
ORIGINAL ARTICLE**Locomotor disability, functional dependence and perceived family needs in survivors of index stroke***Saraswathi N^{1*}, Shantheri Pai R², Ranganath R Kulkarni³**Department of Psychiatry, ¹Belagavi Institute of Medical Sciences, Belagavi-590001 (Karnataka) India,**²National Institute of Mental Health and Neuro Sciences, Bengaluru-560029 (Karnataka) India,**³Dharwad Institute of Mental Health and Neuro Sciences, Dharwad-580008 (Karnataka) India*

Abstract

Background: Post-Stroke Survivors (PSS) commonly present with varying grades of functional dependence and disability leading to dependency and caregiver burden. Our study assessed perceived family needs in relation to severity of stroke, locomotor disability and functional dependence in PSS. **Aim and Objectives:** To explore the relationship between functional impairment, locomotor disability, and perceived needs among PSS. **Material and Methods:** A cross-sectional study of 250 PSS three to six-months following index stroke studied sociodemographic and clinical profile (stroke severity, risk factors), locomotor disability (Barthel index for ADL), level of functional independence (modified Rankin's scale), and perceived needs (family needs questionnaire). We excluded PSS with cerebral venous thrombosis, vascular malformations, subarachnoid hemorrhages, cognitive decline, aphasia, serious medical conditions and severe psychiatric disorders. **Results:** Of 250 PSS, majority were aged > 50 years (73.6%), males (74.8%), married (88.4%), and formally educated (87.2%). Major risk factors included hypertension (69.2%), alcohol use (54.4%), tobacco use (44.8%) and family history of stroke (41.6%). Nearly half of PSS had moderate severity stroke with one-third without disability, 21.2% mild, 16% moderate, and 4.4% had severe disability. Two-thirds of PSS had mild-to-moderate functional impairment. All domains of needs were found to be significant, except involvement in care. Locomotor disability and functional independence showed significant positive and negative correlation ($p < 0.001$), respectively with needs of PSS. Perceived needs were significantly associated with severity of locomotor disability ($F = 10.34$; $p < 0.001$; $\eta^2p = 0.255$), stroke severity ($F = 10.05$; $p < 0.001$; $\eta^2p = 0.210$) and functional dependence ($F = 4.91$; $p < 0.001$; $\eta^2p = 0.130$). **Conclusion:** Perceived family needs showed significant association with severity of locomotor disability, stroke severity and functional dependence. It is prudent to address these needs during various stages of stroke management to mitigate caregiver burden and may improve treatment and rehabilitation outcomes.

Keywords: Cerebrovascular accident, disability, locomotor, perceived needs, post-stroke survivors, severity, stroke

Introduction

Stroke heralds a significant impact on the personal, social and economic lives of patients and their caregivers. Global burden of disease study (2019) reported stroke as the third leading cause of death and disability [1], and India is amidst a stroke epidemic. Stroke can be seen as a disease that affects the whole family, due to disruption in the life of Post-Stroke Survivors (PSS) as a result of

dependency [2]. Regardless of the severity of the stroke, most PSS experience diminished Quality of Life (QoL), impacting their Activities of Daily Living (ADL), relationships with their family members, and social life [3].

Recovery following a stroke is a gradual and multidimensional process. Hence, it is vital to understand perceived needs of PSS to aid decision-

making. PSS frequently express physical, cognitive, psychological, emotional, social and financial needs, in addition to information, education, and rehabilitation services. Due to lack of community or home-based accessible and affordable rehabilitative services in India, majority of PSS stay with their families and remain dependent on family caregivers for all their needs, thus fostering dependency [4]. Most studies world-wide have reported similar themes of perceived needs among PSS. In a Chinese qualitative study on community-dwelling PSS with mild to moderate disability, four major themes such as shifts in social life, shaken sense of self, complex rehabilitation needs, perception and patterns of physical activity emerged and though PSS recognized their need for further rehabilitation, their demands remained unmet due to a combination of personal and external factors such as limited mobility and the absence of supportive companions and accessible facilities [5]. A multi-centric Indian study reported severe disability among 72.7% of the rural population, of whom 74.4% needed high supportive care [6]. In a qualitative study, 82% of PSS following discharge expressed a need for rehabilitation-related information and 70% expressed financial needs to sustain life after stroke [4].

