



# Development and Validation of the PACE Intervention for Home Care Training of Ischemic Stroke Caregivers: A Developmental Research Study

Ram Karan Yadav, Rakesh Sharma

Department of College of Nursing, All India Institute of Medical Sciences, Rishikesh, Uttarakhand, India

## Abstract

**Background:** Caregivers of ischemic stroke survivors play a key role in patient recovery, yet they often lack structured training to provide effective home care.

**Aim:** The aim of this study was to develop and validate the Personal hygiene, Ambulatory care, Communication and support system, and Elimination and feeding care (PACE) intervention for training caregivers of ischemic stroke survivors.

**Methods:** This research was conducted in three phases. In the first phase, a checklist was developed and administered to caregivers of ischemic stroke survivors to identify their needs. The identified needs were grouped into five categories, collectively termed PACE: Personal hygiene care, ambulatory care, communication and support system care, and elimination and feeding care. In the second phase, the PACE intervention was developed. In the third phase, the draft intervention and checklist were reviewed by five experts from neurology, palliative medicine, rehabilitation, and clinical nursing to assess content validity and reliability. After validation, the module was translated into Hindi to enhance accessibility, and a language expert assessed its readability.

**Results:** The needs assessment identified ambulation (80%), oral hygiene (74%), communication (70%), catheter and bathing care (66%), elimination care (64%), and feeding care (58%) as the major caregiver needs. Expert validation demonstrated excellent content validity (scale content validity index = 0.94), item-level content validity index values  $\geq 0.78$ , and high internal consistency (Cronbach's  $\alpha > 0.79$ ).

**Discussion:** The PACE intervention demonstrated excellent content validity and provides a structured, evidence-based approach for caregiver training.

**Conclusion:** The PACE intervention is a validated, structured home care training program that equips caregivers with essential skills for managing ischemic stroke survivors.

**Keywords:** Delphi method, developmental research, home-based rehabilitation, ischemic stroke care, PACE intervention

## BACKGROUND

Stroke is a major public health concern globally, affecting nearly 15 million individuals annually. Among these patients,

Date of Submission: 02-08-2026

Date of Revision: 20-08-2026

Date of Acceptance: 20-08-2026

### Access this article online

Website: <https://innovationaljournals.com/index.php/ijns>

ISSN No: 2581-463X

DOI: 10.31690/ijns.2026.v01i1i03.012

approximately 5 million died, and 5 million cases suffered from lifetime disability, contributing significantly to societal and familial burdens.<sup>[1]</sup> Stroke ranks as the second leading cause of mortality and disability. The majority of stroke cases are seen in low- and middle-income nations compared to high-income countries.<sup>[2]</sup>

Strokes are broadly classified into ischemic and hemorrhagic types. Ischemic strokes account for nearly 87% of cases, while hemorrhagic strokes make up the remaining 13%.<sup>[3]</sup> Approximately 62% of all strokes are ischemic, making ischemic stroke the most common type of stroke and responsible for an estimated 4.3–4.5 million deaths worldwide in 2025.<sup>[4]</sup> The

### Address for correspondence:

Ram Karan Yadav, All India Institute of Medical Sciences, Rishikesh, Uttarakhand, India. E-mail: [karanyadav1916@gmail.com](mailto:karanyadav1916@gmail.com)

This is an open-access journal, and articles are distributed under the terms of the Creative Commons Attribution Noncommercial Share Alike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms

global ischemic stroke death toll rose from 2.024 million in 1990 to 3.29 million in 2023 and is projected to reach 4.9 million by 2030.<sup>[5]</sup>

Asia, comprising about 60% of the global population, experiences a disproportionate stroke burden, partly due to developing economies and healthcare disparities.<sup>[6,7]</sup> Stroke mortality in Asia exceeds that of Western Europe. Factors such as population ageing, increasing life expectancy, declining infectious disease mortality, and a rise in vascular risk factors contribute to the growing burden.<sup>[8,9]</sup> Japan reports some of the highest stroke incidence rates in Asia, with 422/100,000 person-years in men and 212 in women, primarily due to its ageing demographic.<sup>[10,11]</sup>

