RESEARCH ARTICLE

# Development of functional balance training tasks for stroke rehabilitation: A Delphi study with Pakistani experts

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## Abstract

**Objective:** To develop functional balance training tasks for stroke rehabilitation to enhance recovery outcomes for stroke patients.

**Method:** A cross-sectional study employing a two-phase structured Delphi technique was conducted in Rawalpindi and Islamabad, Pakistan, from August to December 2023, following approval from the ethics review committee of Riphah College of Rehabilitation and Allied Health Sciences, Islamabad. In the first phase, a list of functional balance tasks was generated through literature review and semi-structured interviews with experts. In the second phase, iterative three-round Delphi survey was conducted with a larger panel. Descriptive statistics were used at the end of each round to finalise the list of functional tasks based on pre-set consensus criteria. Data was analysed using SPSS 25.

**Results:** Of the 10 experts in Phase 1, there were 8(80%) females and 9(90%) had postgraduate qualification in Neuromuscular Physical Therapy, while the mean professional experience was 6.1±5.17 years. The corresponding values for the 30 experts in Phase 2 were 34(80%), 29(96%) and 5.48±5.08. In Phase 1, 100 functional balance tasks were generated. In Round 1 of Phase 2, 76 tasks met the consensus criteria of ≥60% agreement. In Round 2 of the phase, 52 tasks reached consensus criteria of ≥75% agreement, while in Round 3 of the phase, 50 tasks achieved consensus of ≥80% agreement.

**Conclusion:** An evidence-based list of functional balance tasks for stroke rehabilitation was deemed suitable by local experts for stroke patients in Pakistan.

**Keywords:** Rehabilitation, Delphi technique, Stroke, Postural balance. (JPMA 76: 212; 2026)

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## Introduction

Stroke is the second leading cause of death,[1] with an estimated annual incidence of 250/100,000 in Pakistan alone.[2] The average age of stroke patients in Pakistan (43 years) is reportedly lower compared to that in Western nations.[3] Stroke is the major cause of human suffering worldwide, with the resulting disease burden of 143 million disability-adjusted life years (DALYs).[4] The acquired disability due to cerebrovascular accident is due to a wide range of motor and non-motor deficits. Motor impairments alone lead to a decrease in gait, balance and overall physical functions in nearly 50% of stroke cases in the subacute stage.[5]

Post-stroke balance impairments have a prevalence ranging from 16.7% to 83%.[6] Balance is defined as the ability to maintain the centre of gravity within the base of support with minimal postural sway. This maintenance is required in nearly all tasks of life. Impaired balance results in increased sway in static standing, delayed anticipated and reactive postural adjustments, and declined ability to shift towards stability limits. Balance disturbances significantly impact quality of life (QOL), leading to decreased participation of an individual in functional activities of daily living (ADLs).

Functional recovery after stroke follows the principle of neuroplasticity. Practising functional tasks that mimic ADLs, known as task-oriented training, can induce significant neuroplastic changes that transfer to real-life situations.[7] This training approach, tailored to the individual needs of the patient, is promising in stroke rehabilitation, providing a motivating and engaging therapy experience.[8] Functional balance training and task-oriented balance training terminologies are used interchangeably in the literature.[9]

Functional tasks can be performed using different modes, exercises and equipment.[10,11] A wide range of interventions, such as treadmill training, walking on the ground, cycling, endurance training and circuit training, as well as reaching tasks, can be used to improve balance in stroke patients.[12] Different modes, such as virtual reality (VR), can also be used for balance training. Functional training tasks, such as single-leg standing, sit-to-stand, stepping over obstacles, and tandem standing, improve balance in stroke patients.[13] However, there remains a lack of consolidated, expert-validated lists identifying which specific functional balance tasks are most feasible, relevant

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and impactful in stroke rehabilitation, especially in low-resource clinical contexts. Moreover, heterogeneity in task selection and lack of standardisation in defining task components make it difficult to translate findings into clinical protocols. An evidence-based, context-sensitive list of functional balance training tasks is needed to guide practice and to reduce variability in rehabilitation outcomes.

The current study was planned to compile a comprehensive list of functional balance strategies for stroke rehabilitation based on Pakistani experts' opinions and evidence.

## Subjects and Methods

A cross-sectional study employing a two-phase structured Delphi technique was conducted in Rawalpindi and Islamabad, Pakistan, from August to December 2023, following approval from the ethics review committee of Riphah College of Rehabilitation and Allied Health Sciences, Islamabad. The study followed standard guidelines for conducting and reporting Delphi research.[14]

The experts included in each phase of the study were physiotherapists of either gender with a minimum of 3 years of clinical experience after graduation, and had exposure to working with stroke patients. Experts with <3 years of clinical experience, undergraduate physiotherapy students, and experts not willing to participate were excluded, and so were experts with 3 years of clinical experience but no exposure to stroke patients. The sample size was based on a thorough literature review.[15,16] The samples for the two rounds were raised using a purposive non-probability sampling technique through institutional affiliations, personal networks, and professional forums, such as WhatsApp groups and Facebook pages, of regional physiotherapy associations.

In Phase 1, a list of functional tasks was generated through literature review and semi-structured interviews with a group of experts. The literature review was conducted independently by two researchers having postgraduate training in rehabilitation sciences. Databases, including PubMed, Google Scholar and the Physiotherapy Evidence Database (PEDro), were searched using pre-defined key words related to functional balance training and stroke rehabilitation. The literature review included systematic reviews, meta-analyses, quasi-experimental studies, case series, and randomised controlled trials (RCTs) related to functional balance training for stroke rehabilitation.

