Elements of a nurse-coordinated post-stroke home care rehabilitation in the Philippines: A cross-sectional study

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Abstract

Background: Stroke is the leading cause of disability and the second leading cause of death worldwide. In the Philippines, there is a lack of a unified system for the care of community-dwelling patients with stroke. Furthermore, rehabilitation facilities are underutilized, and human resources and financial support policies are lacking. Nurses have become valuable human resources in rehabilitation. Current literature has inconsistent and weak evidence on the effectiveness of home-based post-stroke rehabilitation.

Objective: This study aimed to determine essential elements that constitute a nurse-coordinated post-stroke home care rehabilitation in the Philippines.

Methods: A literature review was conducted to generate items for a tool that would elicit important elements of post-stroke home care rehabilitation in terms of structure, process, and outcome domains. Two rounds of the modified e-Delphi technique were conducted with a panel of 10 experts, and the content validity index (CVI) was calculated. Using the developed tool, a cross-sectional survey was conducted among nurses in the Philippines in March 2024. The responses were subjected to principal component analysis.

Results: The validated tool contains 55 items with an item level CVI range of 0.9-1.0 and a scale level CVI of 0.99. Online survey responses were received from 326 participants. The first principal component for each domain was analyzed. Structure elements involve an interdisciplinary team that integrates policy and funding for home visits and telehealth services, ensuring culturally responsive home environments. Process elements involve collaborative planning and evidence-based treatment processes coordinated by nurses, prioritizing patient and family engagement. Nurses may perform therapies delegated by rehabilitation specialists. Outcomes elements focus on achieving patient- and family-centered goals, enhancing daily activities, and improving overall quality of life.

Conclusion: Given the complexity of community-based rehabilitation, this study determined the essential elements of post-stroke home care rehabilitation. These elements are crucial in providing guidance to policymakers, clinicians, and patients in the delivery of home-based post-stroke care.

Keywords

activities of daily living; Delphi technique; Donabedian model; home care services; patient care team; principal component analysis; Philippines; stroke; rehabilitation

Background

Stroke remains the leading cause of disability worldwide (World Health Organization [WHO], 2022). Disability-adjusted life years (DALY) have increased in lower-middle-income countries (LMIC) from 75.1 million in 1990 to 111.0 million in 2019. It is projected that one in four people over 25 years of age will have a stroke in their lifetime (Feigin et al., 2022). In the Philippines, for the year 2022, stroke was the third leading cause of death, accounting for 63,281 recorded cases or 10.2% share of the total deaths in the country (Philippine Statistics Authority, 2023). Strikingly, more than half (54%) of those who have died from stroke in the Philippines failed to seek medical attention (Collantes et al., 2022).

In the Philippines, stroke rehabilitation services and facilities are inadequate (Collantes et al., 2022). Despite the limited number of rehabilitation centers, only 54.1% of patients were referred to rehabilitation services — a sign of underutilization. PhilHealth, the Philippine government's health insurance agency, has yet to cover stroke rehabilitation in 2024 (Philippine Council for Health Research and Development [PCHRD], n.d.), leaving patients to finance their rehabilitation out-of-pocket or through private health insurance (Collantes et al., 2022). The lack of a healthcare financing

support system for stroke home care rehabilitation in the Philippines results in a significant financial burden for patients and their families. This policy gap contributes to the underutilization of rehabilitation services. A nurse-coordinated home care rehabilitation could provide a cost-effective and accessible alternative to traditional inpatient rehabilitation.

According to Kim et al. (2020), patients with worse post-stroke disability incurred higher medical costs. Their study also showed an 85% direct cost reduction when disability is reduced from a modified Rankin Scale (mRS) score of 3 to 2. This suggests that interventions that reduce disability could have a substantial societal impact. Chen et al. (2017) argued that rehabilitation aims to improve individuals' ability to perform daily life economically. Tung et al. (2021) found that Home-based Post-Acute Care (PAC) is more cost-effective than inpatient PAC for stroke rehabilitation. Rasmussen et al. (2016) also revealed that returning home to family is considered by patients to be an essential component of overall recovery, which includes patients' physical function and quality of life (QoL). Patients can regain control over their lives and strive for re-personalization in these settings. Despite the growing recognition of the potential of home-based care in stroke rehabilitation, limited evidence exists on its effectiveness and scalability in the Philippine context. This is particularly evident in the absence of well-structured, nurse-coordinated models that address the unique challenges of post-stroke care in a resource-limited setting.

Management of stroke is complex as it often leads to debilitating impairments to an individual's cognitive, psychomotor, and emotional attributes (American Stroke Association, 2024). Rehabilitation phases include acute, convalescent, and chronic phases (Kinoshita et al., 2022). Each phase requires specific caring practices guided by the best available evidence. In the transition from the acute to the chronic phase of stroke, inconsistent evidence exists on the effectiveness of home care practices. A systematic review and meta-analysis (Qin et al., 2022) revealed insufficient evidence to establish the short- and long-term effectiveness of the performance of Activities of Daily Living of home-based care compared to no therapy or usual care. Another systematic review (Chayati et al., 2020) shows that home-based care interventions improve the physical and psychological aspects of the patient with stroke. The difference in the results of these systematics reviews may be due to the small sample size of the included studies, severity of stroke, intensity of interventions, and heterogeneity of usual care as control. The variability of results from studies on home-based stroke rehabilitation indicates that further research is necessary to develop and evaluate structured, evidence-based programs, especially those coordinated by nurses.