In India, the annual stroke incidence ranges from 105 to 152/100,000 people.<sup>[12]</sup> According to the National Family Health Survey 2019–2021 survey in Uttarakhand, stroke was identified as the primary cause of disability among 53,657 individuals.<sup>[13–15]</sup> The care of disabled stroke survivors imposes significant physical, emotional, and economic strain on families, with many patients becoming partially or fully dependent on caregivers.<sup>[16,17]</sup>

Following acute hospital care and stabilization of the patient's condition, many ischemic stroke survivors are discharged with medical devices such as Foley catheters, tracheostomy tubes, or feeding tubes. Their caregivers, who are often family members, frequently neglect their own health while providing care, resulting in reduced well-being and increased caregiver burden.<sup>[18]</sup> Without proper training, caregivers are at risk of physical and psychological distress, social withdrawal, and burnout.<sup>[19]</sup>

In India, around 80% of stroke survivors return home post-treatment and are cared for by family members, often without any formal caregiving training.<sup>[20]</sup> Due to limited infrastructure and economic constraints, professional rehabilitative care remains inaccessible for many. Introducing structured caregiver training starting at the hospital discharge stage can help mitigate caregiver strain and improve the recovery trajectory of stroke survivors.<sup>[21]</sup>

Managing ischemic stroke survivors at home are complex and demand that caregivers be proficient in rehabilitation practices.<sup>[22,23]</sup> International studies underscore the importance of structured training programs to prevent complications such as infections, bedsores, and stroke recurrence, while also enhancing overall quality of life.<sup>[24,25]</sup>

India continues to face a growing ischemic stroke burden due to lifestyle-related risk factors, poor public awareness, delayed emergency responses, and limited rehabilitation access, especially in rural areas. Stroke patients often suffer profound physical, cognitive, and emotional deficits that demand ongoing care. In such contexts, untrained family caregivers become the primary support system. Although several international caregiver education programs have been reported, currently no structured, evidence-based home care intervention

is available in the Indian context specifically for caregivers of ischemic stroke survivors in India. This gap highlights the need for a standardized caregiver training program. Therefore, the present study aimed to develop and validate the PACE intervention using a developmental research design, and the Delphi technique would provide structured guidance on aspects such as hygiene, mobility, communication, feeding, and toileting. Such tools can significantly enhance functional independence, patient outcomes, and caregiver competence, particularly in resource-constrained settings like India.

## METHODS

### Study design

The present study used a developmental research design [Figure 1].

1. Phase I – Descriptive analysis using a needs assessment checklist was done
2. Phase II – Development of the PACE home care intervention for ischemic stroke survivors based on the survey findings
3. Phase III – Validation of PACE home care intervention using the Delphi technique.

### Setting and population

The study was conducted in the Neurosurgery Ward at AIIMS, Rishikesh, among primary caregivers of ischemic stroke survivors.

### Sample and sampling technique

A feasibility-based sample of 50 primary caregivers of ischemic stroke survivors was selected due to the limited study duration and the availability of eligible participants during the data collection period.

### Inclusion and exclusion criteria

Participants were eligible for inclusion if they were caregivers who were relatives of the patient (parents, children, siblings, or spouse) or individuals residing with the patient and actively involved in providing care. Eligible caregivers were aged  $\geq 18$  years, literate in Hindi or English, and willing to participate in the study. Caregivers were excluded if they had a physical disability or cognitive impairment that could affect participation, had a diagnosed mental illness, or were pregnant or lactating women.