The semi-structured interviews were conducted using a self-designed questionnaire comprising 11 open-ended questions. The questionnaire was developed based on findings from the literature review[17,18] and aligned with the study's objectives to explore experts' clinical insights on functional balance training in stroke rehabilitation. After developing the questionnaire, it was pilot tested by 10 experts for authenticity, clarity, and relevance to ensure that the questions effectively addressed the study objectives.

The interviews were audio-recorded, and the recordings were transcribed verbatim and coded manually by the principal investigator. Codes were compared, discussed and finalised through consensus. The process concluded with the categorisation of functional tasks for the initial Delphi round.

In Phase 2, a three-round iterative Delphi survey was conducted. Delphi questionnaires in each round, along with clear instructions, were sent to the panel of experts via SMS and WhatsApp messages.

In each round, Phase 2 experts rated the functional tasks on feasibility, relevance and impact using a questionnaire that was scored on a 5-point Likert scale. The domains defined were 'Feasibility', meaning practicality of the task in clinical settings, 'Relevance', meaning direct contribution of the task to post-stroke balance recovery, and 'Impact', meaning the potential of the task to produce meaningful clinical improvement in balance.

The Likert scale used for scoring indicated 5=highly feasible, relevant and impactful, 4=good feasibility, impact, relevance, 3=uncertain, 2=slightly feasible, relevant, impactful, and 1=not at all feasible, relevant, and impactful. Scores 4-5 indicated greater feasibility, relevance and impact, while scores 1-2 indicated minimal feasibility, relevance and impact. The experts could provide suggestions or reasons for a low rating of a task in any domain, and they were sent regular reminders through email or a call.

In each successive round, the previous round's results in the form of tables were presented to the panel. In Rounds 2 and 3, the experts re-rated and re-analysed the tasks narrowed down from the previous round.

Descriptive statistics, including percentage of agreement and mean values, were used to assess consensus in each round. The percentage of agreement is generally set at any value between 50% and >80%, the interquartile range (IQR) ≤1, median ≥4, and mean 3.5.[19] In the current study, percentage agreement and mean rating were used as the primary consensus thresholds to simplify the analysis and reflect the practical consensus strategy used in previous Delphi studies in rehabilitation contexts.[20] To ensure a strong consensus, progressively stricter criteria were set for

each round. The percentage of agreement was calculated after compiling the experts' ratings at 4 and 5 points on the Likert scale for each domain separately. A task was considered acceptable in that domain if it had combined 4-point and 5-point ratings befitting the consensus criterion for that round. Only the tasks that fulfilled the consensus criteria in all three domains of feasibility, relevance and impact were considered for re-rating and re-analysis in successive rounds.

In Round 1, tasks that achieved ≥60% agreement among the expert panel and had a corresponding mean of approximately 3.5 in each domain were considered acceptable. In Round 2, the criteria of consensus were raised to ≥75% agreement with a mean rating of ≥3.5. In Round 3, the criteria were further increased to ≥80% agreement and a mean rating of ≥3.5. Data was analysed using SPSS 25.

## Results

Of the 10 experts in Phase 1, there were 8(80%) females and 9(90%) had postgraduate qualifications in Neuromuscular Physical Therapy, while the mean professional experience was 6.1±5.17 years. The corresponding values for the 30 experts in Phase 2 were 34(80%), 29(96%) and 5.48±5.08 (Table 1). Of the 40 eligible experts contacted for Round 2, 30(75%) agreed to participate, and there were no further dropouts in successive rounds.

In Phase 1, the literature review comprised 45 studies[21-23] including 9(20%) systematic reviews, 33(73.3%) RCTs, 2(4.4%) quasi-experimental studies, and 1(2.2%) cohort study. Of the 105 tasks identified, 76(72.4%) were based on literature review, with 29(27.6%) being suggested by the experts. After removing duplicate tasks, the final list of 100(95.2%) tasks was categorised into seven categories: core exercises, weight-shifting exercises, technology-based exercises, regimes, coordination exercises, somatosensory exercises, and walking exercises (Table 2).

In Round 1 of Phase 2, 76(76%) tasks met the consensus criteria (Table 3). In Round 2 of the phase, 52(68.4%) tasks reached consensus criteria (Table 4), while in Round 3 of the phase, 50(96.2%) tasks achieved consensus (Table 5).

**Table-1:** Characteristics of the participating experts.

| Characteristics | Phase 1 | Phase 2 |
|---|---|---|
| Gender | | |
| Female | 8(80%) | 24(80%) |
| Male | 2(20%) | 6(20%) |
| Qualifications | | |
| Bachelors | 1(10%) | 1(3.3%) |
| Masters in Neuromuscular Physical Therapy | 9(90%) | 29(96%) |
| Experience (in years) | 6.1±5.17 | 5.48 ±5.08 |
| Working in the Academic Sector | 1(10%) | 1(3.3%) |