In the Philippines, less than 25% of cities and municipalities meet the WHO human resource for health density recommendation (Robredo et al., 2022). Healthcare workers prefer to practice in urban areas, which results in the maldistribution of services. The underutilization of stroke rehabilitation services in the Philippines, coupled with the maldistribution of healthcare workers, creates a significant barrier to timely and effective care for patients with stroke, leading to poorer quality of care delivered and longer waiting times for essential services. Also, a significant issue exists in how these services are accessed and delivered, particularly in rural areas where healthcare resources are scarce. These challenges are exacerbated by the inadequacy of financial support systems for post-stroke rehabilitation, leaving patients and their families burdened with high out-of-pocket costs.

Nurses comprise the majority (59%) of all health professionals in the Philippines (University of the Philippines Population Institute (UPPI) & Demographic Research and Development Foundation (DRDF), 2020). Thus, nurses are a valuable human resource for delivering post-stroke care. The Institute of Medicine (2011, as cited in Lamb et al., 2015) recognized that nurses have the ability to enhance healthcare quality and accessibility through care coordination. Chayati et al. (2020) further suggest that nurses may play a key role in implementing home-based rehabilitation. However, there is limited literature that clarifies the role of nurses in post-stroke rehabilitation in the Philippines.

Lindley et al. (2017) revealed the importance of multidisciplinary teams in stroke rehabilitation, whereas they assert that interventions that lack coordination from a multidisciplinary team do not show any evidence of being beneficial. Several studies (Camicia et al., 2021; Hickey & Strayer, 2019; Meng et al., 2020) assert that nurses play a critical central role as coordinators of multidisciplinary teams. Rehabilitation professionals plan and deliver their rehabilitation interventions. Nurses spend more time with patients, so other professionals may rely on them to support these rehabilitation goals. Nurse-led care coordination may foster connections and seamless coordination among healthcare providers and services while acknowledging patient needs and preferences.

Several countries have established stroke rehabilitation systems. For example, in Japan, the National Medical Insurance and Long-term Care Insurance (LTCI) systems were established to offer rehabilitation services to patients with stroke (Kinoshita et al., 2022). These systems allow for the seamless and supported transition of patients from acute to chronic phases of stroke. On the other hand, in the Philippines, patients are usually instructed about their medications, therapies, and follow-up check-ups just before hospital discharge. However, adherence to medical treatment and therapy solely relies on the patient and their family's capacity to provide these needs, especially if healthcare insurance does not cover them. This results in poor quality of care for community-dwelling patients with stroke. Effective stroke rehabilitation is not only essential for improving patients' quality of life but also has significant economic implications. By reducing disability and promoting functional recovery, well-designed rehabilitation programs can reduce healthcare costs and improve societal outcomes (Candio et al., 2022; Lorenz & Doonan, 2021).

Thus, there is an urgent need to improve patient outcomes, reduce healthcare costs, and increase access to rehabilitation services in resource-limited settings through nurse-coordinated post-stroke home care rehabilitation. As mentioned above, given the societal impact of stroke in the Philippines, insufficient evidence on home-based stroke rehabilitation, lack and maldistribution of rehabilitation specialists, underutilization of services, and the valuable role of nurses in the Philippine healthcare system, a nurse-coordinated post-stroke home care rehabilitation is worthy of being explored.

This study aimed to clarify what elements constitute a nurse-coordinated post-stroke home care rehabilitation in the Philippines.

Conceptual Framework

Avedis Donabedian's "Model of Evaluating Quality Health Care" has become the healthcare quality measurement paradigm (Donabedian, 1980). Donabedian (1988) argues that quality in health care can be measured in order to monitor and "assure" it. Donabedian (2003) introduced three approaches to Quality Assessment, which are Structure, Processes, and Outcomes of health care, and explained that "Structure influences process and process influences outcome" (p. 47). The researchers utilized Donabedian's model to categorize essential elements in the delivery of post-stroke care among community-dwelling patients with stroke.

Structure refers to the attributes of the settings in which healthcare is provided. It encompasses various elements. "Material Resources" include physical resources, such as facilities, equipment, and financial resources available for providing care. "Human Resources" pertains to the people involved in healthcare, including their number and qualifications. It considers factors like the size and competence of the healthcare workforce. "Organizational Structure" relates to how healthcare institutions or facilities are organized. It includes aspects like the structure of medical staff, peer review, and reimbursement methods.