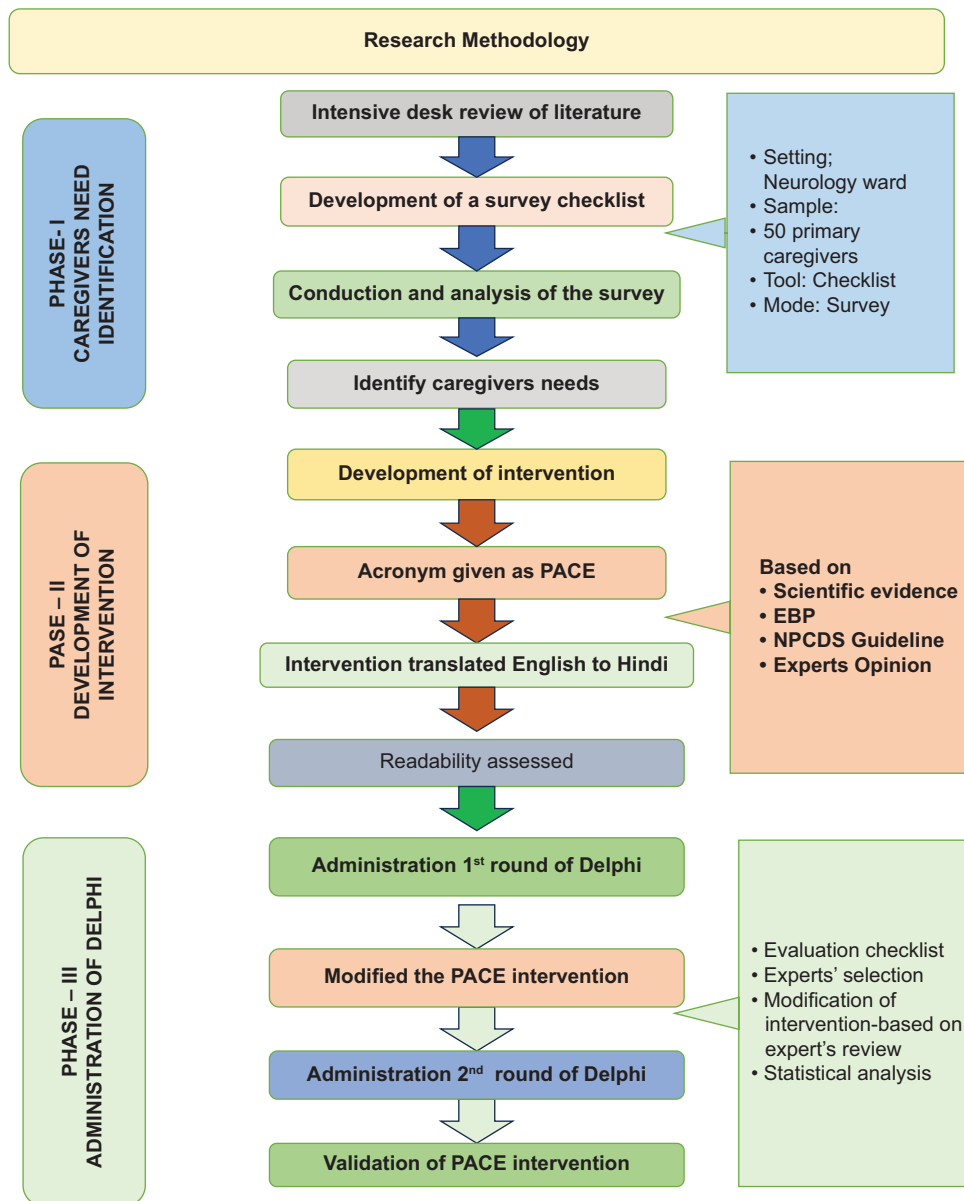
### Ethical consideration

Ethical permission was obtained from the IEC of AIIMS Rishikesh (AIIMS/IEC/23/341) on October 06, 2023.

### Data collection process and outcome

#### Phase I – survey conduction

Based on a review of the literature, a structured checklist was developed and administered to 50 primary caregivers of ischemic stroke survivors to assess their caregiving practices. The questionnaire covered the essential aspects of home-based stroke care. It included hygiene care, focusing on bathing, oral hygiene, skin care, catheter care, and grooming. The



**Figure 1:** Flowchart illustrating the methodology of the study

mobility support domain assessed safe patient transfers, use of mobility aids, fall prevention, and assistance with exercises. The toileting domain evaluated bladder and bowel training, incontinence management, and constipation prevention.