**Table-2:** Categorisation of tasks.

| CATEGORY | FUNCTIONAL TASKS |
|---|---|
| **Core exercises** | |
| | 1. Bridging on bed[1] |
| | 2. Bridge with legs crossed on bed,[1] |
| | 3. Bridge with one leg on bed,[1] |
| | 4. Curls up with straight reach on bed[1] |
| | 5. Curls up with diagonal reach on bed[1] |
| | 6. Curls up with straight reach on wedge[1] |
| | 7. Curls up with diagonal reach on wedge[1] |
| | 8. Birddog exercise on bed[1] |
| | 9. Side bridge on bed[1] |
| | 10. Curls up with arms crossed on wedg[1] |
| | 11. Bridge up on Swiss ball[1] |
| | 12. Birddog on Swiss ball[1] |
| | 13. Push-ups on Swiss ball[1] |
| | 14. Abdominal curls up on Swiss ball[1] |
| | 15. Turning at an angle between 90 and 180[2] |
| **Latest technology-based exercises** | |
| | 1. Robotic-assisted rehabilitation[1] |
| | 2. Perturbation-based training on the mechatronic device while treadmil[1] |
| | 3. Exergaming on Nintendo Wii[1] |
| | 4. Whole body vibration training[1] |
| | 5. Action observation therapy with rhythmic auditory stimulation[1] |
| | 6. PNF exercises underwater[1] |
| | 7. Locating and pointing targets by controlling the movement of the trunk on the Bon Saint device[1] |
| | 8. Catching and throwing activities while standing on an aero step[2] |
| **Regimes** | |
| | 1. Taichi[1] |
| | 2. Badu Anjin qigong exercise[1] |
| | 3. Otago[2] |
| | 4. Body awareness training[1] |
| | 5. Aerobic (cycling) |
| | 6. Cognitive-motor dual-task training[1] |
| | 7. Maintaining hand to one-foot pose[1] |
| | 8. Maintaining warrior pose[1] |
| | 9. Maintaining triangle pose[1] |
| | 10. Maintaining palm tree pose[1] |
| | 11. Closed kinetic chain exercise[1] |
| **Walking** | |
| | 1. Zigzag walking[2] |
| | 2. Gait training while holding a tray. *[1,2] |
| | 3. Walking on parallel bars in front of a mirror[2] |
| | 4. Walking in parallel bars in front of the mirror on foam with verbal instructions[2] |
| | 5. Speed walk[1] |
| | 6. Walking backwards on the treadmill[1] |
| | 7. Stand up and walk[1] |
| | 8. Gait initiation with non-paretic limb usage[1] |
| | 9. Balance beam[1] |
| | 10. Gait training on an unstable surface with mats and 1 kg shin pads[1] |
| | 11. Toe walking[2] |

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**Table-2:** *Continued from previous column.*

| CATEGORY | FUNCTIONAL TASKS |
|---|---|
| **Walking** | 12. Heel walking[2] |
| | 13. Tandem walking |
| | 14. Figure eight walking[1] |
| | 15. High-intensity step training[1] |
| | 16. Crossover stepping[1] |
| | 17. Heel raise lower exercise on a 5cm block[1] |
| | 18. Heel raise lower exercise on a level surface[1] |
| | 19. Guided stepping training *[1,2] |
| | 20. Climbing steps[1] |
| | 21. Stepping around obstacles[1] |
| | 22. Stepping over obstacles[1] |
| | 23. Backwards stepping[2] |
| | 24. Marching in place[2] |
| | 25. Outdoor walking[1] |
| | 26. Indoor walking[1] |
| | 27. Lateral walking[1] |
| **Coordination exercise** | |
| | 1. Clapping of hands[2] |
| | 2. Bilateral tapping of hands on thighs with alternating dorsal and palmar surfaces of hands[2] |
| | 3. Lifting the thigh with the knee flexed and returning the foot firmly on the ground in sitting[2] |
| | 4. Walking on footprints patterns drawn on the floor[2] |
| | 5. Heel to shin[2] |
| | 6. Bean placing[1] |
| | 7. Buttoning and unbuttoning of the shirt.[1] |
| | 8. Towel push on stable surfaces[1] |
| | 9. Towel push on an unstable surface[1] |
| | 10. Wearing clothes[1] |
| | 11. Catching things[1] |
| | 12. Ball kicking[1] |
| **Somatosensory targeted** | |
| | 1. Standing with feet closed and eyes open[2] |
| | 2. Standing with feet closed and eyes closed*[1,2] |
| | 3. Cognitive sensorimotor training on lower extremity[1] |
| | 4. Single leg standing on the mat.[1] |
| | 5. Single leg standing on the floor*[1] |
| | 6. Tandem stance with eyes closed[1] |
| | 7. Tandem stand with eyes open[1] |
| | 8. Single leg standing against wall*[1,2] |
| | 9. Anteroposterior cephalic movements with eyes open, then closed and then the addition of mats. |
| | 10. Semi-tandem standing[2] |
| | 11. Supported standing with an alternate leg in abduction.[2] |
| | 12. Partial wall squats against the wall[2] |
| **Weight-shifting** | |
| | 1. Perturbation and buttock shuffling[1] |
| | 2. Push and pull by the therapist in standing[1] |
| | 3. Push and pull by the therapist in sitting[1] |
| | 4. Voluntary weight shifting in all directions, wearing a body harness support[1] |
| | 5. Anteroposterior weight transfer and discharge on mat[1] |
| | 6. Lateral weight shift and discharge on the stable surface than on 1 or 2 mats[1] |
| | 7. Dissociation of scapular and pelvic girdles[1] |

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**Table-2:** *Continued from previous column.*

| CATEGORY | FUNCTIONAL TASKS |
|---|---|
| **Weight-shifting** | 1. Perturbation and buttock shuffling[1] |
| | 2. Push and pull by the therapist in standing[1] |
| | 3. Push and pull by the therapist in sitting[1] |
| | 4. Voluntary weight shifting in all directions, wearing a body harness support[1] |
| | 5. Anteroposterior weight transfer and discharge on mat[1] |
| | 6. Lateral weight shift and discharge on the stable surface than on 1 or 2 mats[1] |
| | 7. Dissociation of scapular and pelvic girdles[1] |
| | 8. Functional reach exercises with variance in object height[2] |
| | 9. Object retrieving from the floor with a variance of height of the object.[2] |
| | 10. Object retrieving from the floor with variance in weight of the object.[2] |
| | 11. Sitting balance training with a platform 10 degrees tilted to the affected side.[1] |
| | 12. Maintaining balance on rectangular wobble board, doing upper extremity abduction and flexion[2] |
| | 13. Weight shifting on circular Wobble board.[1] |
| | 14. Sit to stand with visual feedback.[1] |
| | 15. Weight shifting on hands in sitting.[2] |

[1]: Tasks from reviewed literature, [2]: Tasks from phase 1 experts, *Duplicated tasks (n=5).