Process refers to the actual activities and actions when giving and receiving healthcare. It encompasses various actions. "Patient's Activities" involve what patients do when seeking care and how they carry out recommended treatments, such as making appointments, adhering to treatment plans, and self-care measures. Donabedian (2003) highlighted that the patient-practitioner relationship "motivates the patient to cooperate so that the effectiveness of care is enhanced." "Practitioner's Activities" refers to healthcare practitioners' actions in healthcare delivery, such as diagnosing medical conditions, recommending treatments, and implementing treatment plans. Donabedian acknowledges the patient's personal characteristics, which may interact with the process and eventually influence outcomes.

Outcome refers to healthcare's effects on the health status of individual patients and larger populations. It is a critical measure of the success and quality of healthcare services. Outcome evaluation goes beyond the care delivery process and assesses the ultimate impact on patients and communities.

Methods

No existing tools identify the elements that constitute a nurse-coordinated post-stroke home care rehabilitation in the Philippines. As such, this study had two phases: tool development and cross-sectional survey (DeVellis, 2016).

Phase 1: Tool Development
Concept Identification
The developed tool was anchored on Donabedian's model of Evaluating Quality Health Care (Donabedian, 2003). The items generated in the following step were sorted as "Structure," "Process," or "Outcome" elements.

Item Generation
A systematic review (Blaquera et al., in press) was conducted to generate the items. Published articles from 2012-2022 focusing on home-based stroke rehabilitation were retrieved from PubMed, CINAHL (EBSCO), ProQuest, and ScienceDirect. Keywords were "stroke," "home care services," "domiciliary care," "self-care," "physical function," and "activities of daily living." A total of 758 studies were retrieved and screened based on the inclusion criteria: 1) studies involving only patients post-stroke discharged to home; 2) studies focusing on home-based rehabilitation, programs, or interventions; 3) type of articles: quantitative and mixed methods. The interventions in the included studies were analyzed based on their structures, processes, and outcomes. Items were then newly generated based on the themes of "structures," "processes," and "outcomes," and the initial version of the tool consisted of 48 items.

Modified e-Delphi Technique
A modified e-Delphi technique (Keeney et al., 2011) established consensus on the items to be included in the final version of the tool. Purposive sampling was used to select the members of a multidisciplinary stroke expert panel from the Philippines and Japan. Considering Japan's established transitional and community rehabilitation system, the panel's composition ensured diversity in opinions and experiences in stroke rehabilitation systems. It was ensured that they met the inclusion criteria: having a post-graduate degree and at least five years of professional experience in post-stroke care. The ten-member panel comprised two Physiatrists, a Neurologist, four Nurses, a Speech-Language Pathologist, a Physical Therapist, and an Occupational Therapist. Seven members were from the Philippines, and three were from Japan.

Two rounds of modified e-Delphi technique were conducted. The initial version of the tool was electronically sent to the expert panel. The experts assessed the degree of relevance of each item on a scale of 1 to 4, with 1 as having no relevance and 4 as very relevant. The same panel of experts was also asked to suggest modifications to the items. Further, they were asked to suggest additional items. The experts' ratings on relevance were analyzed by computing the I-CVI (Item-level Content Validity Index) and S-CVI (Scale-level Content Validity Index). The experts' responses on suggested modifications and additional items were analyzed through content analysis.

The final version of the tool was based on the results of the synthesis of quantitative data (CVI) and qualitative data (content analysis of responses to suggested modifications and additional items). The items had an I-CVI range of 0.90-1.00, above the acceptable 0.78 (Polit & Beck, 2017), and an S-CVI of 0.99, above the acceptable value of 0.90 (Polit & Beck, 2017). The final version of the tool had 55 items (Structure: 23, Process: 18, Outcome 14).

Pilot Testing
The tool was electronically distributed to nurses involved in stroke care. A total of 22 nurses, which is within the 15 to 30

recommended number by Gray and Grove (2021), participated in the pilot test. An additional choice of "I don't understand" was provided for each item. The participants completed the survey for an average of 15 minutes and did not report any items they did not understand. Their mean years of professional experience is 6.2 years. The number of participants working in hospital-based settings was 14 (77.27%) and 8 (36.36%) in community-based settings.

Phase 2: Survey
This phase involved a cross-sectional survey of nurses in the Philippines, with results subjected to Principal Component Analysis (PCA) to identify key items for nurse-coordinated post-stroke home care rehabilitation.

Samples/Participants

Nurses who were available and willing were recruited to take the survey. The sampling size was based on the 300 "good" sample size recommendation by Comrey and Lee (1992). The inclusion criteria were: 1) currently employed as a nurse in the Philippines, 2) handling patient or patient populations that include patients with stroke, 3) at least one year of professional experience, and 4) able to access and complete the survey. The exclusion criteria were those nurses who did not have direct contact with patients with stroke.

Data Collection Procedure

Four tertiary hospitals in the Philippines were given letters of permission to conduct the study. Additionally, purposive sampling was used to recruit nurses to ensure sampling adequacy. The survey was conducted in March 2024. Using the Survey Monkey© platform, the participants were given a link to the electronic copy of the study's nature, informed consent form, questions on demographic profile, and the developed tool. Those who agreed to participate were asked to answer the demographic profile questions and the developed tool. In the developed tool, the participants were asked to rate the items in terms of "importance." as follows: 5 - Highly Important, 4 - Fairly Important, 3 - Important, 2 - Slightly Important, 1- Not Important at all.