The feeding domain examined practices related to swallowing care, nasogastric (NG) tube feeding, diet, hydration, and feeding assistance. The communication domain assessed support for speech, use of gestures and memory aids, and emotional encouragement. The medication domain included timely administration of medicines, monitoring of vital signs, wound care, and follow-up visits. In addition, the psychosocial support domain focused on emotional care, family involvement, and social support, while the safety domain assessed home modifications, removal of hazards, and emergency preparedness. Together,

these domains provided a comprehensive assessment of caregiving practices for ischemic stroke survivors receiving care at home.

The checklist was administered to 50 primary caregivers to assess the perceived needs of ischemic stroke survivors receiving care at home. Each item was rated as either “Need Present” or “Need Not Present,” and caregivers were also given the opportunity to report any additional needs through open-ended responses. Data were collected through face-to-face interviews or telephone interviews, depending on the convenience and availability of the participants. Furthermore, caregivers were asked open-ended questions to describe any other problems, concerns, or challenges that they experienced while providing care to an ischemic stroke survivor.

### Phase II – intervention development

Based on the quantitative and qualitative findings of the study, the key home care needs of caregivers of post-ischemic stroke patients were identified and summarized using the acronym PACE. The P in PACE represents Personal Hygiene Care, which focuses on maintaining the patient's personal cleanliness and comfort through activities such as bathing, oral hygiene, eye care, and perineal care. The A stands for Ambulatory Care, which emphasizes proper positioning techniques to prevent pressure ulcers, safe patient mobility, and strategies to reduce the risk of falls. The C denotes Communication and Support System Care, which includes methods to enhance communication with stroke survivors, particularly those with speech or hearing impairments, as well as guidance on the care and management of *in situ* medical devices such as tracheostomy tubes and Foley catheters. The E represents Elimination and Feeding Care, which focuses on maintaining healthy bladder and bowel habits and provides caregivers with practical training on safe feeding techniques, including NG tube feeding when required.

The “PACE” home care training program was developed in accordance with the stroke guideline “National Program for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke 2019 (NPCDCS)” issued by the Directorate General of Health Services, Ministry of Health and Family Welfare, Government of India. The home care module was constructed based on evidence-based practices derived from reputable sources, including medical journals, clinical guidelines, professional medical organizations, government health agencies, and credible health websites. Readability of the intervention was assessed by a language expert proficient in both English and Hindi using an expert linguistic review technique. The content was initially prepared in English and then translated into Hindi. The expert evaluated the translated version for linguistic accuracy, sentence structure, and ease of comprehension. Suggestions were incorporated to simplify complex medical terms and ensure the language was suitable for both literate and semi-literate caregivers.

### Phase III – validation of PACE home care intervention using the Delphi technique

A checklist based on the four domains of the PACE module was developed and submitted to five experts to assess its content validity and reliability. Five experts were purposefully selected from diverse but directly relevant clinical domains to ensure comprehensive and credible insights. The panel included a clinical nurse, a nursing faculty member, a specialist in palliative medicine, a neurologist from the department of neurology, and a rehabilitative nurse. Each expert possessed a minimum of 10 years of clinical experience in their respective fields and was actively involved in patient care, recovery, or rehabilitation of individuals with ischemic stroke. This multidisciplinary selection approach ensured that the sample represented a wide range of professional perspectives closely aligned with the study's objectives.

The content validity of the intervention was evaluated using a 4-point Likert scale, where 1 indicated not relevant, 2 indicated somewhat relevant, 3 indicated quite relevant, and 4 indicated highly relevant. In addition to rating each item, the experts were encouraged to provide their comments, opinions, and recommendations for improving the clarity, relevance, and comprehensiveness of the content. Their qualitative feedback was carefully reviewed and incorporated into the intervention wherever appropriate. To achieve consensus and further refine the content, the Delphi technique was employed in two rounds, allowing experts to reassess the revised version and ensuring that the final intervention reflected collective expert agreement.

