanation of the information sheets and consent forms to the participants, as well as their ability understand and complete the questionnaires.

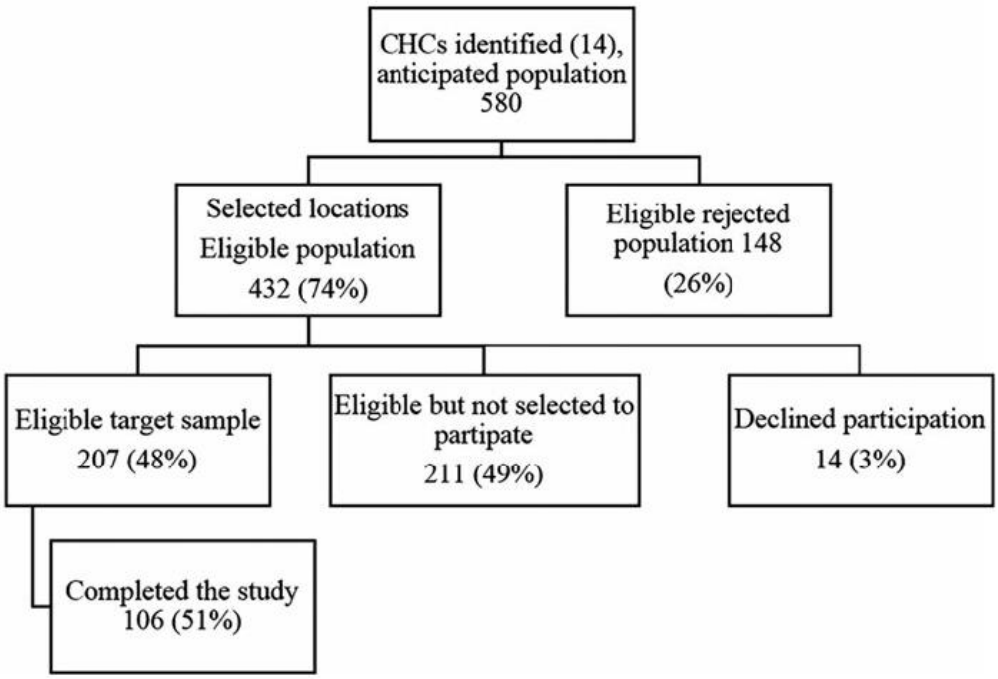

Figure 1. Study flow diagram.

Table 1. WHODAS 2.0 domain question series.

Domain	Questions
Cognition	Concentrating for ten minutes, remembering to do important things, finding solutions to problems, understanding what people say and conversing with others
Mobility	Standing for a long period (30 minutes), standing up from sitting down, moving around inside and outside of their homes and walking a long distance (equivalent to 1 kilometer)
Self-Care	Washing, dressing, eating and staying alone for a few days
Getting along with people	Dealing with unfamiliar people, maintaining a friendship, getting along with people close to you, making new friends and sexual activities
Life Activities (Divided into household and work activities)	Household activities: Taking care of household activities, how well it gets done, getting all activities done and how quickly it gets done. Work activities: Performing day-to-day work activities, doing these tasks well, doing tasks quickly, getting all tasks done, working at a lower level and earning less money
Participation	Joining in community activities, barriers in the community, living with dignity, increased time spent on health condition, emotional and financial implications, problems with family, time spent by individual for relaxation

Table 2. Demographic features of the participants.

	n (%)		*n* (%)
Gender		Age (years)	
Male	53 (50.0)	≤49	17 (16)
Female	53 (50.0)	50–64	47 (44.3)
Marital status		≥65	42 (39.6)
Never married	22 (20.8)	Educational status	
Currently married	47 (44.3)	None	3 (2.8)
Separated, divorced or widowed	36 (34)	Primary	43 (40.6)
Cohabiting	1 (0.9)	Secondary	53 (50.0)
Living situation		Employment status	
Independent	5 (4.7)	Paid work	2 (1.89)
Family and friends	90 (84.9)	Retired	37 (34.9)
Care provider	11 (10.4)	Unemployed	66 (62.4)
Monthly income ($)		Risk factors	
0$–99$	30 (28.3)	None	53 (50.0)
100$–199$	67 (63.2)	Tobacco	29 (27.4)
200$–299$	3 (2.8)	Alcohol	4 (3.8)
300$–399$	1 (0.9)	Tobacco and alcohol	20 (18.9)
Other	5 (4.8)		
Comorbidities			
None	8 (7.5)		
Hypertension	26 (24.5)		
Diabetes	2 (1.9)		
Cholesterol	6 (5.7)		
Multiple Comorbidities	64 (60.4)		

n: frequency; %: percentage distribution; $: United States Dollar.