**Table-3:** Results of Round 1 of Phase 2 with 30 experts.

| Categories/ Functional Tasks | Feasibility Mean±SD | Relevance Mean±SD | Impact Mean±SD |
|---|---|---|---|
| **Core Exercises** | | | |
| Bridging with legs crossed on the bed | 4.10 ±0.96 | 4.17±0.79 | 4.50±0.73 |
| Bridge with one leg on the bed | 4.07±0.79 | 4.37±0.490 | 4.43±0.77 |
| Curls up with straight reach on bed | 4.37±0.89 | 4.53±0.57 | 4.37±0.93 |
| Curls up with diagonal reach on the bed | 3.93±0.69 | 4.10±0.40 | 4±0.79 |
| Curls up with straight reach on wedge | 3.80±0.80 | 4.10±0.76 | 3.87±0.730 |
| Curls up with diagonal reach on wedge | 4.10±1.03 | 4.13±0.97 | 3.80±0.761 |
| Birddog exercise on bed | 3.4±1.006 | 3.8±0.89 | 3.73±0.87 |
| Turning at an angle between 90 and 180 | 3.93±0.94 | 4.07±0.69 | 3.93±0.74 |
| Bridging on bed | 4.27±0.58 | 4.17±0.59 | 4.37±4.90 |
| **Latest technology Exercises** | | | |
| Perturbation Training on the mechatronic device while on a treadmill | 3.5±1.6 | 3.93±0.91 | 4±0.64 |
| **Regimes** | | | |
| Aerobic cycling | 4.17±0.59 | 4.13±0.57 | 4.43±0.82 |
| Maintaining a hand-to-one-foot pose | 4.00±1.36 | 4.30±0.92 | 4.23±1.01 |
| Maintaining triangle pose | 3.70±0.99 | 3.77±0.82 | 4.10±1.13 |
| Maintaining palm tree pose | 3.63±.96 | 4.03±1.07 | 3.90±0.80 |
| Cognitive and motor dual-task training | 4.07±0.69 | 3.90±0.66 | 3.67±1.15 |
| Closed kinetic chain exercise | 4.13±1.01 | 4±1.14 | 4.23±0.97 |
| **Somatosensory Exercises** | | | |
| Standing with feet closed and eyes open | 4.40±0.50 | 4.33±0.48 | 4.60±0.50 |
| Standing with feet close, eyes closed | 4.70±0.65 | 4.43±0.90 | 3.93±0.94 |
| Cognitive sensorimotor training on lower extremity | 4.17±0.87 | 4.10±0.48 | 4.10±0.48 |
| Single leg standing on the floor | 4.17±0.79 | 4.23±0.63 | 4.27±0.58 |
| Single leg standing on foam | 4.00±0.70 | 3.77±1.07 | 4.40±0.72 |
| Tandem stance with eyes closed | 4.40±0.50 | 3.90±1.21 | 3.83±1.21 |
| Tandem stand with eyes open | 4.37±0.56 | 4.10±0.76 | 4.60±0.62 |
| Single-leg standing against the wall | 3.93±0.98 | 4.27±0.64 | 4.27±0.52 |
| Semi-tandem standing | 4.03±1.03 | 3.80±1.09 | 4.40±0.93 |
| Supported standing with alternate leg in abduction | 4.23±0.50 | 4.10±0.55 | 4.33±0.55 |
| Partial wall squats against the wall | 4.27±0.45 | 4.47±0.63 | 4.33±0.48 |

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**Table-3:** *Continued from previous column.*