### Statistical analysis

Descriptive statistics (frequency, percentage, mean, and standard deviation) were used for the assessment of the needs of primary caregivers of ischemic stroke survivors. Content validity was assessed using item-level content validity index (I-CVI) and scale content validity index (S-CVI). Interquartile range (IQR) was used to determine expert consensus. Internal consistency was assessed using Cronbach's alpha. Statistical analyses were performed using the Statistical Package for the Social Sciences version 27.0.

## RESULTS

### Phase I

Table 1 presents the home care needs identified among primary caregivers of ischemic stroke survivors. Among the six identified need domains, ambulation difficulties were the most frequently reported (80%), followed by oral hygiene problems (74%), communication issues (70%), catheter and bathing care (66%), elimination challenges (64%), and feeding/NG tube care (58%). Based on these findings, the identified needs were synthesized into four major domains represented by the acronym PACE.

### Phase II

The PACE home care training program was developed based on the identified home care needs of caregivers of post-ischemic stroke patients from quantitative and qualitative findings. The readability of the intervention was assessed by a language expert using a linguistic review technique.

**Table 1: Identified home care needs among primary caregivers of ischemic stroke survivors (n=50)**

| Home care need domain         | (n=50) | Percentage |
|-------------------------------|--------|------------|
| Ambulation difficulties       | 40     | 80.00      |
| Oral hygiene problems         | 37     | 74.00      |
| Communication issues          | 35     | 70.00      |
| Catheter and bathing care     | 33     | 66.00      |
| Elimination challenges        | 32     | 64.00      |
| Feeding/nasogastric tube care | 29     | 58.00      |

Data are presented as frequency (n) and percentage (%). All home care need domains were assessed among the same sample of 50 primary caregivers. Multiple responses were permitted

### Phase III

A PACE-based checklist was validated by five multidisciplinary stroke experts using a 4-point Likert scale. Expert feedback and two Delphi rounds refined the intervention and established content validity.

Table 2 shows that I-CVI was calculated as the proportion of experts who rated each item 3 or 4, with values  $\geq 0.78$  indicating excellent content validity. The S-CVI, calculated using the average method, was 0.94, demonstrating excellent overall content validity. The IQR was used to assess the level of consensus among experts, with lower IQR values indicating greater agreement.

### Reliability test

As shown in Table 2, the internal consistency of each domain of the PACE intervention was evaluated using Cronbach's alpha. The Personal Hygiene domain demonstrated acceptable reliability ( $\alpha = 0.703$ ), while the ambulation ( $\alpha = 0.810$ ), communication and support ( $\alpha = 0.794$ ), and elimination and feeding ( $\alpha = 0.823$ ) domains showed good internal consistency. These findings indicate that the intervention possesses satisfactory reliability for use in caregiver training.

### DISCUSSION

The present study aimed to develop and validate the PACE (personal hygiene, ambulation, communication and support, elimination, and feeding) intervention for the home care training of ischemic stroke survivors' caregivers using the Delphi technique. The findings of this study emphasize the importance of structured caregiver education in promoting better home-based stroke rehabilitation outcomes, particularly in low-resource settings such as India.

The results from the initial needs assessment survey revealed that caregivers most frequently identified needs in ambulation (80%), oral hygiene (74%), communication (70%), and

elimination care (64%). These findings are similar to previous literature, which highlights that post-stroke patients often experience difficulties with mobility, self-care, and communication, leading to increased caregiver burden and poor patient recovery.<sup>[22,23]</sup>

A similar study was conducted to develop a home-based virtual rehabilitation module to provide remote intervention for the upper extremities that helps in the improvement of the six kinematics of the upper extremities. Likewise, Jissika (2019) developed a stroke caregiver training module in the UK, focusing on functional independence, safety, and caregiver coping. Their study showed that structured caregiver training reduced hospital readmissions and improved caregiver preparedness and quality of life.<sup>[26]</sup>

The present study's use of the Delphi technique for validation provided a rigorous framework for expert consensus. The calculated I-CVI and scale-level CVI (S-CVI = 0.94) confirmed strong agreement among experts, consistent with similar validation studies conducted in the nursing and rehabilitation domains. Furthermore, high reliability as measured by Cronbach's alpha ( $>0.80$ ) indicated internal consistency across intervention domains.

