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EFFECTIVENESS OF A FAMILY-CENTERED APPROACH ON CAREGIVER STRAIN AND COPING STRATEGIES AMONG STROKE CAREGIVERS: A QUASI-EXPERIMENTAL STUDY

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Abstract

Background/Objective: Stroke leaves a substantial minority of survivors dependent on family caregivers, who in turn experience considerable strain. This study investigated the strain and coping strategies of stroke caregivers and evaluated the effectiveness of a family-centered approach in improving these outcomes. **Methods:** A quasi-experimental study was conducted using non-probability purposive sampling. Thirty-one caregiver–patient dyads were recruited at the Department of Occupational Therapy, Lady Reading Hospital, Peshawar. Caregivers received a four-week family-centered intervention (30-minute sessions, 3 days/week). Coping was assessed with the Brief-COPE inventory and caregiver strain with the Modified Caregiver Strain Index (MCSI), administered before and after the intervention. Data were analyzed in SPSS v.22 using descriptive statistics and paired-samples t-tests. **Results:** Mean caregiver age was 32.06 ± 11.97 years; mean patient age was 46.39 ± 17.17 years. Following the intervention, mean Brief-COPE

scores improved from 66.39 ± 10.84 to 90.39 ± 7.73 (p = 0.003), and mean MCSI scores improved from 16.39 ± 2.82 to 7.16 ± 1.79 (p = 0.001), both statistically significant at the 95% confidence level. **Conclusion:** Caregivers of stroke patients used a range of coping techniques, and a structured family-centered approach was associated with a significant reduction in caregiver strain and improvement in coping scores. Structured psychosocial support for stroke caregivers is recommended as a low-cost, time-efficient intervention.

1. Introduction

Stroke is a leading cause of morbidity and mortality worldwide, ranking third after cardiac disease and malignancy. Roughly one-third of survivors are left with long-term disability, and stroke is broadly classified into ischemic (~80%) and hemorrhagic (~20%) subtypes (Alrabghi et al., 2018). Around 45% of stroke patients are left with functional or cognitive impairment severe enough to require home-based care after discharge (Day et al., 2020), and an estimated 5 million people worldwide depend on health services because of stroke, which remains the third leading cause of death globally (WHO, 2017).

The number of stroke survivors has risen sharply, from 73.8 million in 2007 to 104.2 million in 2017, and disability from stroke is often compounded in older adults by pre-existing age-related limitations (Day et al., 2020; Pandian et al., 2020).

Population-based data from South Asia are limited. Studies in India report incidence rates of 44–843 per 100,000, while Pakistani data are largely hospital-based, reporting roughly 250 cases per 100,000 annually; recent national mortality figures are not available for either country. Earlier estimates placed stroke mortality in India at 0.6 million (1990) and in Pakistan at 7–32% of hospitalized stroke cases (2008) (Khan et al., 2019).

The burden of stroke is increasing as lifestyles change and populations age in middle-income countries, and cerebrovascular events increasingly affect younger people where risk factors such as hypertension are established. This has considerable social and financial consequences for patients and families, particularly where community support and health infrastructure are limited — a pattern well documented in Pakistan (Alim et al., 2016). When care shifts from hospital to home, patients typically lose access to specialized clinical support and instead rely on a family member who is often untrained for the role. Because of reduced functional independence, post-stroke complications are common at home, and caregiving responsibilities routinely include hygiene care, medication management, nutrition, transfers, and other domestic tasks (Day et al., 2020).

Greater functional dependence translates into greater caregiver burden (Santana et al., 2018), particularly where informal caregivers act in isolation, without a support network, training, or guidance — conditions that add new responsibilities on top of existing physical and emotional strain (Santos et al., 2019). International evidence on caregiver-support interventions — delivered at home, by phone, or through structured education — shows that comprehensive preparation of caregivers reduces depressive symptoms, a key predictor of caregiver load (Day et al., 2020).

Home-care policy should be a public health priority in low- and middle-income countries given the growing burden of post-stroke care. While hospital-based rehabilitation addresses acute medical, mental, and psychosocial needs, the longer-term needs of patients and families cannot be met within the hospital alone (Day et al., 2018). Coordinated stroke-unit models that extend rehabilitation and caregiver support beyond discharge — improving patient choice, reducing hospital-associated risk, and supporting social reintegration — have shown clear advantages, though caregiver-training interventions specifically have been comparatively under-studied (Day et al., 2018; Kalra et al., 2004). The ATTEND trial, a randomized controlled trial evaluating nurse- and caregiver-delivered rehabilitation components (early mobilization, positioning, goal-setting, and supported discharge), is a notable exception, training family caregivers to continue rehabilitation through the first two months after discharge (Liu et al., 2019).