| Categories/ Functional Tasks | Feasibility Mean±SD | Relevance Mean±SD | Impact Mean±SD |
|---|---|---|---|
| **Walking** | | | |
| Zigzag walking | 4.07±0.52 | 4.13±0.51 | 4.17±0.38 |
| Walking in parallel bars in front of the mirror | 4.40±0.50 | 4.43±0.57 | 4.40±0.50 |
| Speed walk | 3.57±1.41 | 3.53±1.01 | 4.03±0.85 |
| Stand up and walk | 4.73±0.45 | 4.20±0.71 | 4.63±0.49 |
| Gait initiation with nonparetic limb usage | 3.80±0.66 | 3.83±0.70 | 4.07±0.74 |
| Gait training on an unstable surface with a 1kg shin pad | 3.77±1.10 | 3.83±0.70 | 3.80±1.27 |
| Toe walking | 4.27±1.11 | 4.20±0.96 | 4.40±0.814 |
| Heel walking | 4.47±0.82 | 3.97±0.72 | 4.33±0.80 |
| Tandem walking | 4.27±0.52 | 4.10±0.80 | 4.63±0.49 |
| Figure eight walking | 3.73±0.78 | 4±1.08 | 4.20±0.81 |
| Crossover stepping | 3.87±0.94 | 4.13±0.82 | 4.20±0.76 |
| Heel raise lower exercise on a 5cm block | 3.87±1.07 | 3.87±0.68 | 3.97±0.56 |
| Guided stepping training | 4.20±0.41 | 4.50±0.51 | 4.47±0.68 |
| Climbing steps | 3.90±0.76 | 4.13±0.43 | 4.10±0.40 |
| Stepping around obstacles | 4.17±0.46 | 4.37±0.49 | 4.30±0.47 |
| Marching in place | 3.93±0.98 | 3.93±0.98 | 3.87±0.86 |
| Backward stepping | 4.23±0.50 | 4.07±0.70 | 4.10±0.40 |
| Stepping over hurdles | 4.20±0.48 | 4.40±0.50 | 4.27±0.45 |
| Gait training while holding a tray | 3.63±0.89 | 3.57±0.77 | 4.10±0.92 |
| Walking in parallel bars in front of a mirror on foam | 4.87±0.35 | 4.33±0.61 | 4.83±0.46 |
| Outdoor walking | 4.23±1.10 | 4.07±0.52 | 4.10±0.55 |
| Lateral walking | 4.17±0.38 | 4.27±0.45 | 4.60±0.50 |
| Indoor walking | 4.27±0.64 | 4.67±0.48 | 4.60±0.56 |
| **Weight-shifting exercises** | | | |
| Weight shifting on hands in sitting | 4.47±0.51 | 4.27±0.45 | 4.53±0.82 |
| Push and pull by the therapist in standing | 4.10±0.66 | 4.33±0.71 | 4.20±0.66 |
| Push and pull by the therapist in sitting | 4.10±0.66 | 4.37±0.669 | 4.17±0.59 |
| Voluntary weight shifting in all directions, while wearing with body harness | 4±1.11 | 4.27±0.69 | 4.07±0.69 |
| **Weight-shifting exercises** | | | |
| Anteroposterior weight transfer and | 3.77±1.07 | 4.07±0.64 | 3.77±0.73 |
| Perturbation and buttock shuffling | 3.60±1.13 | 4.43±0.728 | 3.87±0.73 |
| Lateral weight shift and discharge on the stable surface than on 1 or 2 mats | 3.63±0.89 | 3.80±0.847 | 4.47±0.94 |
| Functional reach exercise with variance in height | 4.03±0.490 | 4.37±0.556 | 4.60±0.50 |
| Object retrieving from floor with variance height | 4.03±0.850 | 4.33±0.606 | 4.20±0.61 |
| Object retrieving from the floor with variance in weight | 3.97±0.81 | 4.20±0.61 | 4.57±0.68 |
| Sitting balance training with a platform 10 degrees tilted to the affected side | 3.4±1.0 | 4.10±0.40 | 4.43±0.568 |
| Maintaining balance on rectangular wobble board, doing upper extremity abduction and flexion | 3.93±0.91 | 4.20±0.48 | 4.13±0.73 |
| Weight shifting on circular Wobble board | 3.77±1.07 | 4.10±0.31 | 4.074±0.69 |
| Sit to stand with visual feedback | 4.67±0.48 | 4.67±0.80 | 4.83±0.38 |
| **Coordination exercises** | | | |
| Clapping of hands | 4.37±0.49 | 4.23±0.97 | 4.53±0.68 |
| Bilateral tapping of hands on thighs alternating dorsal and palmar surface of hands | 4.10±0.66 | 4.03±0.49 | 3.93±0.74 |
| Lifting thigh with knee flexed and returning foot firmly to the ground in a sitting | 4.57±0.73 | 4.43±0.82 | 4.10±0.85 |
| Walking on footprints patterns drawn on the floor | 4.10±0.76 | 4.17±0.38 | 4.37±0.85 |
| Heel to shin | 4.23±0.43 | 4.20±0.41 | 4.03±0.72 |
| Bean placing | 3.67±0.99 | 3.93±0.83 | 3.87±0.57 |
| Buttoning and unbuttoning | 4.67±0.48 | 4.43±0.82 | 4.63±0.49 |
| Wearing clothes | 3.67±0.88 | 3.87±0.68 | 4.20±0.41 |
| Towel push on a stable surface | 4.23±0.63 | 4.07±0.25 | 4.20±0.41 |
| Towel push on an unstable surface | 4.03±0.615 | 3.97±0.320 | 4.07±0.45 |
| Catching things | 4±0.830 | 4.10±0.305 | 4.27±0.45 |
| Ball kicking | 4.63±0.49 | 4.43±0.82 | 4.07±0.37 |