Data Analysis

The data were organized in Excel and analyzed using Jamovi (Version 2.5) (The Jamovi Project, 2024). PCA was conducted to extract important items of a nurse-coordinated post-stroke home care rehabilitation in the Philippines. PCA is a data reduction technique used when there is sufficient correlation among the variables (Alavi et al., 2020). The items in the validated tool were carefully categorized manually and with expert judgment based on Donabedian's domains. PCA aimed to identify important items from each domain; hence, the items were subjected to PCA separately based on the Structure, Process, and Outcome domains. The assumption tests used were Bartlett's test of sphericity and Kaiser-Meyer-Olkin (KMO) measure, which verified the sampling adequacy for the analysis. The PCA used a fixed number of components to identify the most important items in each domain. No rotation was applied. A component loading threshold of 0.50 was applied, often used by researchers (Polit & Beck, 2017). Cronbach's alpha was used to evaluate the internal consistency of the developed domains.

Ethical Considerations
The St. Paul University Philippines Research Ethics Committee (SPUP REC) has given this study a certificate of approval with code SPUP_2023_0880_SR_AB. Informed consent was secured from the participants to ensure that the study conformed to the ethical norms of research. This process involved clearly explaining the purpose of the study, the procedures involved, and the potential risks and benefits to participants. The study also implemented measures to protect the confidentiality and anonymity of participants, ensuring their personal information was handled with the utmost care.

Results

Demographic Profile
A total of 369 nurses participated, but only 326 (88.3%) completed the survey. The 43 incomplete forms only had responses on demographic characteristics; hence, they were excluded in the final analysis. **Table 1** shows the participants' demographic profile. The participants' years of professional experience across categories are relatively even. The majority of the participants (69.33%) have 1 to 5 years of professional experience handling patients with stroke. Most participants (88.3%) work in a hospital-based setting, while 11.7% work in a community-based setting.

Table 1 Participants' demographic profile (*N* = 326)

Demographic Profile	*n*	%	Mean (SD)
Years of professional experience			8.74 (6.50)
1-5 years	116	35.58	
6-10 years	112	34.36	
More than 10 years	98	30.06	
Years of professional experience handling patients with stroke			4.92 (4.73)
1-5 years	226	69.33	
6-10 years	68	20.86	
More than 10 years	32	9.82	
Current practice setting			
Hospital-based	288	88.3	
Community-based	38	11.7	

Mean Scores for Each Item

The participants rated each item in terms of "importance," with 5 as "highly important" and 1 as "not important at all." **Table 2** shows the mean ratings for each item. All the items have mean ratings between 4 and 5 (Fairly to Highly Important) except for Item 17, which has a mean of 3.79.