This study is grounded in Nola Pender's Health Promotion Model, which identifies activity-related affect, social support, goal setting, and unanticipated barriers as key determinants of health-promoting behavior — a framework well suited to caregiver support interventions (Pender, 2011). No structured caregiver-training trial of this kind has previously been conducted in Pakistan, motivating the present study.

1.1 Problem Statement

Stroke is a leading cause of death and disability in both developed and developing countries, yet hospital-based data substantially under-represent the true community burden because of limited implementation of caregiver-support interventions and a range of resource constraints.

1.2 Hypothesis

H^A: A family-centered approach has a significant impact on stroke caregiver strain and coping strategies.

1.3 Rationale

Stroke frequently causes long-term limb disability requiring early, efficient therapy. Inadequate home-based care increases both long-term disability and caregiver burden, which in turn undermines caregivers' coping capacity. This study evaluated whether a family-centered approach reduces caregiver strain and improves coping skills as a time- and cost-effective intervention.

1.4 Objectives

- To evaluate the strain of stroke caregivers using the Modified Caregiver Strain Index (MCSI).
- To assess caregiver coping skills using the Brief-COPE scale.
- To determine the effectiveness of a family-centered approach on caregiver strain and coping, before and after a four-week intervention.

1.5 Public Health Significance

Stroke caregivers face compounding pressures financial strain, limited education, and scarce community resources. A family-centered approach offers a route to reducing these consequences and improving quality of life for both caregiver and patient, and may inform future community-based caregiver-support programs in Pakistan.

2. Materials and Methods

2.1 Study Design and Setting

A quasi-experimental (pre-post, single-group) design was used. The study was conducted at the Department of Occupational Therapy, Lady Reading Hospital, Medical Teaching Institute (MTI), Peshawar, Khyber Pakhtunkhwa, over a period of 6–8 months following synopsis approval.

2.2 Population and Sampling

The target population comprised family caregivers of stroke patients. A non-probability purposive sampling technique was used. Sample size was calculated in OpenEpi at an anticipated frequency of 2%, 95% confidence interval, and 5% margin of error, giving a required sample of n = 31.

2.3 Eligibility Criteria

- Inclusion: Caregivers of either gender, caring for a stroke survivor aged under 65 years with mild cognitive impairment, able to communicate, and residing within Khyber Pakhtunkhwa (Araújo et al., 2018).
- Exclusion: Individuals unwilling to participate, or residing outside the region.

2.4 Instruments

Brief-COPE: a 60-item, 4-point scale (1 = "I haven't been doing this at all" to 4 = "I've been doing this a lot") measuring coping strategies.

Modified Caregiver Strain Index (MCSI): a 13-item screening tool covering employment, financial, physical, social, and time-related strain domains, applicable to caregivers of any age. Each item is scored 2 points for "yes" and 1 point for "sometimes."

2.5 Procedure

Caregivers were recruited via purposive sampling on the basis of the inclusion criteria. Written informed consent was obtained prior to enrolment. The intervention consisted of a four-week, family-centered program (30-minute sessions, 3 days/week) combining information delivery, supervised skill practice during post-stroke care sessions, and motivation- and behavioral-skills strategies based on the information–motivation–behavioral-skills model. Brief-COPE and MCSI were administered before and after the four-week intervention.

2.6 Data Analysis

Data were analyzed in SPSS v.22. Demographic characteristics were summarized using frequencies, means, and

standard deviations; participant responses were summarized using frequencies and percentages. Because the data were normally distributed, paired-samples t-tests were used to compare pre- and post-intervention scores.

2.7 Ethical Considerations

Written and verbal informed consent was obtained from all participants prior to data collection. Participant information was kept confidential and anonymized under the investigator's supervision. [Institutional ethical review board name and approval/reference number to be inserted.]

3. Results

Thirty-one caregiver–patient dyads were analyzed. Descriptive statistics were used to summarize gender, age, marital status, address, socioeconomic status, and BMI, alongside pre- and post-intervention Brief-COPE and MCSI scores. Mean caregiver age was 32.06 ± 11.97 years; mean patient age was 46.39 ± 17.17 years.