The intervention was translated into Hindi and reviewed by a language expert to ensure cultural appropriateness and ease of understanding, especially for semi-literate or rural caregivers, yet it is crucial for practical implementation, particularly in India, where literacy levels are low.

The intervention's modularity is similar to the "Train-the-Caregiver" model developed in UP, India, which is effective in reducing the caregiver burden and improving patient adherence to rehabilitation protocols.<sup>[27]</sup>

While this study focused on content development and validation, future research should evaluate the effectiveness of the PACE intervention through a randomized controlled trial

**Table 2: Expert validation of the PACE home care intervention tool for primary caregivers of ischemic stroke survivors**

| Domain                       | Sub components                          | E1 | E2 | E3 | E4 | E5 | Mean $\pm$ SD  | I-CVI | IQR | Cronbach's alpha |
|------------------------------|-----------------------------------------|----|----|----|----|----|----------------|-------|-----|------------------|
| P: Personal hygiene          | Bathing care                            | 4  | 4  | 4  | 3  | 3  | 3.6 $\pm$ 0.55 | 1     | 1   | >0.703           |
|                              | Oral hygiene                            | 3  | 4  | 4  | 3  | 4  | 3.6 $\pm$ 0.55 | 1     | 1   |                  |
|                              | Eye and hair care                       | 3  | 4  | 4  | 4  | 3  | 3.6 $\pm$ 0.54 | 1     | 1   |                  |
|                              | Skin care and pressure ulcer prevention | 3  | 4  | 4  | 4  | 4  | 3.6 $\pm$ 0.55 | 1     | 1   |                  |
|                              | Perineal hygiene                        | 3  | 4  | 4  | 4  | 4  | 3.8 $\pm$ 0.45 | 1     | 1   |                  |
| A: Ambulation                | Range of motion exercises               | 3  | 4  | 4  | 4  | 4  | 3.6 $\pm$ 0.55 | 1     | 1   | >0.810           |
|                              | Positioning and mobility assistance     | 4  | 3  | 4  | 4  | 3  | 3.6 $\pm$ 0.55 | 1     | 1   |                  |
|                              | Use of assistive devices                | 4  | 4  | 4  | 4  | 3  | 3.6 $\pm$ 0.55 | 1     | 1   |                  |
|                              | Fall prevention strategies              | 4  | 4  | 4  | 4  | 3  | 3.8 $\pm$ 0.45 | 1     | 1   |                  |
| C: Communication and Support | Non-verbal and gesture communication    | 3  | 4  | 4  | 4  | 3  | 3.6 $\pm$ 0.55 | 1     | 1   | >0.794           |
|                              | Caregiver-patient interaction           | 3  | 3  | 4  | 4  | 3  | 3.4 $\pm$ 0.55 | 1     | 1   |                  |
|                              | Handling tracheostomy and devices       | 3  | 4  | 4  | 4  | 4  | 3.8 $\pm$ 0.45 | 1     | 1   |                  |
| E: Elimination and feeding   | Bladder and bowel care                  | 3  | 4  | 4  | 4  | 3  | 3.6 $\pm$ 0.55 | 1     | 1   | >0.823           |
|                              | Nasogastric tube feeding                | 4  | 3  | 4  | 4  | 4  | 3.8 $\pm$ 0.45 | 1     | 1   |                  |
|                              | Safe oral feeding                       | 3  | 4  | 4  | 4  | 4  | 3.8 $\pm$ 0.45 | 1     | 1   |                  |
|                              | Nutritional monitoring                  | 3  | 4  | 3  | 2  | 4  | 3.2 $\pm$ 0.84 | 0.8   | 2   |                  |

E1–E5: Expert reviewers 1 to 5, Mean: Mean expert rating for each item, SD: Standard deviation, I-CVI: Item-level content validity index; values  $\geq 0.78$  indicate acceptable content validity, IQR: Interquartile range; lower values indicate greater consensus among experts and Cronbach's  $\alpha$  = Cronbach's alpha coefficient used to assess the internal consistency of items within each PACE domain

or quasi-experimental study to assess outcomes such as patient recovery, caregiver burden, and hospital readmission rates.