According to the Patient-Centered Outcomes Research Institute, it is crucial to consider the needs of PSS as perceived by their caregivers while making healthcare decisions [7]. Hence, it is prudent for the healthcare professionals to include caregivers as part of care team to assess perceived care needs of PSS while addressing appropriate rehabilitation measures. We aimed to explore the relationship between functional impairment, locomotor disability, and perceived needs among PSS.

Material and Methods

A cross-sectional study was conducted between July-2019 and August-2021 at the outpatient setting

of the Neurology department in a tertiary care hospital. As per the 'proportional recovery rule', PSS can regain about 55%-85% of their lost functions within 3-6 months after stroke [8]. Hence, we contacted PSS who were in the sub-acute stage (3-6 months) of functional recovery following an index stroke, along with their caregivers to participate in the study, and included them after obtaining informed consent. Ethical approval for the study was obtained from the Institutional Ethics Committee, and the study adhered to the principles of declaration of Helsinki.

Participants

We screened a total of 433 PSS after index stroke, of which 83 (19.2%) patients lost to follow-up, 35 (8.1%) cases succumbed or died due to unknown reasons, 33 (7.6%) cases refused to participate in the study and 32 (7.4%) cases had incomplete data. The remaining 250 (57.7%) PSS were included into the study. Inclusion criteria comprised of PSS following an index stroke who were available for interview between three to six-months post-stroke. PSS with a history of cerebral venous thrombosis, vascular malformations, subarachnoid hemorrhages, serious medical conditions, severe psychiatric disorders, history of cognitive decline and aphasia were excluded.

Assessment tools

A semi-structured proforma was utilized to collect socio-demographic and clinical characteristics from PSS and their caregivers. Clinical profile included risk factors such as history of alcohol and tobacco use, Ischemic Heart Disease (IHD), hypertension, diabetes mellitus, dyslipidemia and a family history of stroke.

National Institute of Health Stroke Severity (NIHSS) scale is a 15-item systematic assessment

tool that provides quantitative measure of stroke-related neurologic deficits. It evaluates the effect of acute cerebral infarction on the levels of consciousness, language, neglect, visual-field loss, extra-ocular movement, motor strength, ataxia, dysarthria, and sensory loss. The scoring ranges from 0 to 42 points, with higher scores indicating higher severity. A score of less than five points is indicative of “no stroke symptoms or a minor stroke”, a score of 5–15 represents a moderate stroke, a score of 16–20 represents a moderate to severe stroke, and a score of 21–42 represents a severe stroke. It takes less than ten minutes to administer [9].

Barthel index for ADL (BIADL) assesses locomotor disability across ten ADL and mobility domains such as personal hygiene, bathing, feeding, toilet, stair climbing, dressing, bowel control, bladder control, ambulation and wheelchair mobility and transfers. Each item is scored numerically based on the extent of assistance required by the PSS and has a maximum numerical score of 100. Scores ranging from 0–24 represent total dependency, 25–49 severe dependency, 50–74 moderate dependency and 75–90 little dependency [10].

Modified Rankin's Scale (MRS) is a widely used single-item, seven-level, clinician-reported measure that evaluates the overall degree of functional dependence in individuals following a stroke or other neurological conditions. It provides a global assessment of functional status by determining a person's ability to perform usual ADL and the extent of assistance required. The scale captures levels of independence from slight to severe disability with scores ranging from 0 (no symptoms) to 6 (death). It does not focus on specific impairments such as motor, sensory, or cognitive deficits; instead serves as a broad indicator of functional outcome and is commonly used in both clinical practice and

research to assess recovery, treatment effectiveness, and long-term prognosis in stroke survivors [11].