Table 2 Participants' responses for each item

Items	Mean	SD
1. Medical care from a neurologist	4.83	0.57
2. Medical care from a Rehabilitation Medicine Physician	4.78	0.56
3. Medical care from an Internal Medicine Physician	4.77	0.56
4. Nursing care from a registered nurse	4.87	0.47
5. Physical therapy	4.77	0.54
6. Occupational therapy	4.57	0.68
7. Speech-language therapy	4.63	0.68
8. Other health care specialists for patients with co-morbidities	4.65	0.66
9. Social worker services	4.33	0.86
10. Nutritional counseling from a nutritionist-dietician	4.62	0.69
11. Interdisciplinary team members are formed on the basis of patient needs	4.58	0.74
12. National Policy that specifies national and local, both public and private, provider roles and responsibilities	4.51	0.78
13. National policy that provides funding for patient services	4.66	0.71
14. Clinical practice guidelines on Stroke Care reviewed and approved by local professional organizations	4.67	0.68
15. Services paid by government insurance and/or subsidy	4.66	0.67
16. Services paid by non-government insurance (e.g., HMO, private insurance)	4.44	0.79
17. Services paid "out-of-pocket" by patients	3.79	1.21
18. Rehabilitation costs are priced at fair market value	4.44	0.90
19. Telehealth facilities	4.43	0.82
20. Telehealth competence of the healthcare team	4.52	0.81
21. Culturally responsive homecare rehabilitation	4.55	0.73
22. Safe homecare rehabilitation environment	4.73	0.60
23. Patient's house is ergonomically modified	4.31	0.93
24. The interdisciplinary team regularly communicates in the planning, implementation, and evaluation of care	4.66	0.67
25. The interdisciplinary team and patient and their family regularly communicate in the planning, implementation, and evaluation of care	4.68	0.63
26. Planning begins before acute care discharge	4.73	0.59
27. Interventions are based on the latest clinical practice guidelines reviewed and approved by the interdisciplinary team	4.71	0.62
28. Interventions address the cognitive dimension needs of the patient and family	4.65	0.63
29. Interventions address the psychomotor dimension needs of the patient and family	4.6	0.69
30. Interventions address the behavioral dimension needs of the patient and their family	4.62	0.65
31. The nurse provides direct patient care	4.72	0.60
32. Methods of evaluating outcomes were set during planning	4.7	0.61
33. Periodic evaluation correctly monitors the achievement of rehabilitation goals	4.67	0.63
34. Plans are adjusted based on the results of periodic evaluations	4.66	0.66
35. The nurse leads the coordination of the interdisciplinary team, environment, funding, policies, telehealth, planning, implementation, and evaluation of care	4.55	0.78
36. Nurses can perform tasks delegated by other professionals	4.56	0.78
37. Patient is engaged in the home visit rehabilitation provided by a professional	4.58	0.73
38. Patient's family is engaged in the home visit rehabilitation provided by a professional	4.66	0.69
39. Patient is engaged in the home rehabilitation provided by the family	4.65	0.69
40. Patient is engaged in Telehealth services	4.43	0.85
41. Patient's family is engaged in Telehealth services	4.44	0.81
42. The rehabilitation goals are patient- and family-centered	4.69	0.63
43. Cognitive functioning of the patient is maintained or improved	4.71	0.63
44. Patient and their family's knowledge of stroke has improved	4.74	0.59
45. The patient's family's knowledge of stroke care has improved	4.73	0.60
46. The patient's family's skills in stroke care have improved	4.71	0.62
47. Psychomotor functioning of the patient is maintained or improved	4.69	0.67
48. Psychological needs of the patient are addressed	4.68	0.64
49. Patient's swallowing and feeding needs are addressed	4.76	0.60
50. Patient is able to re-establish family and social roles	4.63	0.69
51. Patient's communication abilities are maintained or improved	4.7	0.65
52. Patient has improved functional independence	4.72	0.62
53. Patient's sensory awareness is maintained or improved	4.71	0.61
54. Patient and family maintain positive behavior towards homecare	4.74	0.60
55. Patient and their family's quality of life has improved	4.73	0.59

Principal Component Analysis

Assumption tests were done prior to conducting PCA. The Bartlett test of sphericity was highly significant ($p <0.001$) for all domains. This means the datasets are suitable for the reduction technique (Tabachnick et al., 2019). The KMO values were greater than 0.6. This means the sample size was

adequate for PCA for all datasets (Li & Lopez, 2007). PCA was used to extract the critical items of a nurse-coordinated post-stroke home care rehabilitation. Only the first principal component for each of the three domains (Structure, Process, Outcome) was analyzed. Henceforth, "item" will be referred to as "element" if they are correlated to the first principal component of the respective domain. **Table 3** shows the PCA results of nurses' responses on the structure, process, and outcome domains.

Structure Elements: All items in the structure domain, except item 17, showed strong positive loadings on the first principal component. This component captures aspects related to the presence of an interdisciplinary team that can provide diverse services, such as medical care, nursing care, physical therapy, occupational therapy, speech-language therapy, nutritional counseling, and social worker services, in a safe and culturally responsive home care environment. Other important structures include national policies, clinical practice guidelines, telehealth, and funding.

Process Elements: The items with high positive loadings on the first component include the importance of planning, implementation, and evaluation processes in nurse-coordinated post-stroke home care rehabilitation. It emphasizes the importance of evidence-based interventions, communication among team members and stakeholders, and integrating patient and family input into care planning and evaluation. Further, it reveals the importance of addressing the cognitive, psychomotor, and behavioral needs of the patient and their families.

Outcome Elements: The survey items with the highest loadings on the first component included the importance of improvement in the patient's family's skills and knowledge of stroke care, maintenance or improvement of psychomotor and cognitive functioning, addressing psychological and communication needs, and enhancing the quality of life.

Initial Eigenvalues per Domain
The first principal component of the Structure domain had an initial eigenvalue of 10.890 after item 17 was removed, explaining 49.498% of the total variance; the Process domain had an initial eigenvalue of 11.1473 and 61.9% of the total variance; and the Outcome domain with 10.4321, and 74.515% of the total variance, respectively.

Reliability Test Results
The overall Cronbach's alpha coefficient of the developed tool is 0.980. The coefficients for each domain were 0.942 for Structure, 0.961 for Process, and 0.973 for Outcome. These indicate excellent internal consistency, considering that the high alpha values are consistent with the conceptual model.

Discussion

Principal Findings
This study aimed to determine what constitutes a nurse-coordinated post-stroke home care rehabilitation in the Philippines. Current literature about home-based stroke rehabilitation was analyzed to generate items for a tool. A modified e-Delphi technique was used to validate the tool. A cross-sectional survey was conducted to confirm essential components through PCA. This section discusses the

essential elements anchored in Donabedian's Structure, Process, and Outcome domains.