### Limitations and recommendations

The present study could have benefited from a qualitative approach using open-ended questionnaires to better understand the personal experiences, challenges, and support needs of primary caregivers of ischemic stroke survivors. Including a larger group of experts from different fields could have provided broader perspectives and strengthened the validation process of the intervention. The PACE intervention can be strengthened by broadening its scope to address the diverse and evolving needs of caregivers, including emotional well-being, financial guidance, and long-term care planning. Future research should pilot the intervention with a larger and more diverse group of caregivers across different healthcare settings to evaluate its feasibility, effectiveness, and adaptability. Regular feedback from caregivers should be incorporated throughout the implementation process to ensure the intervention remains practical, user-centered, and responsive to real-life caregiving challenges. Training healthcare professionals on the principles and delivery of the PACE intervention are also essential to promote consistent implementation and provide meaningful support to caregivers. In addition, integrating digital tools, such as mobile applications or online platforms, could enhance accessibility by offering real-time guidance, reminders, educational resources, and opportunities for peer support. Finally, further validation and reliability testing involving a more diverse panel of experts is recommended to strengthen the intervention's cultural relevance, credibility, and applicability across different populations and care contexts.

### CONCLUSION

The present study successfully developed and validated the PACE intervention using a systematic developmental research approach and Delphi technique. The intervention demonstrated excellent content validity and high reliability, providing a structured, evidence-based caregiver training program tailored for home-based management of ischemic stroke survivors. It offers a structured, evidence-informed guide for home-based stroke rehabilitation and can be integrated into nursing training and patient discharge planning for improved outcomes.

### ACKNOWLEDGMENT

The authors express their sincere gratitude to all the experts who participated in the Delphi validation process and to the caregivers who willingly participated in this study. The authors also thank the language expert for reviewing the translated version of the intervention.

### CONFLICTS OF INTEREST

There is no conflict of interest regarding the development, validation, and evaluation of the PACE intervention. The study was conducted independently, and there are no financial,

commercial, or personal relationships that could have influenced the findings or interpretation of the results.

### FUNDING

This study was self-funded by the authors. No financial support, monetary assistance, or funding was received from any individual or organization.

