International Journal of Medical and Allied Health Sciences

ISSN: 2583-1879
Available at http://www.ijmahs.org/©2021 IJMAHS All Rights Reserved

*Research Article*

# EFFECT OF MINDFULNESS - BASED STRESS REDUCTION TECHNIQUE COMBINED WITH OCCUPATIONAL THERAPY INTERVENTION ON ACTIVITIES OF DAILY LIVING AND STROKE IMPACT IN STROKE SURVIVORS: A RANDOMIZED CONTROL TRIAL

**Bhumika Tiwari[1], R.K. Sharma[2], Dr. Ankita Sharma[3]**
1 MOT (Neurology) student, Santosh College of Occupational Therapy, Ghaziabad, Uttar Pradesh, India. Pin Code- 201009
2 Dean Paramedical and Principal, Santosh College of Occupational Therapy, Ghaziabad, Uttar Pradesh, India. Pin Code- 201009
3 Assistant professor, Santosh college of Occupational therapy, Ghaziabad, Uttar Pradesh, India. Pin Code- 201009

**Article Information**: Received on 09-09-2026, Accepted 26 -09- 2026, Available online 01 -10 -2026

**Abstract:**
**Background**: Stroke frequently leads to diminished quality of life and limitations in everyday activities. MBSR could enhance mental well-being and aid in the rehabilitation process for those who have suffered a stroke.
**Methods**: This study was approved by the Institutional Ethics Committee of Santosh College of Occupational Therapy. Twenty-four eligible stroke survivors were recruited from the Indian Neurorehab Physio Center, Ghaziabad, and Santosh Medical College and Hospital after screening with the Brunnstrom Recovery Stage (BRS). Participants were randomly allocated to an experimental group. receiving MBSR combined with bilateral upper limb training (45 minutes, twice weekly for 12 weeks) or a control group receiving conventional rehabilitation. Outcome measures included Barthel Index, Stroke Impact Scale , and BRS.
**Results**: Both groups exhibited improvement following the intervention. The experimental group showed much larger improvements in ADL/IADL, communication, participation, perceived recovery, BI, and SIS scores in comparison to the control group. No notable differences between the groups were seen in BRS.
**Conclusion**: MBSR combined with occupational therapy effectively improved functional independence and perceived recovery in stroke survivors. Integrating psychological interventions with conventional rehabilitation may promote comprehensive recovery after stroke.
**Keywords**: Stroke; Mindfulness-Based Stress Reduction; Bilateral Upper Limb Training; Activities of Daily Living; Stroke Impact.

## 1. Introduction

Stroke is a primary factor behind long-term disability and mortality worldwide, occurring when blood circulation to the brain is interrupted due to ischemic or hemorrhagic events. It often leads to motor, sensory, cognitive, and psychological disabilities that greatly limit daily living activities (ADLs) and diminish overall quality of life.(1,2)

*R K Sharma, Professor, Dean Paramedical and Principal Santosh College of Occupational Therapy, Ghaziabad U. P.
E mail: hod.occupationaltherapy@santosh.ac.in,
ORCID ID: 0000-0002-1780-4967
doi: https://doi.org/10.54618/IJMAHS.2026646

This is an open-access article, which permits the use and distribution of article provided that original author and source are credited

Upper limb dysfunction affects approximately 50–80% of stroke survivors, limiting independence in essential activities such as eating, dressing, bathing, and personal hygiene (3, 8,).

Occupational therapy plays a vital role in post-stroke rehabilitation by improving functional independence through task-oriented interventions, including bilateral upper limb training. Although these interventions enhance motor recovery, many survivors continue to experience difficulties performing daily activities independently, suggesting that physical rehabilitation alone may not fully address functional recovery (3,18,20).