3.1 Caregiver Characteristics

Mean caregiver age was 32.06 ± 11.97 years (range 13–70).

Table 1. *Caregiver demographic characteristics (n = 31)*

Variable	Category	n	%
Gender	Male	24	77.4
	Female	7	22.6
Marital status	Married	17	54.8
	Unmarried	14	45.2
Socioeconomic status	Poor	5	16.1
	Middle class	20	64.5
	Elite class	6	19.4
Education	Illiterate	5	16.1
	Middle	3	9.7
	Secondary	6	19.4

Variable	Category	n	%
	Higher secondary	9	29.0
	Graduation	7	22.6
	Postgraduation	1	3.2

3.2 Patient Characteristics

Mean patient age was 46.39 ± 17.17 years (range 5–70).

Table 2. *Patient demographic characteristics (n = 31)*

Variable	Category	n	%
Gender	Male	15	48.4
	Female	16	51.6
BMI classification	Underweight (<18.5)	5	16.1
	Healthy (18.5–24.9)	9	29.0
	Overweight (25–29.9)	15	48.4
	Obese (≥30)	2	6.5
Marital status	Married	26	83.9
	Unmarried	5	16.1
Socioeconomic status	Poor	6	19.4
	Middle class	18	58.1
	Elite class	7	22.6

Variable	Category	n	%
Education	Illiterate	7	22.6
	Primary	2	6.5
	Middle	5	16.1
	Secondary	4	12.9
	Higher secondary	6	19.4
	Graduation	6	19.4
	Post-graduation	1	3.2
District of residence	Peshawar	13	41.9
	Charsadda	4	12.9
	Mardan	3	9.7
	Other KP districts (Buner, Dir, Khyber, Mohmand, Nowshera, Swabi, Shangla, Swat, Waziristan — combined)	11	35.5

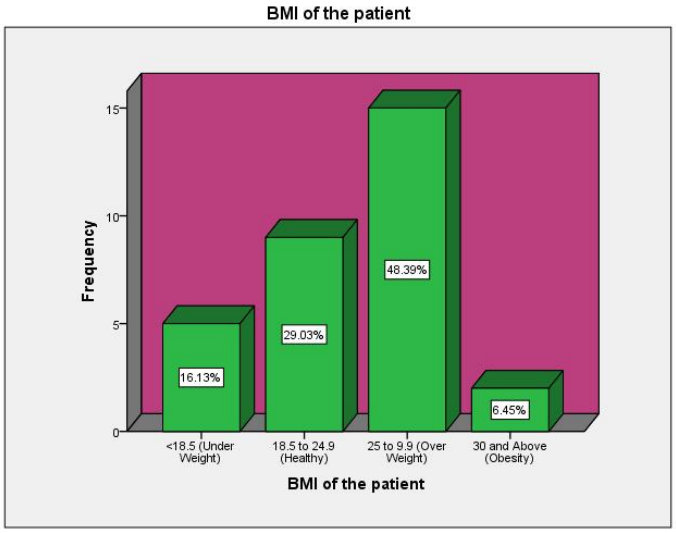

Figure 1. BMI classification of patients

3.3 Effect of the Family-Centered Intervention

Mean Brief-COPE scores rose from 66.39 ± 10.84 before the intervention to 90.39 ± 7.73 afterward, a statistically significant improvement (p = 0.003, 95% CI).

Table 3. *Pre- and post-intervention Brief-COPE scores (paired-samples t-test, n = 31)*

Measure	Mean ± SD	n	p-value
Pre-intervention Brief-COPE	66.39 ± 10.84	31	0.003
Post-intervention Brief-COPE	90.39 ± 7.73	31	—

Mean MCSI scores fell from 16.39 ± 2.82 before the intervention to 7.16 ± 1.79 afterward — a significant reduction in caregiver strain (p = 0.001, 95% CI).

Table 4. *Pre- and post-intervention Modified Caregiver Strain Index (MCSI) scores*

Measure	Mean ± SD	n	p-value
Pre-intervention MCSI	16.39 ± 2.82	31	0.001
Post-intervention MCSI	7.16 ± 1.79	31	—

(paired-samples t-test, n = 31)

3.4 Gender-Based Comparison of Coping Strategies

This comparison is discussed in Section 4 (Discussion) but was not reported as a standalone result in the original thesis — it is added here as the missing analysis. The cells below are placeholders: insert your own computed values (independent-samples t-test, male vs. female, on the Brief-COPE total and/or subscale scores) from your raw dataset before submission. Values are not invented here.