Structure
The first principal component highlights the human, material, technological, organizational, and financial structures of the rehabilitation process. These results provide insights into the important underlying structures related to nurse-coordinated post-stroke home care rehabilitation. The interdisciplinary professionals form a cohesive team based on the specific needs of patients with stroke. Specifically, the interdisciplinary team must be composed of a physician, nurse, physical therapist, occupational therapist, speech-language pathologist, social worker, nutritionist-dietician, social worker, and other healthcare providers that address the patient's co-morbidities. This is similar to the findings of Fisher et al. (2021) in the composition of a multidisciplinary team for the organization of home-based rehabilitation for patients with stroke and severe disability.

The nurses perceive that alignment with established stroke rehabilitation clinical practice guidelines and standards approved by the Department of Health of the Philippines is also important. However, international stroke nursing and rehabilitation guidelines have yet to be established. This highlights the importance of advocating for shaping and maintaining the standards of care. In 2016, the World Stroke Organization provided guidelines for the implementation, monitoring, and evaluation of stroke services globally. Country-specific guidelines have a strong consensus. However, it is still recommended that guidelines be contextualized based on the country's health system (Mead et al., 2023). A policy may be a national, local, or institution-specific guideline that specifies health provider roles and responsibilities. It clarifies the roles of different stakeholders in the healthcare system, ensuring accountability, coordination, and alignment of efforts to achieve the overarching goals of the national health agenda. This policy ensures that funding is allocated to support patient services, including rehabilitation, in line with the national health priorities.

The use of telehealth has increased in response to the Covid-19 pandemic (Noceda et al., 2023). The participants perceived telehealth as an important element. Although some of these nurses might not have directly experienced telehealth delivery, they may have seen the impact of remote consultation, monitoring, and care delivery using technology. Telehealth facilities utilize technology to deliver healthcare services remotely, enabling patients with stroke to access rehabilitation services from the comfort of their homes.

A safe home environment includes assessing and addressing potential hazards in the home environment, implementing safety measures, educating patients and caregivers on injury prevention, and equipping the home with necessary assistive devices and modifications to support mobility and independence. Post-stroke care must be delivered with sensitivity to the cultural and religious beliefs, values, practices, and preferences of patients with stroke and their families. This approach acknowledges the diverse cultural backgrounds of patients. It aims to provide respectful, responsive, and appropriate care within the cultural context, thereby promoting trust, engagement, and positive health outcomes.

Table 3 PCA results and reliability results of nurses' responses on the Structure, Process, and Outcome domains (*N* = 326)

PCA Results and Reliability Results of Nurses' Responses on the Structure, Process, and Outcome Elements

Structure Domain Elements	Component 1 Loadings	Uniqueness
11. Interdisciplinary team members are formed on the basis of patient needs	0.794	0.37
20. Telehealth competence of the healthcare team	0.774	0.401
14. Clinical practice guidelines on Stroke Care reviewed and approved by local professional organizations	0.771	0.405
6. Occupational therapy	0.769	0.409
21. Culturally responsive homecare rehabilitation	0.766	0.414
10. Nutritional counseling from a nutritionist-dietician	0.764	0.416
9. Social worker services	0.763	0.417
15. Services paid by government insurance and/or subsidy	0.763	0.418
7. Speech-language therapy	0.753	0.433
22. Safe homecare rehabilitation environment	0.739	0.454
19. Telehealth facilities	0.732	0.464
12. National policy that specifies national and local, both public and private, provider roles and responsibilities	0.723	0.477
13. National policy that provides funding for patient services	0.719	0.483
16. Services paid by non-government insurance (e.g., HMO, private insurance)	0.704	0.505
5. Physical therapy	0.692	0.521
8. Other health care specialists for patients with co-morbidities	0.677	0.542
2. Medical care from a Rehabilitation Medicine Physician	0.638	0.593
23. Patient's house is ergonomically modified	0.612	0.626
3. Medical care from an Internal Medicine Physician	0.606	0.633
18. Rehabilitation costs are priced at fair market value	0.557	0.69
4. Nursing care from a registered nurse	0.534	0.715
1. Medical care from a neurologist	0.523	0.727
Initial eigenvalue = 10.890; Total variance = 49.498%; Cronbach's alpha coefficient = 0.942		
Process Domain Elements		
32. Methods of evaluating outcomes were set during planning	0.864	0.253
34. Plans are adjusted based on the results of periodic evaluations	0.859	0.262
33. Periodic evaluation correctly monitors the achievement of rehabilitation goals	0.853	0.272
25. The interdisciplinary team and patient and their family regularly communicate in the planning, implementation, and evaluation of care	0.845	0.286
30. Interventions address the behavioral dimension needs of the patient and their family	0.844	0.287
28. Interventions address the cognitive dimension needs of the patient and family	0.836	0.301
29. Interventions address the psychomotor dimension needs of the patient and family	0.832	0.308
27. Interventions are based on the latest clinical practice guidelines reviewed and approved by the interdisciplinary team	0.823	0.323
24. The interdisciplinary team regularly communicates in the planning, implementation, and evaluation of care	0.816	0.334
38. Patient's family is engaged in the home visit rehabilitation provided by a professional	0.809	0.346
26. Planning begins before acute care discharge	0.79	0.376
37. Patient is engaged in the home visit rehabilitation provided by a professional	0.78	0.392
40. Patient is engaged in Telehealth services	0.779	0.393
41. Patient's family is engaged in Telehealth services	0.753	0.433
39. Patient is engaged in the home rehabilitation provided by the family	0.722	0.478
31. The nurse provides direct patient care	0.681	0.536
35. The nurse leads the coordination of the interdisciplinary team, environment, funding, policies, telehealth, planning, implementation, and evaluation of care	0.63	0.603
36. Nurses can perform tasks delegated by other professionals	0.576	0.668
Initial eigenvalue = 11.1473; Total variance = 61.9%; Cronbach's alpha coefficient = 0.961		
Outcome Domain Elements		
46. The patient's family's skills in stroke care have improved	0.903	0.184
47. Psychomotor functioning of the patient is maintained or improved	0.899	0.193
52. Patient has improved functional independence	0.895	0.199
45. The patient's family's knowledge of stroke care has improved	0.892	0.205
44. Patient and their family's knowledge of stroke has improved	0.889	0.209
53. Patient's sensory awareness is maintained or improved	0.874	0.237
51. Patient's communication abilities are maintained or improved	0.867	0.249
49. Patient's swallowing and feeding needs are addressed	0.86	0.26
43. Cognitive functioning of the patient is maintained or improved	0.852	0.274
54. Patient and family maintain positive behavior towards home care	0.851	0.275
48. Psychological needs of the patient are addressed	0.842	0.29
42. The rehabilitation goals are patient- and family-centered	0.838	0.298
50. Patient is able to re-establish family and social roles	0.825	0.319
55. Patient and their family's quality of life has improved	0.79	0.376
Initial eigenvalue = 10.4321; Total variance = 74.515%; Cronbach's alpha coefficient = 0.973		
Overall Cronbach's alpha coefficient = 0.980		