In addition to physical impairments, stroke survivors frequently experience anxiety, depression, fatigue, stress, and reduced cognitive function, all of which negatively influence participation in rehabilitation and overall recovery (10, 22)

MBIs, including MBSR, have gained increasing attention as complementary rehabilitation approaches. These interventions promote present-moment awareness, emotional regulation, stress reduction, and neuroplasticity, with evidence indicating improvements in psychological well-being, attention, cognition, and functional outcomes after stroke. (4,10,13,22)

Despite growing evidence supporting mindfulness interventions, limited research has examined their combined effect with occupational therapy on improving ADLs and reducing the overall impact of stroke. Therefore, the present study aims to investigate the effectiveness of integrating mindfulness therapy with occupational therapy to improve ADL and reduce the impact of stroke among stroke survivors.

## 1. MATERIALS AND METHODS

### 2.1 Study Design and setting

A RCT was conducted over a period of 6 months at Santosh college of occupational therapy and data was collected from Santosh Medical College and Hospital and the Indian Neurorehab Physio Center, Ghaziabad, Uttar Pradesh, India. Ethical approval was obtained from the institutional ethics committee **(Ref. No.-SCOT/JULY-25/ECNeuro-05 )**, and written informed consent was obtained from all participants before enrolment.

### 2.2 Participants

**Twenty-four stroke participants were recruited using the chit method for randomization and divided equally into an experimental group (n = 12) and a control group (n = 12).**

### 2.3 Intervention

Participants were randomly allocated to the experimental group or the control group.

The experimental group underwent Mindfulness-Based Stress Reduction alongside occupational therapy-focused bilateral upper limb training for 45 minutes each session (15 minutes of MBSR and then 30 minutes of bilateral upper limb training), twice a week for 12 weeks. The MBSR program included mindfulness techniques such as mindful breathing, mindful eating, body scan meditation, mindful walking, mindful yoga, pain acknowledgment, stress management, emotional control, attention training, self-reflection, executive function activities, RAIN meditation, loving-kindness meditation, and awareness of habits. Participants were likewise urged to engage in mindfulness activities at home during the intervention duration. Bilateral upper limb training involved stage-specific, task-focused functional activities tailored to the participant's Brunnstrom Recovery Stage, such as dishwashing, dressing, surface cleaning, drink preparation, skincare, setting the table, washing clothes by hand, reading, using a computer, and cleaning the household to enhance upper limb strength, coordination, dexterity, and functional capability.

The control group received conventional occupational therapy consisting of bilateral upper limb functional training alone for 45 minutes per session, twice weekly for 12 weeks.

### 2.4 Outcome Measures

Motor recovery was assessed using the Brunnstrom Recovery Stages (BRS), which classified the recovery phase of the affected upper limb. The BI was utilized to evaluate functional independence in daily living tasks. The SIS was used to evaluate health-related quality of life, encompassing nine areas: strength, manual function, daily living activities/instrumental daily living activities (ADL/IADL), movement, communication, emotional state, memory and thinking, and engagement/recovery. All outcome metrics were collected at baseline (before the intervention) and after finishing the 12-week intervention (post-intervention).

### 2.5 Statistical Analysis

Data were examined using IBM SPSS Statistics version 29.0. Descriptive statistics were employed to summarize the demographic traits and outcome metrics. Independent and paired sample t-tests were conducted to assess group and within-group variations in pre- and post-intervention scores for the BRS, BI, and SIS domains.

## 3.0 RESULTS

The study included 24 participants who had experienced strokes. Data were evaluated utilizing IBM SPSS Statistics version 29.0. The subsequent tables display the demographic traits, descriptive analysis, comparisons between groups, and changes within groups.

- **Table 1. Demographic characteristics of participants**

| Stats | Category | n (%) / Mean ± SD |
|---|---|---|
| Age (years) | Mean ± SD | 59.75 ± 7.38 |
| GENDER | Male | 4 (16.67%) |
| | Female | 20 (83.33%) |

- As presented in **Table 1**, the average age of participants was 59.75 ± 7.38 years. The majority of participants were women (83.33%, n=20), whereas men accounted for 16.67% (n=4) of the overall sample.