Family Needs Questionnaire (FNQ) assesses the needs of family caregivers of patients with stroke and is based on the need's questionnaire for family caregivers by Kreutzer and Marutz [12]. It includes 43 items under six domains that include items on health information (13 items), instrumental support (nine items), emotional support (eight items), patient care participation (five items), professional support (four items), and community networks (four items). The presence and absence of a need is assigned a score of one and zero, respectively. The scale provides scores for each domain, with higher scores indicating higher needs. An overall score is calculated by summing the scores obtained from each domain [12,13].

Sample size estimation

The sample size estimated using the formula $n = [(Z(1-\alpha/2))^2 \times (1-p) * 1.2] / d^2$, with a prevalence of perceived unmet needs in PSS of 84%, [14] and corrected the sample size owing to anticipated non-response, missing, or incomplete data following index stroke at a non-response rate of 20% using the formula for adjusted sample size (calculated sample size divided by one minus anticipated non-response rate). We obtained a sample size of 248 that was rounded off to 250 cases, with 95% confidence limit, 80% power, 5% alpha error with two-sided hypothesis testing.

Statistical analysis

Data were collected and entered into the Microsoft Excel® spreadsheet. Statistical analysis was carried out using the Statistical Package for the Social Sciences software version 26 [IBM; Chicago]. Continuous variables were assessed for normality of the distribution using Q-Q plots and Kolmogorov-

Smirnov test. Descriptive statistics including frequencies, percentages, means, Standard Deviations (SD), median and Inter-Quartile Range (IQR) were presented. Pearson's correlation test was utilized to examine for the strength and direction of relationship. A One-Way Multivariate Analysis of Variance (MANOVA) test was performed to compare independent (categorical; fixed factors) variables simultaneously across multiple dependent (continuous) variables (six domains of FNQ). Fixed factors included age, gender, education, occupation, residence, socioeconomic status, and presence of risk factors like hypertension, diabetes mellitus, dyslipidemia, past history of IHD, recurrent stroke (after index stroke), stroke severity, type and side of stroke, length of hospital stay, medical complications during hospitalization, locomotor disability and functional independence. Partial eta squared (η^2p) was used as the effect size index for the MANOVA, representing the proportion of variance in the dependent variables attributable to each factor after controlling for other factors. Values of η^2p were interpreted using established benchmarks, with 0.01, 0.06, and ≥ 0.14 representing small, medium, and large effect sizes, respectively. The significance level was set at $p < 0.05$ (two tailed).

Results

Of 250 PSS included in the study, majority (42%) belonged to the age group between 51-65 years followed by those aged more than 65 years, with the mean age of the sample being 58.7 ± 13.54 years. We noted male preponderance (74%) with a male-to-female ratio of 2.9:1. Majority of PSS belonged to the Hindu religion, were married, were from rural backgrounds and had formal education (87.2%) with only 12.8% being not formally educated, while 26% had achieved a university degree. According to the modified Kuppaswamy classification (2020) [15], 46.4% of the sample belonged to the upper-

lower socioeconomic group followed by 41.6% from the lower-middle group (Table-1).

More than two-thirds of the sample (69.2%) had preexisting hypertension followed by diabetes mellitus (32.8%), dyslipidemia (32.8%) and cardiovascular risk factors like IHD (12.8%). Tobacco use (44.8%) and alcohol use (54.4%) were also noted. A family history of stroke was observed in 41.6% of the PSS. Most common type of stroke in PSS was of ischemic type (79%), and nearly half of the sample (49.6%) had right-sided stroke lesions followed by left-sided stroke lesions (43.6%) in the brain. Only seven percent of PSS had bilateral brain stroke lesions. Medical complications such as delirium, recurrent stroke, and urinary tract infections were noted in 15.6% of the PSS during the hospitalization. In the current study, 44% of persons with acute stroke were discharged within a week, 35% of cases stayed in the hospital up to ten days, and only six percent of cases stayed beyond 15 days in the hospital. Nearly, half (48%) of the PSS scored moderate stroke severity, 28.4% scored minor stroke and 19% scored moderate-to-severe on NIHSS scale. One-third (32%) of the sample had moderate locomotor disability on MRS and no locomotor disability in 40% of PSS despite symptoms. Functional impairment with dependence on caregivers was noted to be mild dependence in 35%, and moderate dependence in 34.8% of the PSS (Table 2).