**Table-4:** Results of Round 2 of Phase 2 with 30 experts.

| Categories/ Functional Tasks | Feasibility Mean±SD | Relevance Mean±SD | Impact Mean±SD |
|---|---|---|---|
| **Core exercises** | | | |
| Bridging on bed | 4.1±0.76 | 4.17±0.59 | 4.37±0.49 |
| Bridge with legs crossed on the bed | 3.87±1.14 | 4.17±0.79 | 4.5±0.73 |
| Turning at an angle between 90 and 180 degrees | 3.93±0.94 | 3.8±1.10 | 3.93±0.74 |
| **Regimes** | | | |
| Closed kinetic chain exercise of lower | 4.13±1.01 | 3.97±0.56 | 4.23±0.97 |
| Aerobic exercise(cycling) | 4.17±0.59 | 4.1±0.48 | 4.43±0.82 |
| **Weight-shifting** | | | |
| Sit to stand with visual feedback | 4.7±0.70 | 4.7±0.80 | 4.83±0.38 |
| Perturbation and buttock shuffling | 4.03±0.93 | 4.433±0.73 | 3.87±0.73 |
| Push and pull by the therapist in sitting in all directions while sitting | 4.03±0.61 | 4.433±0.68 | 4.17±0.59 |
| Push and pull the manual by the therapist in all directions in standing | 4.13±0.63 | 4.40±0.67 | 4.2±0.66 |
| Weight shifting on hands in sitting | 4.47±0.51 | 4.17±0.38 | 4.5±0.82 |
| Object retrieving from the floor with variance in object | 4.2±0.81 | 4.27±0.58 | 4.2±0.61 |
| Object retrieving from the floor with variance in weight of the object | 4.07±0.74 | 4.17±0.65 | 4.57±0.68 |
| Maintaining balance on rectangular wobble board and doing upper extremity abduction and flexion | 3.93±0.91 | 4.2±0.48 | 4.1±0.71 |
| Functional reach exercise with a variance of height | 4.13±0.50 | 4.3±0.54 | 4.60±0.50 |
| **Somatosensory** | | | |
| Single-leg standing against a wall | 4.07±0.94 | 4.20±0.714 | 4.27±0.52 |
| Single-leg standing without support on the floor | 4.3±0.65 | 4.13±0.63 | 4.27±0.58 |
| Tandem standing with eyes open | 4.43±0.57 | 4.07±0.78 | 4.6±0.62 |
| Standing with feet closed, with eyes open | 4.40±0.50 | 4.37±0.56 | 4.6±0.50 |
| Standing with feet closed and eyes closed | 4.67±0.48 | 4.47±0.90 | 3.93±0.94 |
| Supported standing with alternate leg in abduction | 4.23±0.50 | 3.97±0.32 | 4.33±0.55 |
| Partial wall squats against a wall | 4.27±0.45 | 4.10±0.55 | 4.33±0.48 |
| Cognitive sensorimotor training on lower extremity | 4.17±0.87 | 4.1±1.03 | 4.1±0.48 |
| **Walking** | | | |
| Guided step training | 4.17±0.46 | 4.5±0.51 | 4.47±0.68 |
| Heel raise lower exercise on a 5cm block | 3.87±1.07 | 3.87±0.68 | 3.97±0.56 |
| Crossover stepping | 3.87±0.94 | 4.13±0.82 | 4.2±0.76 |
| Stand up and walk | 4.73±0.45 | 4.27±0.73 | 4.63±0.49 |
| Walking in parallel bars in front of a mirror | 4.47±0.50 | 4.4±0.50 | 4.4±0.50 |
| Stepping around obstacles | 4±0.70 | 4.4±0.56 | 4.3±0.47 |
| Stepping over hurdles | 4.17±0.70 | 4.33±0.55 | 4.27±0.45 |
| Backward stepping | 4.17±0.59 | 3.97±0.76 | 4.1±0.40 |
| Tandem walking | 4.27±0.52 | 4.1±0.80 | 4.63±0.49 |
| Marching in place | 3.93±0.98 | 4.033±0.93 | 3.87±0.86 |
| Heel walking | 4.47±0.82 | 3.83±0.87 | 4.33±0.80 |
| Toe walking | 4.27±1.11 | 4.13±1.01 | 4.4±0.81 |
| Walking in parallel bars in front of a mirror on foam with verbal instructions | 4.87±0.35 | 4.47±0.69 | 4.83±0.46 |
| Going up and down on 3 low steps of 15cm while holding a cup, progress to 5 steps of 15 cm, then 25c, 3 high steps, step with holding rail | 3.9±0.76 | 4.33±0.61 | 4.1±0.40 |
| Indoor walking programme | 4.27±0.64 | 4.13±0.43 | 4.6±0.56 |
| Outdoor walking program comprising | 4.40±0.81 | 4.67±0.48 | 4.1±0.55 |
| Zigzag walking | 4.13±0.35 | 4.13±0.51 | 4.1±0.48 |
| Lateral walking | 4.17±0.38 | 4.27±0.45 | 4.6±0.62 |
| Figure 8 walking | 3.73±0.78 | 4±1.0828 | 4.2±0.80 |
| **Coordination** | | | |
| Ball kicking | 4.63±0.49 | 4.5±0.8200 | 4.07±0.37 |
| Buttoning and unbuttoning of shirt | 4.67±0.48 | 4.4±0.8137 | 4.63±0.49 |
| Clapping of hands | 4.37±0.49 | 4.27±0.944 | 4.53±0.68 |
| Heel to shin | 4.23±0.43 | 4.17±0.75 | 4.03±0.72 |
| Bilateral tapping hands on thighs with alternating dorsal and palmar surface of hands | 4.1±0.66 | 4.4±0.50 | 3.93±0.74 |

*Continued on next column .....*

**Table-4:** *Continued from previous column.*

| Categories/ Functional Tasks | Feasibility Mean±SD | Relevance Mean±SD | Impact Mean±SD |
|---|---|---|---|
| **Coordination** | | | |
| Lifting thigh with the knee flexed and returning foot firmly on the ground in sitting | 4.57±0.73 | 4.07±0.52 | 4.17®0.83 |
| Towel pushing by upper extremity on a stable surface | 4.23±0.63 | 4.27±0.45 | 4.37±0.49 |
| Towel push on an unstable surface | 4.03±0.61 | 4.07±0.25 | 4.07±0.45 |
| Catching things | 4±0.83 | 4.07±0.52 | 4.27±0.45 |
| Bean placing | 3.8±0.85 | 3.93±0.83 | 3.97±0.67 |
| Walking on foot patterns drawn on the floor | 4.1±0.76 | 4.5±0.68 | 4.37±0.850 |