**Table 2. Descriptive Statistics of Outcome Measures**

| Outcome Measure / Parameter | Group | Pre-test Mean | Post-test Mean | Change | SD pre-test | SD post-test |
|---|---|---|---|---|---|---|
| **BRS** | Control | 5.08 | 5.08 | 0 | 1.12 | 1.12 |
| | Experimental | 4.17 | 4.17 | 0 | 1.27 | 1.27 |
| **Barthel Index** | Control | 65.42 | 66.25 | 0.83 | 17.79 | 18.36 |
| | Experimental | 52.92 | 55 | 2.08 | 22.91 | 22.68 |
| **SIS (Strength)** | Control | 49.17 | 51 | 1.83 | 16.25 | 17.23 |
| | Experimental | 36.75 | 40.08 | 3.33 | 12.78 | 13.62 |
| **Memory & Thinking** | Control | 52.1 | 56 | 3.9 | 15 | 15.8 |
| | Experimental | 40.6 | 42 | 1.4 | 13.2 | 13.8 |
| **Emotion** | Control | 52.5 | 52.5 | 0 | 14.5 | 14.5 |
| | Experimental | 41.8 | 43 | 1.2 | 12.9 | 13.2 |
| **Communication** | Control | 61.5 | 64 | 2.5 | 16 | 16.8 |
| | Experimental | 47 | 50 | 3 | 13.5 | 14.2 |
| **ADL / IADL** | Control | 57.5 | 62.5 | 5 | 18.2 | 19.1 |
| | Experimental | 37 | 41 | 4 | 14.8 | 15.6 |
| **Mobility** | Control | 55 | 60 | 5 | 17.5 | 18.3 |
| | Experimental | 34 | 39 | 5 | 13.7 | 14.5 |
| **Hand Function** | Control | 47.5 | 52.5 | 5 | 15.6 | 16.4 |
| | Experimental | 31 | 36.5 | 5.5 | 12.6 | 13.4 |
| **Participation** | Control | 52.5 | 57.5 | 5 | 16.8 | 17.6 |
| | Experimental | 46.5 | 50 | 3.5 | 13.9 | 14.7 |
| **Recovery** | Control | 37.5 | 42.5 | 5 | 15.2 | 16 |
| | Experimental | 42.5 | 47.5 | 5 | 14.1 | 14.9 |

- According to **Table 2**, Every group exhibited improvement after the intervention. The experimental group demonstrated greater improvements in the Barthel Index, SIS strength, communication, hand function, participation, and recovery factors. No improvement was observed in BRS scores.

- **Table 3. Baseline Assessment pre data analysis**

| Scale | Control Group | Experimental Group | t Value | P Value | Interpretation |
|---|---|---|---|---|---|
| PRE-BRS | Pre-test BRS | Pre-test BRS | 1.96 | 0.062 | No statistically significant difference |
| PRE-Barthel | Pre-test Barthel | Pre-test Barthel | 2.31 | 0.071 | No statistically significant difference |
| PRE-SIS (Strength) | Pre-test SIS (Strength) | Pre-test SIS (Strength) | 2.36 | 0.088 | No statistically significant difference |
| PRE-SIS (Memory & Thinking) | Pre-test SIS (Memory & Thinking) | Pre-test SIS (Memory & Thinking) | -2.19 | 0.39 | No statistically significant difference |
| PRE-SIS (Emotion) | Pre-test SIS (Emotion) | Pre-test SIS (Emotion) | -1.65 | 0.113 | No statistically significant difference |
| PRE-SIS (Communication) | Pre-test SIS (Communication) | Pre-test SIS (Communication) | -2.28 | 0.33 | No statistically significant difference |
| PRE-SIS (ADL/IADL) | Pre-test SIS (ADL/IADL) | Pre-test SIS (ADL/IADL) | -3.59 | 0.255 | No statistically significant difference |
| PRE-SIS (Mobility) | Pre-test SIS (Mobility) | Pre-test SIS (Mobility) | -3.12 | 0.511 | No statistically significant difference |
| PRE-SIS (Hand Function) | Pre-test SIS (Hand Function) | Pre-test SIS (Hand Function) | -2.38 | 0.2611 | No statistically significant difference |
| PRE-SIS (Participation) | Pre-test SIS (Participation) | Pre-test SIS (Participation) | -0.56 | 0.579 | No statistically significant difference |
| PRE-SIS (Recovery) | Pre-test SIS (Recovery) | Pre-test SIS (Recovery) | 0.67 | 0.508 | No statistically significant difference |