Instrumentation

The World Health Organization disability assessment schedule 2.0 (WHODAS 2.0)

The WHODAS 2.0 was developed by the WHO [19] and was used to measure participation along with cognition, mobility, self-care, getting along with people and life activities. In each of these domains, participants are given a series of questions (tasks), and then asked to rate their perceived difficulty with the given task on a scale ranging from 0 (no difficulty) to 4 (extreme difficulty or cannot do). These questions are tabulated above (Table 1). Participants were instructed to think of the past 30 days only when completing the questionnaire [20]. The WHODAS 2.0 possesses a high internal consistency (Cronbach's alpha, a: 0.86), high test–retest reliability (ICC: 0.98), and exhibits good responsiveness [20]. The complex scoring method referred to as item-response theory (IRT) based scoring was used to analyze the data and determine the distribution of the domains in the WHODAS 2.0. Complex scoring considers numerous levels of difficulty for each entry of the WHODAS 2.0 and involves converting the summary score into a metric ranging from 0 to 100 [20]. To determine the total domain

scoring, this metric value was broken down into categories to further classify individual's disabilities. A metric ranging between 0% and 4% indicates no problem, 5% and 24% is mild problem, 25% and 49% indicates moderate problem, 50% and 95% indicates severe problem and 96% and 100% is an indication of complete problem in any given domain [20]. These classifications were used to analyze the domain-specific results, used for analysis in this study.

The social support questionnaire 6 (SSQ6)

The SSQ6 was developed by Sarason et al. [21] and was used to measure social support. This questionnaire required participants to provide the amount of available person/s they can depend on under any circumstances, and then rate their satisfaction with the support received on a six-point Likert scale, ranging from "very dissatisfied" to "very satisfied." The SSQ6 has been found to be reliable (ICC scores of 0.90–0.93), valid and convenient [21]. The SSQ number score (SSQN), the SSQ satisfaction score (SSQS) and the SSQ family score (SSQF) were the scores generated from this questionnaire.

Potential predictors

Table 1 above, shows a series of questions for each domain of the WHODAS 2.0, used to determine the individuals level of disability in the respective domain. These domain-specific scores, along with the WHODAS 2.0 total scores was utilized. The participation domain score was not used here, as it was classified as the dependent variable. Participant risk factors was assessed with the absence or presence of comorbidities including hypertension, cholesterol and diabetes as identified in Table 2. This information, along with the SSQ values, participant demographics and clinical features, were classified as the potential predictors (otherwise known as independent variables).

Ethics

This study was approved by all the relevant authorities (reference number 14/5/22). The purpose, objectives and procedure of the study were explained to participants and all participants provided either verbal or written informed consent. Both questionnaires were administered using face-to-face interviews in a secluded area of the CHC to maintain confidentiality. Confidentiality was strengthened by ensuring anonymity throughout data collection and participants were provided with the option of withdrawing at any point; as they were assured that their decision would not affect their treatment.

Data analysis

Participants' demographic and clinical features were summarized using descriptive statistics of frequencies and percentages. The magnitude and direction of the relationship between potential predictors and community participation was determined using Pearson's product–moment correlation coefficient. The variables that demonstrated significance were subjected to multiple linear regressions using a stepwise forward strategy model. To determine normality in the regression, linearity check was conducted between variables as well as subsequent errors between the observed and predicted values (residual regression) using the Q- Q-plot. Multicollinearity check (based on correlation matrix) was performed in the regression analysis and variables with correlation $r > 0.7$ were excluded before rerunning the regression. This r score

was used as a cutoff score for inclusion in the regression equation [22]. Model comparison was approached by observing the residual plots and using theoretical and qualitative approaches. The theoretical component was used to appreciate the relationship of the output with available literature, while the qualitative element was used to observe reasonableness of the models in clinical decision making. The use of the stepwise approach also assisted in comparing models. To determine predictors by age and gender both variables were stratified for multiple linear regression. All analyses were conducted using the Statistical Package for the Social Sciences (SPSS) Version 23 with statistical probability level set a priori, at $p < 0.01$.

