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# Effectiveness of Nurse-Led Home Visits in Improving Family Caregiving Skills and Reducing Caregiver Burden among Post-Stroke Patients: A Quasi-Experimental Study in West Sumatra, Indonesia

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**ABSTRACT**

**Background:** Post-stroke patients discharged from hospital often experience residual impairments that limit daily functioning and require ongoing care from family members. However, many families are not adequately prepared to provide such care due to limited knowledge and caregiving skills, which may increase caregiver burden and negatively affect patient recovery. Strengthening family capacity through structured support is therefore essential, particularly during the transition from hospital to home care.**Objective:** This study aimed to examine the effectiveness of nurse-led home visits in improving caregiving skills and reducing caregiver burden among families of post-stroke patients in Bukittinggi and Agam, Indonesia. **Methods:** A quasi-experimental pretest–posttest design was conducted over four months from February to August 2023. A total of 56 family caregivers of post-stroke patients were recruited using convenience sampling and assigned to an intervention group (n=28) and a control group (n=28). Caregiving skills were measured using a validated questionnaire, while caregiver burden was assessed using the Caregiving Burden Instrument. Data were analyzed using paired and independent t-tests. The intervention consisted of structured nurse-led home visits, including education, training, and counseling. **Results:** The findings showed significant improvements in caregiving skills and significant reductions in caregiver burden in the intervention group compared to the control group after four months ($p<0.001$). Significant changes were also observed within the intervention group at two and four months ($p<0.05$), indicating sustained intervention effects. **Conclusion:** Nurse-led home visits are effective in improving caregiving skills and reducing caregiver burden among families of post-stroke patients, supporting their integration into post-discharge care programs.

## INTRODUCTION

Rasyid et al. (1) reported stroke continues to be a major contributor to the global burden of non-communicable illnesses and a major cause of death and long-term disability. According to Feigin et al. (2) the Global Burden of Disease (GBD) study, since 1990, there has been a 44% increase in mortality and a 70% increase in stroke cases globally. Nearly 90% of stroke-related fatalities and disability-adjusted life years (DALYs) worldwide occur in low- and middle-income countries (LMICs), which bear the brunt of the burden. The frequency of stroke in West Sumatra is 8.8 per 1,000 people, higher than the national rate of 8.3 per 1,000, according to Kemenkes RI (3) data from the 2023 Indonesian Health Survey (SKI) West Sumatra is among the top ten provinces with the highest prevalence of stroke, ranking eighth out of 33 provinces in the country.

After being admitted to the hospital, the majority of stroke survivors still have residual impairments such as hemiparesis, cognitive impairments, and communication difficulties that require continuous care. Care transitions from hospital-based to home-based settings throughout the crucial post-hospitalization phase. Zeng et al. (4) reported that after being discharged, 74% of stroke patients depend on family members as their primary family caregiver. Friedman et al. (5) emphasized families are crucial in providing care and making healthcare decisions in Indonesia, a country with strong family values. Their participation is crucial to maintaining care continuity and promoting patient recovery. The ability of family members to give patients supporting, emotional, and physical care is referred to as family caregiving abilities, whereas the physical, psychological, and social strain that comes with providing care is referred to as caregiver burden.

However, despite their crucial role, many families are inadequately prepared to provide optimal care. Limited knowledge and insufficient caregiving skills remain major challenges, Yaslina et al. (6) showed that up to 89.6% of families demonstrate low to moderate caregiving competence. Michael et al. (7), Chen et al. (8), and Elf et al. (9) reported that inadequate discharge planning, limited caregiver experience, inadequate social support, and insufficient healthcare system support contribute to difficulties in post-stroke home care. Consequently, caregivers frequently experience substantial psychological and physical strain (6). Such conditions may hinder patient recovery, increase the risk of complications, and potentially lead to re-hospitalization. Previous studies by Dudley et al. (10), Facchinetti et al. (11), and Kable et al. (12) emphasized that continuity of care during the transition phase is essential to improve patient outcomes and reduce post-discharge challenges. Kim et al. (13), Usman et al. (14), and Oksholm et al. (15) demonstrated that transitional care interventions, including education, counselling, and ongoing support, improve quality of life and reduce caregiver burden. Ugur and Erci (16) as well as Kariasa (17) highlighted that nurse-led home visits and caregiver education provide direct support, strengthen caregiving skills, and improve family preparedness after hospital discharge.

Despite the growing body of evidence, several gaps remain. Few studies have integrated both outcomes within a single structured intervention; the majority of prior research has looked at caregiver burden or caregiving skills independently. Furthermore, there is still a dearth of empirical data on the efficacy of nurse-led home visit treatments in Indonesia, especially at the community level in areas like Bukittinggi City and Agam Regency. Therefore, by concurrently evaluating caregiving abilities and caregiver burden within a structured home visit programme over a predetermined intervention duration, this study offers uniqueness.

Strengthening family caregiving capability is a critical objective given the rising incidence of stroke and the crucial role that families play in post-stroke care. Inadequate assistance, poor caregiving abilities, and a heavy workload for carers can impede patient recovery, raise the risk of complications and re-hospitalization, and have a detrimental impact on the well-being of caregivers. In order to assist families during the shift from hospital to home care, evidence-based community nursing interventions are vital. Therefore, the goal of this study is to determine how well nurses' home visits help families of stroke patients in Bukittinggi City and Agam Regency, Indonesia, improve their caregiving abilities and lessen their caregiver burden.