### REFERENCES

1. World Health Organization. The top 10 causes of death. Geneva: World Health Organization; 2020. Available from: <https://www.who.int/news-room/fact-sheets/detail/the-top-10-causes-of-death> [Last accessed on 2026 Jul 10].
2. Prust ML, Forman R, Ovbiagele B. Addressing disparities in the global epidemiology of stroke. *Nat Rev Neurol* 2024;20:207-21.
3. Benjamin EJ, Muntner P, Alonso A, Bittencourt MS, Callaway CW, Carson AP, *et al.* Heart disease and stroke statistics-2019 update: A report from the American heart association. *Circulation* 2019;139:e56-28.
4. Feigin VL, Owolabi MO, World Stroke Organization-Lancet Neurology Commission Stroke Collaboration Group. Pragmatic solutions to reduce the global burden of stroke: A World stroke organization-lancet neurology commission. *Lancet Neurol* 2023;22:1160-206.
5. Zhu W, He X, Huang D, Jiang Y, Hong W, Ke S, *et al.* Global and regional burden of ischemic stroke disease from 1990 to 2021: An age-period-cohort analysis. *Transl Stroke Res* 2025;16:1474-85.
6. Kim AS, Johnston SC. Global variation in stroke burden and mortality. *Lancet Neurol* 2011;10:13-4.
7. Pandian JD, Sudhan P. Stroke epidemiology and stroke care services in India. *J Stroke* 2013;15:128-34.
8. Liu M, Wu B, Wang WZ, Lee LM, Zhang SH, Kong LZ. Stroke in China: Epidemiology, prevention, and management strategies. *Lancet Neurol* 2007;6:456-64.
9. Feigin VL, Norrving B, Mensah GA. Global burden of stroke. *Circ Res* 2017;120:439-48.
10. Nakamura K, Okamura T, Kokubo Y. Japanese stroke incidence rates and risk. *Stroke* 2014;45:1455-62.
11. Ikeda N, Takimoto H, Imai S, *et al.* Health inequalities in Japan. *Lancet* 2011;378:1037-45.
12. Kamalakannan S, Gudlavalleti AS, Gudlavalleti VS, Goenka S, Kuper H. Incidence & prevalence of stroke in India: A systematic review. *Indian J Med Res* 2017;146:175-85.
13. Feigin VL, Stark BA, Johnson CO, Roth GA, Bisignano C, Abady GG, *et al.* Global, regional, and national burden of stroke and its risk factors, 1990-2019: A systematic analysis for the global burden of disease study 2019. *Lancet Neurol* 2021;20:795-820.
14. International Institute for Population Sciences (IIPS), ICF. National Family Health Survey (NFHS-5), 2019-21. India. Mumbai: IIPS; 2021.
15. Behera DK, Rahut DB, Mishra S. Analyzing stroke burden and risk factors in India using data from the global burden of disease study. *Sci Rep* 2024;14:22640.
16. Bhattacharjee M, Reddy K. Caregiver burden and disability in stroke survivors. *J Neurosci Rural Pract* 2020;11:623-7.
17. Lobo EH, Frølich A, Christensen U, *et al.* Burden experienced by informal caregivers of stroke survivors: A systematic review. *Disabil Rehabil* 2021;43:789-803.
18. Bhalla A, Suri V, Kaur P, *et al.* Involvement of family members in care of stroke patients: An Indian perspective. *Neurol India* 2015;63:620-4.
19. Haley WE, Roth DL, Hovater M, Clay OJ. Long-term care needs and family caregiving. *Am J Geriatr Psychiatry* 2015;23:588-97.
20. Gaur R, Asthana SS, Gonnade NM, Ranjan A, Morvadiya D. Repercussions of caregiving on caregivers of stroke survivors: A cross-sectional study. *Cureus* 2023;15:e51250.
21. Srivastava AK, Garg R. Rehabilitation of stroke patients: Need for caregiver education and support. *J Neurosci Rural Pract* 2014;5:202-3.
22. Lutz BJ, Young ME. Rethinking intervention strategies in stroke family caregiving. *Rehabil Nurs* 2010;35:152-60.

23. Bakas T, Clark PC, Kelly-Hayes M, King RB, Lutz BJ, Miller EL, *et al.* Evidence for stroke family caregiver and dyad interventions: A statement for healthcare professionals from the American heart association and American stroke association. *Stroke* 2014;45:2836-52.
24. Greenwood N, Mackenzie A, Cloud GC, Wilson N. Informal primary caregivers of stroke survivors: Evidence-based interventions. *Stroke* 2008;39:929-36.
25. Cheng HY, Chair SY, Chau JP. Effectiveness of a strength-oriented psychoeducation program for family caregivers of stroke survivors: A randomised controlled trial. *Int J Nurs Stud* 2018;87:84-93.
26. Hall JF, Crocker TF, Clarke DJ, Forster A. Supporting carers of stroke survivors to reduce carer burden: Development of the preparing is caring intervention using intervention mapping. *BMC Public Health* 2019;19:1408.
27. Kumar A, Yadav AK, Singh VK, Pathak A, Chaurasia RN, Mishra VN, *et al.* Caregiver burden in caregivers of stroke survivors: A hospital-based study. *Ann Indian Acad Neurol* 2022;25:1092-8.

**How to cite this article:** Yadav RK, Sharma R. Development and Validation of the PACE Intervention for Home Care Training of Ischemic Stroke Caregivers: A Developmental Research Study. *Indian J Nurs Sci* 2026;11(3):60-66.