In the current study, majority of the PSS expressed health-related information and emotional support domains of FNQ as essential needs. Instrumental support and professional support domains of FNQ were considered as moderate needs, while domains like community support and involvement in care were considered as less important needs by PSS (Table 3, Figure 1). Pearson's correlation test

revealed relationship between the various domain scores of FNQ with that of MRS (loco-motor disability) and BIADL (functional impairment) scale scores (Table 4). All the domains of FNQ showed highly significant and very strong positive correlation with locomotor disability (MRS) scores, but highly significant and very strong negative correlation with BIADL scores for functional impairment (Table 4).

A one-way MANOVA test examined the main effects of various determinants on the six domains of FNQ. It revealed a significant association with large effect sizes (η^2p) between the domains of the FNQ and severity of disability [$F(30, 906) = 10.34$,

$P < 0.001$; Wilks' $\lambda = 0.308$; $\eta^2p = 0.255$] and stroke severity [$F(18, 682.14) = 10.05$, $P < 0.001$; Wilks' $\lambda = 0.514$; $\eta^2p = 0.210$]; with medium effect sizes for functional impairment [$F(24, 789.63) = 4.91$, $P < 0.001$ Wilks' $\lambda = 0.616$; $\eta^2p = 0.130$], length of hospital stay [$F(18, 642.54) = 2.29$, $P < 0.002$; Wilks' $\lambda = 0.839$; $\eta^2p = 0.060$], and occurrence of medical complications during hospitalization [$F(6, 227) = 2.67$, $P < 0.016$; Wilks' $\lambda = 0.934$; $\eta^2p = 0.066$]. Socio-demographic factors, vascular comorbidities, stroke subtype, and laterality were not significantly associated with the six domains of FNQ (Table 5).

Table 1: Socio-demographic characteristics of stroke survivors

Characteristics		n (%)
Age (in years)	Mean $\pm$ SD	58.7 $\pm$ 13.54
Age group (in years)	18-34	13 (5.2)
	35-50	53 (21.2)
	51-65	105 (42.0)
	> 65	79 (31.6)
Gender	Male	187 (74.8)
	Female	63 (25.2)
Residence	Rural	141 (56.4)
	Urban	109 (43.6)
Education	Illiterate	32 (12.8)
	High school	118 (47.2)
	Collegiate	28 (11.2)
	Graduation	65 (26.0)
	Post-graduation	7 (2.8)

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Occupation	Unemployed	69 (28.0)
	Farmer	65 (26.0)
	Retired	28 (11.2)
	Private job	44 (17.6)
	Government	22 (8.8)
	Business	22 (8.8)
Socio-economic status	Upper-middle	13 (5.2)
	Upper-lower	117 (46.8)
	Lower-middle	104 (41.6)
	Lower	16 (6.4)

SD = standard deviation

Table 2: Clinical profile of the stroke survivors

Characteristics	n (%)
National Institute of Health stroke severity scale	
No stroke symptoms or minor stroke	71 (28.4)
Moderate stroke	120 (48.0)
Moderate to severe stroke	49 (19.6)
Severe stroke	10 (4.0)
Barthel index for activities of daily living	
Normal functioning	25 (10.0)
Slight dependency	88 (35.2)
Moderate dependency	87 (34.8)
Severe dependency	40 (16.0)
Total dependency	10 (4.0)
Modified Rankin's scale (global disability)	
No symptoms	80 (32.0)
No disability despite symptoms	26 (10.4)