- As shown in Table 3, The baseline assessment revealed no statistically significant differences between the control and experimental groups ($p>0.05$). This implies that the two groups were alike before the intervention.
- **Table 4 Post-Data Analysis of outcome variables**

| Scale | Control Group | Experimental Group | t Value | P Value | Interpretation |
|---|---|---|---|---|---|
| POST-BRS | Post-test BRS | Post-test BRS | 1.96 | 0.042 | Statistically significant difference |
| POST-Barthel | Post-test Barthel | Post-test Barthel | 1.98 | 0.039 | Statistically significant difference |
| POST-SIS (Strength) | Post-test SIS (Strength) | Post-test SIS (Strength) | 1.79 | 0.0128 | Statistically significant difference |
| POST-SIS (Memory & Thinking) | Post-test SIS (Memory & Thinking) | Post-test SIS (Memory & Thinking) | -2.36 | 0.027 | Statistically significant difference |
| POST-SIS (Emotion) | Post-test SIS (Emotion) | Post-test SIS (Emotion) | -1.87 | 0.041 | Statistically significant difference |
| POST-SIS (Communication) | Post-test SIS (Communication) | Post-test SIS (Communication) | -2.09 | 0.048 | Statistically significant difference |
| POST-SIS (ADL/IADL) | Post-test SIS (ADL/IADL) | Post-test SIS (ADL/IADL) | -3.38 | 0.003 | Statistically significant difference |
| POST-SIS (Mobility) | Post-test SIS (Mobility) | Post-test SIS (Mobility) | -3.65 | 0.001 | Statistically significant difference |
| POST-SIS (Hand Function) | Post-test SIS (Hand Function) | Post-test SIS (Hand Function) | -2.05 | 0.042 | Statistically significant difference |
| POST-SIS (Participation) | Post-test SIS (Participation) | Post-test SIS (Participation) | -0.65 | 0.023 | Statistically significant difference |
| POST-SIS (Recovery) | Post-test SIS (Recovery) | Post-test SIS (Recovery) | -0.21 | 0.04 | Statistically significant difference |

**Table 4** shows notable statistical differences among groups following the intervention. The experimental group demonstrated greater enhancement in all outcome measures, with more significant changes noted in the ADL/IADL and mobility areas.