Results

Demographics

A total of 106 community dwelling stroke survivors participated in this study, comprising 51% of the eligible sample (Figure 1). The sample is made up of a 1:1 male to female distribution. Participants' demographic features are displayed in Table 2.

Bivariate analysis output

The results regarding subscales of WHODAS 2.0 indicated significant positive correlations in all domains, except work. Risk factors were negatively correlated with participation, and no significant relationship was found between any of the social support features. These findings are tabulated in Table 3.

Multiple linear regressions

Predictors of community participation

Multiple linear regressions were applied and four variables deemed significant. The results indicate that 54% of the variance ($R^2 = 0.54$, $F\ (1, 104) = 63.53$, $p < 0.0001$) was predicted for community participation. Mobility significantly predicted community participation ($b = 0.62$, $p < 0.0001$, 95% CI [0.39, 0.66]), accounting for 38% of the variance with cognition ($b = 0.36$, $p < 0.0001$, 95% CI [0.21, 0.50]) contributing 11% of the variance. Life activities ($b = 0.19$, $p < 0.007$, 95% CI [0.23, 1.44]) accounted for 4% of the variance and stroke risk factors ($b = 0.18$, $p < 0.010$, 95% CI [0.93, 6.38]) accounted for 1% of the variance (see Table 4).

Determinants by gender

The results indicate that 51% of the variance ($R^2 = 51\%$, $F\ (1, 51) = 26.91$, $p < 0.0001$) was explained for female stroke survivors in four variables. Cognition ($b = 0.59$, $p < 0.0001$, 95% CI [0.40,]) accounted for 33% of the variance and household activities significantly ($b = 0.33$, $p < 0.002$, 95% CI [0.08, 0.42]) accounted 10% of the variance. Furthermore, risk factors ($b = 0.24$, $p < 0.021$, 95% CI [0.76, 9.06]) contributed 5% of the variance and satisfaction with social support significantly ($b = 0.20$, $p < 0.045$, 95% CI [0.10, 8.69]) accounted 4% of the variance.

In male stroke survivors, 62% of the variance ($R^2 = 62\%$, $F\ (1, 51) = 64.86$, $p < 0.0001$) was explained in two variables. Mobility significantly ($b = 0.74$, $p < 0.0001$, 95% CI [0.43, 0.72]) contributed 55% while self-care ($b = 0.39$, $p < 0.003$, 95% CI [0.09, 0.43]) accounted for 7% of the variance (Table 5).

Determinants by age

Participants were clustered into three age categories (s49, 50–64 and ≥65 years) to determine predictors of community participation by age group. The age category of s49 explained 85% of the variance (R^2 = 85%, F (1, 13) = 24.40, p < 0.0001) in three variables. Mobility showed significance (b ¼ 0.81, p < 0.0001, 95% CI [0.36,]) and accounted 63% of the variance and self-care significantly (b =0.36, p < 0.041, 95% CI [0.41, 0.59]) contributed 11% of the variance. Lastly, stroke risk factors (b = 0.35, p < 0.007, 95% CI [2.53, 12.38]) accounted 11% of the variance.

Table 3. Correlations between community participation and potential predictors.

Variable	*R* value	Probability
Age	−0.01	0.929
Employment	0.05	0.603
Education	0.06	0.561
number of strokes	−0.07	0.474
Comorbidities	−0.06	0.562
Risk factors	−0.25*	0.011
Income	0.04	0.668
Current marital status	0.04	0.714
SSQ Number Score	0.07	0.492
SSQ Satisfaction Score	0.03	0.733
SSQ Family Score	0.13	0.199
Cognition	0.57**	0.0001
Mobility	0.62**	0.0001
Self-care	0.58**	0.0001
Getting along	0.49**	0.0001
Household	0.40**	0.0001
Work	0.15	0.119
Total WHODAS Score (***N* = 106**)	0.84**	0.0001

*Significant at 0.05 alpha level.
**Significant at 0.01 alpha level.