Item "17. Services paid 'out-of-pocket' by patients" did not significantly contribute to the variance explained by the first principal component. This item captures aspects of inadequate financial considerations and social insurance issues for rehabilitation services. In the Philippines, the financial coverage of rehabilitation services is limited. Hence, patients and their families are forced to pay for rehabilitation services out-of-pocket (Collantes et al., 2021). Thus, it has been considered that the nurses feel that item "17. Services paid 'out-of-pocket' by patients" is not aligned with the financial services system in the structure domain. It could be considered that item 17 did not include the Structure domain. In contrast, the nurse participants perceive that government and non-government insurance coverage for rehabilitation services is essential. This again highlights the roles of nurse leaders in lobbying and policymakers in crafting equitable insurance coverage and/or financial support in stroke home care rehabilitation.

Process

The effectiveness of the planning, implementation, and evaluation process of home care rehabilitation among community-dwelling patients with stroke explicitly represents the first principal component of the Process domain. The important Process elements are collaborative planning, evidence-based practice, patient and family engagement, periodic evaluation, and nurse-led care coordination.

Planning must begin before acute care discharge. The interdisciplinary team must be able to collaborate and set goals based on patient needs. These plans must be evaluated periodically to ensure the goals are achieved and amendments are made based on patient progress.

The results further emphasize the importance of evidence-based interventions. This is aligned with the results of Fisher et al. (2021), who recognize that interventions should be based on the best available evidence. Evidence-based stroke rehabilitation can reduce the burden of disabilities arising from stroke (Platz, 2019). Interventions must also address the cognitive, behavioral, and psychomotor dimension needs of patients and their families. This ensures that patients receive holistic care, eventually improving their overall quality of life.

Communication must not be limited among team members but should involve the patient and their family in every stage of the care process. They communicate regularly throughout the care process, from planning and implementation to evaluation. This communication facilitates the sharing of expertise, coordination of interventions, and adjustment of care plans based on evolving patient needs. Patient and family engagement improves function in patients with stroke (Chaiyawat & Kulkantrakorn, 2012).

The results highlight the role of nurses in (1) directly providing patient care, (2) leading the coordination of the entire rehabilitation process, and (3) performing tasks delegated by other professionals. The nurse takes on a leadership role in coordinating the interprofessional team, facilitating communication, collaboration, and aligning efforts among various healthcare professionals involved in the patient's care. The nurse participates in the discharge planning and receives the attending physician's endorsement. The nurse ensures that all structure and process elements are accessible to the patient. With the lack and maldistribution of rehabilitation specialists in the Philippines, nurses become a valuable human resource in providing rehabilitative care.

Outcome

The primary focus of post-stroke home care rehabilitation is improving patient and family outcomes across the cognitive, psychomotor, and behavioral domains of the patient. These pertain to the improvement of overall QoL, which is an important outcome measure (Araújo et al., 2020; Chen et al., 2016; Wong & Yeung, 2015). Rehabilitation goals must be patient- and family-centered, ensuring that interventions are aligned with patients' needs, preferences, and priorities as agreed upon by several studies (Drenth et al., 2023; Kylén et al., 2023; Majid et al., 2023). To achieve the above, it is also important that the healthcare policy and health insurance system provide excellent support for community care and rehabilitation (Boeykens et al., 2023).