**Table-5:** Results of Round 3 of Phase 2 with 30 experts.

| Categories/ Functional Tasks | Feasibility Mean±SD | Relevance Mean±SD | Impact Mean±SD |
|---|---|---|---|
| **Core** | | | |
| Bridging on bed | 4.1±0.76 | 4.17±0.59 | 4.37±0.49 |
| The bridge with legs crossed on bed | 3.87±1.14 | 4.17±0.79 | 4.50±0.73 |
| Turning at an angle between 90 and 180 degrees | 3.9±0.92 | 4.27±0.64 | 3.93±0.74 |
| **Regimes** | | | |
| Closed kinetic chain exercise of lower | 4.2±0.89 | 4.10±1.03 | 4.23±0.97 |
| Aerobic exercise(cycling) | 4.17±0.59 | 4.10±0.48 | 4.43±0.82 |
| **Somatosensory** | | | |
| Single-leg standing against the wall | 4.07±0.94 | 4.23±0.63 | 4.27±0.52 |
| Single-leg standing without support on the floor | 4.27±0.64 | 4.13±0.63 | 4.27±0.58 |
| Tandem standing with eyes open | 4.43±0.57 | 4.07±0.79 | 4.6±0.62 |
| Standing with feet closed, with eyes open | 4.4±0.50 | 4.37±0.56 | 4.6±0.50 |
| Standing with feet closed and eyes closed | 4.63±0.49 | 4.47± 0.90 | 4.07±0.74 |
| Supported standing with the alternate leg in abduction | 4.20±0.48 | 4.1±0.55 | 4.33±0.55 |
| Partial wall squats against the wall | 4.27±0.45 | 4.47±0.63 | 4.33±0.48 |
| Cognitive sensorimotor training on the lower extremity | 4.17±0.87 | 4.10±1.03 | 4.10±0.48 |
| **Weight-shifting** | | | |
| Sit to stand with visual feedback | 4.60±0.72 | 4.67±0.80 | 4.83±0.38 |
| Perturbation and buttock shuffling | 4.13±0.82 | 4.43±0.73 | 3.93±0.64 |
| Push and pull by the therapist in sitting in all directions in sitting | 4.13±0.57 | 4.43±0.68 | 4.17±0.59 |
| Push and pull manual by the therapist in all directions in standing | 4.13±0.63 | 4.4±0.68 | 4.2±0.66 |
| Weight shifting on hands in sitting | 4.43±0.50 | 4.27±0.45 | 4.53±0.82 |
| Object retrieving from the floor with a variance in the height of the object | 4.2±0.81 | 4.27±0.58 | 4.2±0.61 |
| Object retrieving from the floor with a variance in the weight of the object | 4.03±0.72 | 4.17±0.65 | 4.57±0.68 |
| Maintaining balance on the rectangular wobble board and doing upper extremity abduction and flexion | 3.97±.93 | 4.20±0.48 | 4.10±0.71 |
| Functional reach exercise with a variance of height | 4.10±0.48 | 4.3±0.54 | 4.6±0.50 |
| **Walking** | | | |
| Guided step training | 4.17±0.46 | 4.5±0.51 | 4.6±0.71 |
| Heel raise lower exercise on a 5cm block | 4.13±0.86 | 3.90±0.66 | 4±0.53 |
| Crossover stepping | 3.87±0.94 | 4.27±0.69 | 4.20±0.76 |
| Stand up and walk | 4.73±0.45 | 4.21±0.73 | 4.63±0.49 |
| Walking in parallel bars in front of the mirror | 4.43±0.50 | 4.4±0.50 | 4.40±0.50 |
| Stepping around obstacles | 3.97±0.67 | 4.40±0.56 | 4.3±0.47 |
| Stepping over hurdles | 4.13±0.68 | 4.33±0.55 | 4.27±0.45 |
| Backward stepping | 4.17±0.59 | 3.97±0.77 | 4.1±0.40 |
| Tandem walking | 4.23±0.50 | 4.10±0.80 | 4.63±0.49 |
| Marching in place | 3.93±0.98 | 4.03±0.93 | 3.87±0.86 |
| Toe walking | 4.23±1.10 | 4.13±1.01 | 4.33±0.80 |
| Heel walking | 4.47±0.82 | 3.83±0.87 | 4.4±0.81 |
| Walking in parallel bars in front of the mirror on foam with verbal instructions | 4.83±0.38 | 4.33±0.61 | 4.83±0.46 |
| Going up and down on 3 low steps 15cm while holding a cup, progress to 5 steps of 15 cm, then 25c, 3 high steps step with holding rail | 3.87±0.73 | 4.13±0.43 | 4.1±0.40 |