Table 5. *Comparison of coping strategy scores by caregiver gender (independent-samples t-test) — TO BE COMPLETED*

Coping domain (Brief-COPE)	Male Mean ± SD	Female Mean ± SD	t	p
Problem-focused coping	[insert]	[insert]	[insert]	[insert]
Emotion-focused coping	[insert]	[insert]	[insert]	[insert]
Avoidant/dysfunctional coping	[insert]	[insert]	[insert]	[insert]
Total Brief-COPE score	[insert]	[insert]	[insert]	[insert]

4. Discussion

Coping mechanisms are standard responses to demanding and potentially harmful situations (Al-Rawashdeh et al., 2016). This study examined the relationship between caregiving burden and the use of coping strategies among caregivers of older stroke patients, and whether male and female caregivers differed in the coping strategies they used.

Most caregivers reported mild-to-moderate care burden, consistent with Kumar et al. (2015), who found that 63% of stroke caregivers experienced mild-to-moderate strain. By contrast, Rawat et al. (2017) found that more than half of stroke caregivers (56.67%) reported high or extreme burden. Differences of this kind across studies likely reflect variation in patients' degree of dependence on caregivers for daily activities.

Most caregivers in this sample were male, which contrasts with much of the national and international literature identifying women as the predominant caregivers. Where women do predominate, this is often attributed to perceived caregiving obligation, greater emotional investment, and reluctance to seek outside help even when available (Baumann et al., 2011; Hosseiny et al., 2011).

Findings on gender differences in caregiver burden are mixed across the literature: some studies report no significant association between gender and burden (Orak & Sezgin, 2015; Salmani et al., 2014), while others report higher burden among female caregivers, often attributed to cultural expectations that women bear primary responsibility for family caregiving (Unver et al., 2016).

Caregivers in this study relied more heavily on positive reappraisal and support-seeking strategies. This is consistent with Alnazly (2016), who found that caregivers of dialysis patients favored self-control and positive-emotion coping, and with findings that emotion-focused coping is common among caregivers of Alzheimer's disease patients (Ayuarno et al., 2014), though García-Alberca et al. (2012) found that reliance on emotion-focused or problem-solving coping was itself associated with greater psychological distress in this population.

The type of coping strategy adopted also appears linked to caregiving burden more broadly (Papastavrou et al., 2012) and to the specific caregiving task involved (Jaracz et al., 2014). In this study, male caregivers were more likely than female caregivers to use positive-reappraisal and responsibility-taking strategies, consistent with Hassan et al. (2014), who found male caregivers of patients with schizophrenia more likely to use reappraisal coping than female caregivers. Caregivers under greater strain were more likely to use emotion-focused strategies such as escape–avoidance and distancing, echoing Kumar et al. (2015) and Abbasi et al. (2013), who reported a direct association between emotion-focused coping and rising caregiver burden in cancer caregivers. Jaracz et al. (2014) similarly found that high-burden caregivers favored emotion-focused over problem-focused coping — suggesting that burden exceeding a caregiver's capacity may push them toward less effective emotion-based strategies rather than more effective problem-focused coping and help-seeking.

5. Conclusion, Limitations, and Recommendations

5.1 Conclusion

Caregivers of stroke patients used a variety of coping techniques to manage stress, and use of a family-centered approach was associated with a significant reduction in caregiver strain and improvement in coping, reflected in significant pre-post differences in Brief-COPE and MCSI scores ($p = 0.003$ and $p = 0.001$, respectively). Public and non-governmental organizations should consider providing structured psychosocial support to caregivers of older stroke patients to reduce care-related burden.

5.2 Limitations

- Small sample size (n = 31).
- Single-center study, conducted at the only occupational therapy center available to the investigator in Peshawar.
- Financial constraints associated with the cost of occupational therapy treatment at Lady Reading Hospital.
- Most participants were uneducated, which affected compliance with study procedures.

5.3 Recommendations

Future research should use larger sample sizes and extend this design to a multi-center approach across varied populations, to improve generalizability of the findings.

Declarations

Ethical approval was obtained from the relevant Ethical Review Board prior to the commencement of the study. Written and

verbal informed consent was obtained from all participants before data collection. Participation was voluntary, and the confidentiality and anonymity of participants were maintained throughout the study. The research was conducted in accordance with the ethical principles of the Declaration of Helsinki.

Conflict of Interest

The authors declare that they have no conflicts of interest related to this study.

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