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Slight disability	53 (21.2)
Moderate disability but able to walk	40 (16.0)
Moderate disability but unable to walk	40 (16.0)
Severe disability	11 (4.4)
Risk factors	
Hypertension	173 (69.2)
Diabetes mellitus	82 (32.8)
Dyslipidemia	49 (19.6)
Ischemic heart disease	32 (12.8)
Tobacco use	112 (44.8)
Alcohol consumption	136 (54.4)
Type of stroke in post-stroke survivors	
Ischemic	198 (79.2)
Hemorrhagic	52 (20.8)
Side of stroke in post-stroke survivors	
Right	124 (49.6)
Left	109 (43.6)
Bilateral	17 (6.8)
Length of hospital stay (in days)	
1-5	110 (44.0)
6-10	89 (35.6)
11-15	35 (14.0)
≥16	16 (6.4)
Medical complications during hospitalization	39 (15.6)
Family history of stroke	104 (41.6)

Table 3: Perceived needs of stroke survivors

Family needs questionnaire domains (domain-wise maximum score)	Mean ± SD	Median	IQR
Health information (44)	29.14 ± 7.87	26	16-42

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Emotional support (40)	24.36 ± 8.34	22	10-39
Instrumental support (24)	14.23 ± 6.135	13	7-24
Professional support (20)	14.4 ± 5.07	14	8-22
Community support network (20)	11.65 ± 4.23	11	5-19
Involvement in care (8)	4.36 ± 1.82	4	2-7

SD=standard deviation; IQR=inter-quartile range

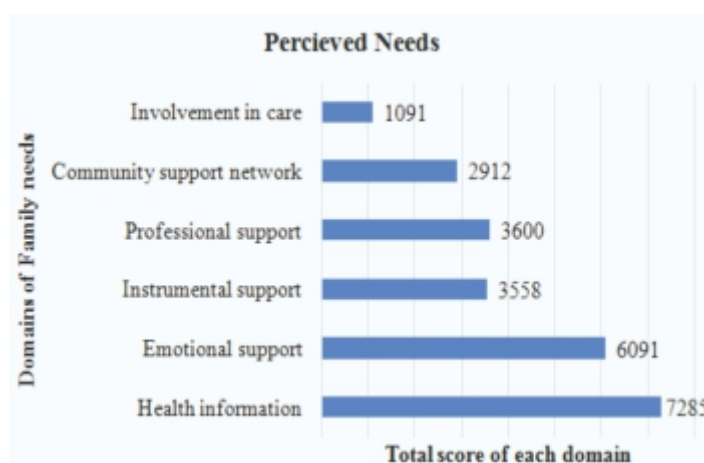


Figure 1: Domain-wise scores of perceived family needs

Table 4: Correlation of family needs with loco-motor disability and functional impairment

Family needs questionnaire domains	Modified Rankin's scale		Barthel index for ADL	
	r	p	r	p
Health information	0.918	< 0.001*	-0.914	< 0.001*
Emotional support	0.922	< 0.001*	-0.912	< 0.001*
Instrumental support	0.937	< 0.001*	-0.933	< 0.001*
Professional support	0.934	< 0.001*	-0.915	< 0.001*
Community support network	0.932	< 0.001*	-0.918	< 0.001*
Involvement in care	0.922	< 0.001*	-0.895	< 0.001*

**p < 0.05; r = Pearson's correlation coefficient; ADL= activities of daily living*

Table 5: Multivariate analysis of variance with six domains of family needs questionnaire