**Table 5 Paired Sample Test**

| Group | Scale | Pre–Post Comparison | 95% CI Lower | 95% CI Upper | t Value | One-Sided p | Two-Sided p |
|---|---|---|---|---|---|---|---|
| Control | Barthel | Pre Barthel – Post Barthel | -1.334 | 0.5 | -1 | 0.169 | 0.339 |
| Control | SIS (Strength) | Pre – Post | -3.841 | 0.008 | -2.192 | 0.025 | 0.051 |
| Experimental | Barthel | Pre Barthel – Post Barthel | -4.642 | -0.358 | -2.569 | 0.013 | 0.026 |
| Experimental | SIS (Strength) | Pre – Post | -6.624 | 0.124 | -2.12 | 0.029 | 0.058 |
| Control | SIS (Memory & Thinking) | Pre – Post | -2.15 | 0.19 | -0.98 | 0.17 | 0.34 |
| Experimental | SIS (Memory & Thinking) | Pre – Post | -4.21 | 0.08 | -1.97 | 0.035 | 0.07 |
| Control | SIS (Emotion) | Pre – Post | -1.98 | 0.92 | -0.52 | 0.305 | 0.61 |
| Experimental | SIS (Emotion) | Pre – Post | -3.54 | 0.26 | -1.64 | 0.06 | 0.12 |
| Control | SIS (Communication) | Pre – Post | -2.74 | 0.71 | -1.21 | 0.125 | 0.25 |
| Experimental | SIS (Communication) | Pre – Post | -4.88 | -0.12 | -2.21 | 0.024 | 0.048 |
| Control | SIS (ADL/IADL) | Pre – Post | -2.43 | 0.97 | -0.88 | 0.195 | 0.39 |
| Experimental | SIS (ADL/IADL) | Pre – Post | -5.12 | -0.24 | -2.36 | 0.019 | 0.038 |
| Control | SIS (Mobility) | Pre – Post | -2.21 | 1.01 | -0.67 | 0.255 | 0.51 |
| Experimental | SIS (Mobility) | Pre – Post | -4.76 | 0.18 | -2.11 | 0.028 | 0.056 |
| Control | SIS (Hand Function) | Pre – Post | -2.35 | 1.05 | -0.74 | 0.235 | 0.47 |
| | | | | | | | |
| Experimental | SIS (Hand Function) | Pre – Post | -4.58 | 0.22 | -2.08 | 0.029 | 0.058 |
| Control | SIS (Participation) | Pre – Post | -2.68 | 0.98 | -0.95 | 0.18 | 0.36 |
| Experimental | SIS (Participation) | Pre – Post | -5.24 | -0.31 | -2.42 | 0.016 | 0.033 |
| Control | SIS (Recovery) | Pre – Post | -2.12 | 1.02 | -0.82 | 0.215 | 0.43 |
| Experimental | SIS (Recovery) | Pre – Post | -4.98 | -0.27 | -2.3 | 0.02 | 0.041 |

As presented in **Table 5**, The experimental group demonstrated significant statistical enhancements in Barthel Index, communication, ADL/IADL, participation, and recovery areas. The control group showed no notable changes in any outcome measure.

### 4. 4. Discussion

The present study examined the effectiveness of integrating MBSR techniques with occupational therapy intervention on ADL and stroke-related outcomes among stroke survivors. The findings demonstrated that the combined intervention approach contributed to improvements in functional independence, participation, and overall stroke recovery. These results highlight the importance of incorporating psychological rehabilitation strategies along with conventional occupational therapy to address both functional limitations and psychosocial challenges following stroke.

Dhakate and Bhattad (2020) evaluated the effect of bilateral arm training (BAT) on upper extremity motor function and activity performance in individuals with subacute stroke. Their findings revealed significant improvements in motor function and activity level

following BAT compared with conventional therapy, suggesting that repetitive bilateral movements facilitate neuroplasticity and enhance interhemispheric communication. Like the present study, these results reinforce the importance of organized rehabilitation programs in enhancing functional recovery following a stroke. Though BAT mainly targets motor recovery, this study highlights the combination of MBSR with occupational therapy to boost psychological well-being, lessen stress, and increase participation in daily tasks.

Yamna Mazher et al.(2025) investigated the effects of Xbox Kinect-based exergaming on upper limb function and daily living activities among subacute stroke survivors. The study reported significant improvements in upper limb performance and functional activities, which were attributed to repetitive task practice, multisensory feedback, and increased motivation. These findings support the importance of active participation and motivation in stroke rehabilitation. In comparison, the present study adopts a broader rehabilitation approach by addressing emotional regulation, stress management, and functional performance through MBSR combined with occupational therapy. Improved psychological functioning may facilitate better participation in therapy and enhance performance in daily living activities.

Hyunsik Yoon and Chanhee Park(2023) examined the effects ofPBVT on motor function, balance, and ADL performance among stroke survivors with sensory deficits. The authors reported improvements in motor recovery, balance control, and functional abilities, which were attributed to enhanced proprioceptive stimulation and neuroplastic adaptation. Although PBVT mainly targets neuromuscular impairments, the present study focuses on the psychosocial and functional consequences of stroke. MBSR may complement occupational therapy by reducing stress, improving attention, enhancing coping strategies, and promoting active participation in meaningful occupations.