*Continued on next column .....*

**Table-5:** *Continued from previous column.*

| Categories/ Functional Tasks | Feasibility Mean±SD | Relevance Mean±SD | Impact Mean±SD |
|---|---|---|---|
| **Walking** | | | |
| Indoor walking programme | 4.27±0.64 | 4.67±0.48 | 4.6±0.56 |
| Outdoor walking programme | 4.4±0.81 | 4.07±0.52 | 4.10±0.55 |
| Zigzag walking | 4.13±0.35 | 4.10±0.31 | 4.1±0.48 |
| Lateral walking | 4.17±0.38 | 4.27±0.45 | 4.60±0.62 |
| Figure 8 walking | 3.63±1.25 | 3.67±0.80 | 4±0.87 |
| **Coordination** | | | |
| Ball kicking | 4.6±0.50 | 4.50±0.82 | 4.07±0.37 |
| Buttoning and unbuttoning of shirt | 4.63±0.49 | 4.4±0.81 | 4.63±0.49 |
| Clapping of hands | 4.37±0.49 | 4.3±0.79 | 4.53±0.68 |
| Heel to shin | 4.20±0.41 | 4.4±0.50 | 4.03±0.718 |
| Bilateral tapping hands on thighs with alternating dorsal and palmar surface of hands | 4.07±0.64 | 4.07±0.52 | 3.93±0.74 |
| **Coordination** | | | |
| Towel pushing by the upper extremity on a stable surface | 4.17±0.59 | 4.07±0.25 | 4.37±0.49 |
| Towel push on an unstable surface | 4.1±0.55 | 3.97±0.32 | 4.07±0.45 |
| Catching things | 4.03±0.85 | 4.10±0.31 | 4.27±0.45 |
| Walking on foot patterns on the floor | 4.07±0.74 | 4.17±0.38 | 4.37±0.85 |

## Discussion

The current study highlights the importance of intervention strategies in terms of their feasibility, relevance and impact. Throughout the three rounds of the iterative survey, numerous tasks were excluded from each category, ultimately totalling 50 exclusions. Action observation therapy and peripheral nerve facilitation techniques underwater were identified as successful interventions for stroke patients.[21] While robot-assisted therapy equipment was considered expensive and complex.[24] However, all these tasks and tasks involving the Bon Saint Come device and body harness support system had poor ratings because of their non-availability in Pakistan. Other reasons for exclusion were that hydrotherapy requires strict maintenance; the robot is a high-technology equipment with its applicability in developed countries alone, and action observation therapy with rhythmic auditory stimulation has poor applicability in clinical settings due to environmental constraints.

A study highlighted the positive relationship between core exercises and gait improvement.[25] However, core exercises were excluded in Round 1 because they were considered difficult for stroke patients to perform, and the Swiss ball usage needed extra precautionary measures. In Round 2, core exercises were removed because of their low feasibility and focus on strengthening core musculature rather than on improving balance. The literature reports that these tasks are feasible and suitable exercises for stroke patients.[25]

Taiichi and Baduanjin Qigong regimes require symmetrical postures, coordinated motions and slow breathing.[26] However, the rhythm and transition between muscle roles

in these two protocols are difficult for stroke patients to maintain.

Maintaining a warrior pose had a low impact score. Hand to one-foot pose, triangle pose, and palm tree pose were generally classified as good for breathing and posture correction, but not highly recommended for stroke.

Certain exercises were deemed more suitable for neurological patients other than stroke patients. Anterior-posterior cephalic movement with eyes open and then closed, with the addition of mats, was considered more suitable for vestibular patients. Similarly, two types of dual-task training exercises, which improve balance post-stroke,[27] were deemed more important for other neurological disorders with severe cognitive loss, such as Parkinson's disease.

Experts recommended combining Latero-lateral weight shift and discharge, anteroposterior weight transfer and discharge, and perturbation training on a mechatronic device while treadmill walking into a single task. Although mechatronic devices are often unavailable, therapist-induced perturbations are considered sufficient. However, evidence suggests incorporating both of these methods as they effectively improve balance.[28]

Whole-body vibration and walking backwards on a treadmill were considered ineffective by most experts. Yet, recent studies have commented that whole-body vibration training can improve balance through neuromuscular adaptation[29] and 30 minutes of backwards treadmill walking can enhance cardiovascular fitness, walking speed and balance.[30]

Nintendo Wii exercises were labelled as having low adherence because teaching all the steps of dressing and undressing in the clinical setup was not possible. Gait training on unstable surfaces with 1kg shin pads was considered useful for improving functional performance in stroke patients, but was excluded due to low relevance and impact, as it contained a strength training component.

Balance beam and sitting balance training on a tilted platform were excluded due to the fear of fall. Weight-shifting on a circular wobbleboard requires a high degree of balance, which stroke patients usually lack. Body awareness training was deemed difficult for stroke patients to comprehend.

In high-intensity step training and speed walking, speed does not add any additional benefit to balance. The literature has described speed walking as a task-oriented training that boosts balance confidence[28] but the direct relationship between speed and balance was not listed.

Figure 8 walking was excluded due to its resemblance to the zigzag walking exercise, and bean placing was removed as it focussed entirely on the upper extremity. Otago was also excluded, as it is an exercise primarily for geriatrics, and not all stroke patients are elderly.

The current study has several limitations. Firstly, only a few systematic reviews and meta-analyses were reviewed. Secondly, some exercises in Rounds 1 and 2 had low ratings without reasons being cited by the experts. These included dissociation of scapular and pelvic girdles, gait initiation with non-paretic limb use, and tandem walking with eyes closed. Lastly, the experts primarily worked with chronic stroke patients, limiting the consideration of tasks for acute and subacute stroke patients.

## Conclusion

The consensus list had 50 functional balance training tasks identified by physical therapy experts who considered them feasible for stroke patients, relevant to balance training, and having a positive impact on the functional status and balance recovery of stroke survivors.

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**Author Contribution:**
**AA:** Data interpretation, collection, methods, made amendments, provide suggestions, final approval and agreement to be accountable for all aspect of the work.
**RS:** Drafting, added and deleted important content, data analysis, acquisition, interpretation, collection, analysis, revision, final approval and agreement to be accountable for all aspect of the work.
**ANM:** Drafting, revision, made amendments, suggestions, critical appraisal, data acquisition, analysis, final approval and agreement to be accountable for all aspect of the work.