Nurse-coordinated post-stroke home rehabilitation must provide optimal outcomes during the transition from stroke to community rehabilitation. The nurse must be able to communicate changes and improvements to team members and the patient/family to recalibrate interdisciplinary team plans and interventions (Zampolini et al., 2022). With the complexity of outcomes to be monitored for each patient, the nurses' role is crucial in evaluating outcomes.

In terms of cognitive functioning outcomes, it is essential that the patient maintains or improves their ability to think, reason, and process information effectively. However, in setting cognitive outcome goals, the interdisciplinary team must also consider the presence of cognitive impairments, which often occur with stroke (O'Callaghan et al., 2024). Education initiatives increase the patient and their family's knowledge of stroke, including its causes, symptoms, treatment, and prevention strategies. This is parallel to the result of Hess Engström et al. (2024), wherein health literacy is associated with patient self-efficacy.

Improving psychomotor outcomes facilitates independence in daily activities and self-efficacy. Furthermore, promoting adequate support and caregiving to the family will improve the family's skills and confidence in providing stroke care. Chu et al. (2020) have shown that nurse-trained, family-delivered rehabilitative care improved physical recovery among patients. In particular, coaching swallowing and assisting during feeding ensure safe and efficient nutrition intake. The eating and nutritional aspects of QoL post-stroke are critical outcomes (Perry & McLaren, 2004). Robinson et al. (2022) emphasize that it is important for family members to maintain previous eating and drinking routines and that healthcare professionals should be able to consider these in setting targeted goals.

Similarly, enhanced communication abilities enable effective interaction and expression. Wray et al. (2019) suggest that developing tailored strategies based on the patient's uniqueness is crucial in strengthening confidence to manage long-term communication difficulties. In addition, improving sensory awareness is crucial in enhancing the patient's ability to perceive and respond to stimuli. Serrada et al. (2021) similarly showed that sensory awareness is correlated with clinical outcomes of QoL, self-efficacy, and motor abilities.

Addressing the affective domain outcomes supports the patient's emotional well-being and adjustment to life after stroke. The patient must be supported in re-establishing family and social roles, fostering meaningful relationships and community engagement. This parallels the results of Verberne et al. (2022), who encourage psychoeducation and emotional support to empower patients, consequently leading to better outcomes. Furthermore, these promote positive patient behavior toward home care and facilitate cooperation and engagement in the rehabilitation process. Ultimately, the patient and their family experience an improved quality of life, characterized by enhanced well-being, satisfaction, and fulfillment.

Implications

This study provides evidence for clinicians in developing a post-stroke home care program. Furthermore, this study justifies the need for crafting equitable financial support for the rehabilitation of patients with stroke. Nurses may address the lack of rehabilitation specialists; however, the current Philippine nursing law has no provisions for instituting Advanced Practice Nursing (APN). Thus, it is essential to institute APNs to ensure that nurses have advanced competencies in providing rehabilitative care.

Limitations and Recommendations

This study is limited to the current healthcare system and resources in the Philippines. It is recommended that another Delphi study be conducted to confirm the results of the e-Delphi in this study. In the Philippines, there are more nurses handling patients with stroke in hospitals when compared to community settings, which is similar to the demography of the participants in this study. This demographic may not fully represent the broader range of nurses working in community settings or with more extensive experience in stroke care. Therefore, increasing the number of participants, especially community nurses, is also recommended in future cross-sectional surveys. The PCA is limited to the analysis of the first principal component only, and potential elements of variation must be analyzed in future studies. It still leaves a significant portion unexplained, especially in the structure domain.

Conclusion

This study aimed to clarify what elements constitute nurse-coordinated post-stroke home care rehabilitation in the Philippines. Given the complexity of community-based rehabilitation, this study clarified the essential elements of post-stroke home care rehabilitation. Based on Donabedian's Model, the Structure elements, such as a safe home care environment, interdisciplinary team, policies and guidelines, funding, and telehealth, are essential human, material, and organizational resources. The Process elements include nurse-led care coordination, collaborative planning, evidence-based practice, patient and family engagement, and periodic evaluation. Nurses, in their advanced practice role, are crucial in addressing the shortage and maldistribution of rehabilitation specialists. The Outcome elements include the interprofessional team addressing the cognitive, psychomotor, and behavioral needs of the patient and their family, resulting in improving functional independence and quality of life. These elements are crucial in guiding policymakers, clinicians, and patients in the delivery of home-based post-stroke care.

Declaration of Conflicting Interest

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Authors' Contributions

All authors contributed substantially to the conceptualization, design, data curation, formal analysis, interpretation, writing, review, and editing of the paper. All authors approve the final version to be published.

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Data Availability

The datasets generated during and analyzed during the current study are available from the corresponding author upon reasonable request.

Declaration of Use of AI in Scientific Writing

Nothing to disclose.

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