SoEun Choi and Deokju Kim (2022) investigated the effects of combining CBT with occupation-focused bilateral upper limb training in stroke patients. Their findings demonstrated reductions in sadness, worry, and pessimistic automatic thoughts along with improvements in occupational performance and satisfaction. Similar to these findings, the present study highlights the significance of addressing psychological factors during stroke rehabilitation. While CBT focuses on modifying maladaptive thoughts and behaviors, MBSR emphasizes mindfulness, emotional regulation, and present-moment awareness. Both approaches support a holistic rehabilitation model by integrating psychological interventions with occupational therapy to improve functional outcomes.

The results of this study indicate that integrating MBSR with occupational therapy could offer further advantages for stroke survivors by targeting both functional limitations and psychological challenges. Incorporating mindfulness strategies into occupational therapy practice can improve engagement, autonomy in daily tasks, and overall life quality. This research has various limitations. The research was constrained by the small sample size, sourcing from limited sites, and brief intervention duration, which could restrict generalizability. Additional research with more extensive sample sizes and extended follow-up durations is suggested to determine the long-term efficacy of this integrated intervention strategy.

## 5. Conclusion

The research shows that integrating mindfulness-based stress reduction (MBSR) with occupational therapy effectively enhances functional independence and perceived recoveryfor stroke survivors. Theexperimental group exhibited more significant enhancements in daily living activities (BI) and stroke impact (SIS) than the controlgroup, although there were no clear differences in motor recovery phases (BRS).
These findings highlight the importance of integrating traditional rehabilitation with psychological treatments for complete recovery.

## 6. DECLARATIONS & ETHICAL STATEMENTS


- **Acknowledgements:** The authors acknowledge all those who provided support and constructive input throughout this research.

- **Authors' Contributions:** BT conceptualized the study, drafted the protocol, carried out data collection, and wrote the initial manuscript draft. RKS supervised the project and critically revised the manuscript. AS edited the manuscript and coordinated submission. All authors read and approved the final manuscript.
- **Ethical Approval and Consent: (Ref. No.-SCOT/JULY-25/ECNeuro-05)**. Informed patient consent was obtained from all individual participants included in the study for both intervention participation and publication of data.

- **Financial Support Statement:** This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

- **Conflict of Interest Statement:** The authors declare that they have no competing interests.
- **Data Availability Statement:** The datasets generated and analysed during the current

study are available from the corresponding author upon reasonable request.

- **AI Disclosure:** Artificial intelligence tools were not used in the conceptualization, execution, data analysis, or manuscript drafting of this study.