Main effects (N=250)	Wilks' Lambda	F	p	Partial eta squared
Age	0.984	0.63	0.707	0.016
Sex	0.994	0.25	0.961	0.007
Residence	0.982	0.71	0.642	0.018
Education	0.969	1.21	0.303	0.031
Occupation	0.987	0.48	0.822	0.013
Socio-economic status	0.970	1.17	0.325	0.030
Severity of stroke	0.514	10.05	0.001*	0.210
Functional dependency status	0.616	4.91	0.001*	0.130
Loco-motor disability status	0.308	10.34	0.001*	0.255
Hypertension	0.970	1.18	0.317	0.030
Diabetes mellitus	0.981	0.75	0.613	0.019
Dyslipidemia	0.981	0.72	0.637	0.019
Ischemic heart disease	0.971	1.11	0.357	0.029
Tobacco use	0.987	0.52	0.797	0.014
Alcohol consumption	0.987	0.51	0.798	0.013
Type of stroke	0.992	0.33	0.920	0.008
Side of stroke	0.986	0.29	0.991	0.007
Time of arrival to the hospital	0.889	1.14	0.294	0.033
Duration of hospitalization	0.839	2.29	0.002*	0.060
Medical complications during hospitalization	0.934	2.67	0.016*	0.066
Family history of stroke	0.993	0.25	0.959	0.007

* $p < 0.05$

Discussion

The current study investigated the relationship between the clinical profile, locomotor disability and functional dependence with the perceived family needs of PSS. Psychosocial consequences of stroke, such as locomotor disability, functional

dependence, social isolation and financial implications, are devastating to the PSS. Needs of the PSS and their family members are essential to be understood so as to address and improve treatment outcomes and plan appropriate rehabilitation

strategies for the PSS [16]. The current study results show a significant burden of disability and a direct correlation between family needs and functional dependence. We observed the prevalence of ischemic stroke (79.2%) consistent with earlier epidemiological studies from India that reported frequencies of ischemic stroke between 60%-80%, while the global epidemiological trend accounted ischemic strokes for nearly 70%-85% [17].

We observed the burden of modifiable risk factors such as alcohol intake (54.4%), tobacco use (44.8%), and hypertension (69.2%) in our study similar to earlier studies [18-21]. Majority of the subjects in our study had moderate stroke severity (48%), and a significant percentage (about 90%) showed functional dependence. In contrast, lower proportion (60%) of PSS had functional dependence in a study from Sweden at three months after stroke [22].

We assessed the family needs of PSS at three to six-months post-stroke in the present study. Health information and emotional support domains of family needs were found to be most essential needs. Domains of FNQ like instrumental support and professional support were observed as moderate needs, while domains like community support and involvement in care were reported to be less important needs. PSS and their caregivers considered stroke-related information, respecting patients during treatment, responding to their queries by health professionals, and providing information on changes in their health condition as essential needs. Often, PSS express a felt need of emotional support which remains often unmet, under-recognized, unrecognized or less emphasized [16]. Similar unmet needs were also observed by Hayashi *et al.* (2011) with 83.7% of the caregivers having reported that they needed information on “how to

maintain the patient's health condition” or “how to prevent recurrent strokes” [23]. A recent Malaysian study by Sidek *et al.* (2022) identified self-psychological support and information regarding complete stroke care at home by the caregivers of PSS [24]. Similarly, an Indian study by Kumar *et al.* (2016) observed that the most important needs among the caregivers of PSS were related to the domains of health information, instrumental support and professional support, while the least important needs were observed among emotional support and community support domains of FNQ [25].

In the present study, family needs showed strong and positive correlation with the locomotor disability and strong but negative correlation with functional independence. These findings suggest that as disability increases and functional ability declines, the perceived needs of patients and families increase substantially. Multivariate analysis further reinforces these findings by demonstrating that clinical factors, particularly stroke severity, functional dependency, and loco-motor disability are the primary determinants of family needs rather than socio-demographic variables. This is consistent with earlier studies that suggest clinical severity of stroke and level of impairment as stronger predictors of post-stroke outcomes and caregiver burden than socio-demographic characteristics [26]. Our findings are similar to a study from Iran on elderly PSS that reported family needs to be associated with length of hospital stay and functional impairment [27].