Table 4. Multiple linear regression predicting community participation.

Variables	R^2	β	Sig.	95% CI for β Lower bound	95% CI for β Upper bound
Mobility	0.37[a]	0.62	0.001	0.39	0.66
Cognition	0.48[b]	0.36	0.001	0.21	0.50
Live activities S/W	0.52[c]	0.19	0.007	0.23	1.44
Risk factors	0.54[d]	−0.18	0.010	6.38	0.93
(**N = 106**)					

β: with positive values suggest better community participation while negative values suggest a lower level of community participation.
[a]Mobility.
[b]Mobility and cognition.
[c]Mobility, cognition, live activities (school/work).
[d]Mobility, cognition, risk factors and household.

Table 5. Predictors of community participation by gender.

Gender	Model	R^2	β	Sig.	95% CI for β Lower bound	95% CI for β Upper bound
Female	1	0.33[a]	0.59	0.0001	0.40	0.91
	2	0.43[b]	0.53	0.0001	0.35	0.83
			0.33	0.003	0.09	0.42
	3	0.48[c]	0.53	0.0001	0.37	0.83
			0.35	0.001	0.11	0.43
			−0.24	0.021	−9.06	−0.77
	4	0.51[d]	0.51	0.0001	0.34	0.79
			0.36	0.001	0.12	0.43
			−0.26	0.011	−9.36	−1.27
			0.20	0.045	0.10	8.69
Male	1	0.55[e]	0.75	0.0001	0.43	0.72
	2	0.62[f]	0.47	0.001	0.16	0.55
			0.39	0.003	0.09	0.43

β: with improved values suggesting better community participation.
[a]Cognition.
[b]Cognition and household.
[c]Cognition, household and, risk factors.
[d]Cognition, household, risk factors, SSQ-satisfaction.
[e]Mobility.
[f]Mobility and self-care.

Table 6. Predictors of community participation by age.

					95% CI for β	
Age category	Model	R^2	B	Sig.	Lower bound	Upper bound
≤49	1	0.63[a]	0.81	0.0001	0.36	0.92
	2	0.72[b]	0.65	0.001	0.24	0.79
			0.36	0.036	0.01	0.59
	3	0.83[c]	0.60	0.0001	0.27	0.69
			0.41	0.008	0.13	0.56
			0.35	0.021	−12.38	−2.53
50–64	1	0.51[d]	0.72	0.0001	0.43	0.78
	2	0.61[e]	0.76	0.0001	0.48	0.80
			0.32	0.011	0.47	1.72
	3	0.64[f]	0.63	0.012	0.36	0.71
			0.28	0.011	0.35	1.56
			0.25	0.027	0.05	0.51
	4	0.69[g]	0.29	0.079	−0.03	0.51
			0.40	0.10	0.08	0.53
			0.31	0.001	0.49	1.63
			0.27	0.008	0.08	0.52
	5	74[h]	0.10	0.534	−0.18	0.35
			0.55	0.0001	0.20	63
			0.33	0.0001	0.61	1.66
			0.31	0.001	0.15	0.55
			0.25	0.003	2.33	10.47
	6	71[i]	0.56	0.0001	0.30	0.55
			−0.18	0.019	−6.70	−0.63
			0.35	0.0001	0.69	1.68
			0.34	0.0001	0.21	0.55
			0.29	0.0001	3.86	11.02
≥65	1	0.34[j]	0.58	0.0001	0.73	1.00
	2	0.45[k]	0.34	0.009	0.59	1.07
			0.49	0.0001	0.64	1.07

β: with positive values suggest better community participation.
[a]Mobility.
[b]Mobility and self-care.
[c]Mobility, self-care, risk factors.
[d]Mobility.
[e]Mobility and live activities (school/work).
[f]Mobility, live activities (school/work), and cognition.
[g]Mobility, self-care, live activities (school/work) and cognition.
[h]Mobility, self-care, live activities (school/work), cognition and SSQ-satisfaction.
[i]Self-care, risk factors, live activities (school/work) and cognition.
[j]Cognition;
[k]Cognition and self-care.