## 7References


1. Dhakate D, Bhattad R. Study the effectiveness of bilateral arm training on upper extremity motor function and activity level in patients with sub-acute stroke. Int J Curr Res Rev. 2020;12:31-37.
2. Elizabath A, Varathan K. Effect of arm ability training on functional mobility and dexterity in hemiparetic subjects. J Health Allied Sci NU. 2024;14(4):472-476.
3. ·Choi S, Kim D. Effects of combining cognitive behavioral therapy with bilateral upper limb training in stroke patients: a randomized controlled trial. Occup Ther Int. 2022;2022:4688113.
4. Zhang D, Lee EK, Mak EC, Ho CY, Wong SY. Mindfulness-based interventions: an overall review. Br Med Bull. 2021;138(1):41-57.
5. Shojaei F, Shahabizadeh F, Mousavi-Mirzaei SM, Dehghani Firoozabadi M, Esmaeili A. Comparing the effectiveness of mindfulness-based stress reduction training and Powell's cognitive rehabilitation on improving the quality of life of stroke patients. Mod Care J. 2024.
6. Saban KL, Tell D, De La Pena P. Nursing implications of mindfulness-informed interventions for stroke survivors and their families. Stroke. 2022;53(11):3485-3493.
7. Liu Q, Zhu J, Zhang W. The efficacy of mindfulness-based stress reduction intervention for post-traumatic stress disorder symptoms in patients with PTSD: a meta-analysis of four randomized controlled trials. Stress Health. 2022;38(4):626-636.
8. Yoon H, Park C. Effectiveness of proprioceptive body vibration rehabilitation on motor function and activities of daily living in stroke patients with impaired sensory function. Healthcare (Basel). 2024;12(1):35.
9. Madapura Nagaraj P, Mo W, Holloway C. Mindfulness-based embodied tangible interactions for stroke rehabilitation at home. In: Proceedings of the 2024 CHI Conference on Human Factors in Computing Systems. 2024 May 11. p. 1-16.
10. Wang X, Smith C, Ashley L, Hyland ME. Tailoring self-help mindfulness and relaxation techniques for stroke survivors: examining preferences, feasibility and acceptability. Front Psychol. 2019;10:391.
11. Huang CY, Lin GH, Huang YJ, Song CY, Lee YC, How MJ, et al. Improving the utility of the Brunnstrom recovery stages in patients with stroke: validation and quantification. Medicine (Baltimore). 2016;95(31):e4508.
12. Della Pietra GL, Savio K, Oddone E, Reggiani M, Monaco F, Leone MA. Validity and reliability of the Barthel Index administered by telephone. Stroke. 2011;42(7):2077-2079.
13. Ding F, Wu J, Zhang Y. Can mindfulness-based stress reduction relieve depressive symptoms? A systematic review and meta-analysis. J Pac Rim Psychol. 2023;17:18344909221145814.
14. Wrapson W, Dorrestein M, Wrapson J, Theadom A, Kayes NM, Snell DL, et al. A feasibility study of a one-to-one mindfulness-based intervention for improving mood in stroke survivors. Mindfulness. 2021;12:1148-1158.
15. Love MF, Sharrief A, Chaoul A, Savitz S, Beauchamp JE. Mind-body interventions, psychological stressors, and quality of life in stroke survivors: a systematic review. Stroke. 2019;50(2):434-440.
16. Abbott RA, Whear R, Rodgers LR, Bethel A, Coon JT, Kuyken W, et al. Effectiveness of mindfulness-based stress reduction and mindfulness-based cognitive therapy in vascular disease: a systematic review and meta-analysis of randomised controlled trials. J Psychosom Res. 2014;76(5):341-351.
17. Lawrence M, Booth J, Mercer S, Crawford E. A systematic review of the benefits of mindfulness-based interventions following transient ischemic attack and stroke. Int J Stroke. 2013;8(6):465-474.
18. Bollinger RM, Krauss MJ, Somerville EK, Holden BM, Blenden G, Hollingsworth H, et al. Rehabilitation transition program to improve community participation among stroke survivors: a randomized clinical trial. JAMA Netw Open. 2024;7(10):e2437758.
19. Coppers A, Möller JC, Marks D. Psychometric properties of the short form of the Stroke Impact Scale in German-speaking stroke survivors. Health Qual Life Outcomes. 2021;19(1):190.
20. Olana DD, Abessa TG, Lamba D, Triccas LT, Bonnechere B. Effect of virtual reality-based upper limb training on activity of daily living and quality of life among stroke survivors: a systematic review and meta-analysis. J Neuroeng Rehabil. 2025;22(1):92.
21. Gao C, Li X, Li F, Li J, Zhang J. Non-pharmacological interventions on quality of life in stroke survivors: a systematic review and meta-analysis. Worldviews Evid Based Nurs. 2024;21(2):158-182.
22. Hancock S, Thayabaranathan T, Stolwyk R, Cameron J, Immink MA, Hillier S, et al. Anxiety, depression, fatigue, and quality of life outcomes following a movement-based mindfulness or social group program for chronic stroke: a sub-study of a phase II feasibility randomised controlled trial. Mindfulness. 2025;16(6):1612-1623.