Although 72% of PSS in the present study were aged above 50 years, age did not emerge as a predictor of family needs in multivariate analysis suggesting that caregivers' needs for PSS were similar irrespective of age, a finding not uncommon among Indian family settings. In contrast, a study

by Ch'ng *et al.* (2008) caregivers' needs were observed to increase in relation to the age of their older patients who usually have a lower ability for self-care which in turn leads to the increased caregiver responsibilities and burden [28]. Fear of death, understanding complex and severe conditions, and the diminished self-worth are reported as the main reasons for older patients becoming dependent on caregivers. This is exacerbated by the older patient's inability or apathy to perform self-care and ADL which demands caregivers' quality time and services. This results in an increase in the number of caregivers' needs especially in the support domain [28].

In current study, medical complications during hospitalization were significantly associated with the perceived needs, as these were frequently associated with increased length of hospital stay. Tsai *et al.* (2015) also observed a relationship between the length of hospital stay and the number of caregivers' needs at all four time-points such as before transferring out of the intensive care unit, prior to the discharge, two weeks post-hospitalization, and three months post-hospitalization [29]. The length of hospital stay is usually related to the severity of a patient's disease and the more complex condition results in family caregivers expressing higher needs. Decreased length of hospital stay was associated with reduced risk of opportunistic infections, medical complications and side-effects of medications. Financial burden associated with long-term hospitalization, the need for long and frequent referrals to the hospital for visiting the patient or participating in care, as well as the increased chance of older patients to acquire nosocomial infections are other potential reasons for the increased caregivers' needs due to prolonged hospitalization [30].

Although, needs of the PSS and family members can vary depending on the stroke severity and type of stroke, [7] we observed stroke severity at the time of admission and not type of stroke as the robust determinant of family needs in addition to the locomotor disability. We found no relationship between the number of needs and underlying diseases in our study.

Our study has examined comprehensive multi-dimensional assessment of PSS for locomotor disability, functional dependence and perceived family needs capturing the overlooked unmet needs, with relatively larger sample size at 3-6 months after index stroke. We believe that our findings may aid in the rehabilitation planning and policy making in relation to the post-stroke rehabilitation strategies and improve treatment outcomes. However, our study has certain limitations. Assessment of family needs at different stages of the natural course of the stroke such as acute stage, admission, and during later stages (> six months) could provide more insights. As current study included PSS and their caregivers during 3-6 months post-stroke from a single centre, generalizability is limited and findings need to be interpreted with caution. Other confounding factors like cognitive impairment and emotional states of PSS were not assessed in the study which may impact the needs of PSS.

Future prospective studies need to focus on the needs of PSS as well as caregivers at different stages of stroke, especially in the community settings. Understanding the unique demands or requirements of the PSS and caregivers is necessary when planning for tailored interventions. It is prudent to design novel suitable interventions and evidence-based policies to lessen the burden and enhance QoL for both PSS and caregivers which necessitate

precise evaluations of the family needs. The enhancement and diversification of community or home-based rehabilitation strategies are therefore necessary to make community rehabilitation more accessible and equitable [5]. Studies focusing on experiences of the healthcare professionals to understand the barriers in meeting the needs of the PSS and caregivers can provide novel service-provider insights that can aid in the planning of the community-based rehabilitation strategies.

Conclusion

Our study highlights health-related information and emotional support as the major family needs of PSS. Multiple impairments among PSS pose signi-

ficant mental, physical, and social impact on the caregivers' personal and professional lives leading to drastic changes in their lifestyle, family dynamics, and daily activities which can increase the caregiver burden and burnout, especially when they assume the essential role obligations of PSS. Understanding the needs, especially on information about the illness, treatment options available, educating family members on caretaking methods for PSS in addition to taking appropriate care of themselves may help in designing better stroke rehabilitation strategies and improve treatment outcomes.

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