In the 50–64 age category, 77% of the variance (R^2 = 77%, F (1, 47) = 50.75, p < 0.0001) was defined with six measures. Mobility significantly (b = 0.72, p < 0.0001, 95% CI [0.44, 0.78]) accounted 51%, while other variables showing significance included life activities (b = 0.32, p < 0.001, 95% CI [0.47, 1.72], R^2 = 10%), cognition (b = 0.25, p < 0.020, 95% CI [0.05, 0.51], R^2 = 4%), self-care (b = 0.27, p < 0.0001, 95% CI [0.20, 0.63], R^2 = 0.4), satisfaction with social support (b = 0.25, p < 0.001, 95% CI [3.14, 10.62], R^2 = 5%) and risk factors (b = 0.29, p < 0.019, 95% CI [0.63, 6.70], R^2 = 3%).

In the age category of ≥65 years, 42% of the variance (R^2 = 42%, F (1, 40) = 20.34, p < 0.0001) was explained in two variables. Cognition was the main predictor (b = 0.58, p < 0.0001, 95% CI [0.28, 0.73]) contributing 32% of the variance while mobility (b = 0.49, p < 0.009, 95% CI [0.09, 0.59]) accounted 10% of the variance (indicated in Table 6).

Discussion

This study investigated factors predicting community participation among stroke survivors. Based on the results, the outcome suggests that participants who performed better in cognition, mobility, self-care, getting along with people and household activities are likely to show better community participation, while an increased exposure to stroke risk factors are suggestive of poorer community participation. The domains mentioned above (mobility, self-care, household activities) can be classified as requiring more physical function/activity, and previous studies have identified a link between fatigue and physical activity in patients with neurological disorders [23,24]. Fatigue is associated with reduced time spent moving around to perform daily activities [24] which could explain the above result.

No significant correlation was found between any of the social support features and participation, contradictory to previous literature showing that the quantity and quality of social support affects participation [25,26]. The relationship between these two factors needs further investigation, especially in the non-western worlds [27]. There is a body of literature that considers the impact of a communication impairment on participation, where cognitive impairments affect leisure activities and employment [28]. Thus, individuals with cognitive deficits and speech impairments who might have relied more on social support in order to participate have been excluded from our study. This could explain the outcome from the current study.

Four factors were found to predict community participation in our sample, with mobility (38%) being the most important predictor, a finding in line with recent literature [29]. Furthermore, a South African study concluded that immobility among stroke survivors negatively influences community ambulation, which in turn can have an adverse effect on participation [30]. Improved mobility extends beyond participation as research has proven that individuals who are more active post-stroke were more involved in other major life activities than those who are less physically active [30–32].

Cognition (11%) was the next major predictor of community participation and literature shows a strong relationship between orientation and social participation [33,34]. Thus, poor concentration, attention and loss of speech can impact stroke survivors largely [34,35]. This outcome suggests the need to plan rehabilitation approaches beyond physical disability which often dominate rehabilitation platforms. The incorporation of such psychological techniques will boost the cognitive status of the patient in order to achieve meaningful and diverse rehabilitation goals.

Lastly, stroke risk factors (1%) and household life activities (4%) each contributed to the variance. A similar finding was presented by a previous study conducted in South Africa where meal preparation, household work and interpersonal interactions were also

Conclusions

Attaining community participation is an important goal setting in a standard rehabilitation plan. The key predictors of community participation are mobility, cognition, self-care and stroke risk factors and these are further influenced by gender and age. Cognition is the most important predictor of community participation in females while mobility was found to be more prominent in males. Mobility is a key predictor of community participation for all age groups but its influence diminishes as stroke survivors become older, as cognition takes over as the main predictor of community participation. Lastly, the influence of social support on community participation is largely defined by the gender and age of stroke survivors.

Disclosure statement

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