## METHOD

*Research Design and Sample*

This study employed a quasi-experimental design using a pretest-posttest approach with an intervention group and a control group. This design evaluated the effects of a structured home visit intervention on two primary outcomes: family caregiving skills and caregiver burden. The intervention group received intervention through weekly home visits by public health center nurses and researchers for a total of 8 visits (approximately 2 months), followed by monitoring and evaluation once a month for the next two months. Measurements were conducted at three time points: baseline (prior to intervention), two months after the intervention, and four months after the intervention, allowing for the assessment of both short-term and sustained effects. Researchers used the chi-square test to verify the equivalence of the respondent groups (homogeneity test) based on the respondents' demographic data. This test was conducted to determine whether the two sample groups were equivalent (homogeneous). Statistical analysis was conducted using paired t-tests to assess within-group differences over time and independent t-tests to compare differences between the intervention and control groups. A significance level of $p < 0.05$ was applied.

The study population consisted of family caregivers of post-stroke patients following hospital discharge. The sample included families of patients discharged from Dr. M. Hatta Hospital, Bukittinggi, Indonesia**.** The study population for this research consists of residents of Bukittinggi and Agam, because the Brain Hospital is located in Bukittinggi, and the majority of patients come from Agam Regency and Bukittinggi City; furthermore, the cultural characteristics of these two cities are nearly identical.The inclusion criteria for the intervention group were as follows: residence in Bukittinggi City or Agam Regency, literacy, willingness to participate, direct involvement in patient care, and a familial relationship with the patient. The selection of Bukittinggi City and Agam Regency as the study sites was based on several considerations. First, these areas represent a substantial proportion of post-stroke patients treated at Dr. M. Hatta Hospital, making them highly relevant for examining post-discharge care outcomes. Second, both regions share relatively similar socio-demographic and cultural characteristics, which supports the comparability of participants across groups. Third, these areas reflect typical community healthcare settings in Indonesia, particularly in terms of access to primary healthcare services and reliance on family-based caregiving. Therefore, the selection of these locations enhances the representativeness and contextual relevance of the study findings within similar regional settings. The control group met the same criteria but resided outside Bukittinggi City and Agam Regency and did not receive the home visit intervention. The study did not distinguish between patients who had suffered a first stroke and those who had suffered a recurrent stroke. The required sample size was calculated using a two-sample difference hypothesis test (18), with a minimum requirement of 50 respondents. To account for potential attrition, an additional 20% was added, resulting in a target sample of 60 participants (30 per group). During the study period, four participants were lost to follow-up due to death and relocation (two from each group). For this study, The family caregiver is defined as a family member who assumes primary responsibility for providing physical, emotional, and supportive care to post-stroke patients after hospital discharge.

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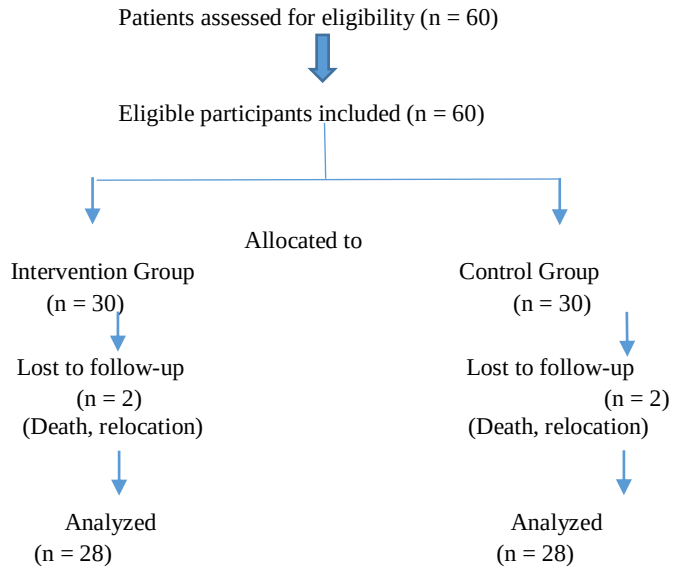


Participants were chosen using a convenience sampling strategy based on availability and eligibility requirements during the study period (18).

**Instrument study**

This study used a family skills questionnaire adapted from Phutthikhamin (19). The questionnaire was translated into Indonesian to aid reader understanding. The instrument development process included adaptation from the original questionnaire, translation, content review, and pilot testing before being used in the study. It was also tested for validity and reliability. The validity of the instrument was demonstrated by the validity testing, which revealed that all items had appropriate correlation coefficients (r-calculated > r-table). Good internal consistency was confirmed by the reliability test, which produced a Cronbach's alpha coefficient of 0.760. Forward translation and content modification were part of the adaptation procedure to guarantee cultural appropriateness. The questionnaire contained 24 statements. Answers used a Likert scale ranging from never (0), sometimes (1), to always (2).

The Caregiving Burden Instrument, which was created by Kim SS et al.(20) and translated and modified for the Indonesian setting, was used to measure carer burden. The adaptation procedure included a forward-backward translation technique to ensure conceptual and linguistic equivalency. A pilot test was conducted with a small group of family carers to ensure that the information was clear and understandable. Based on the results of validity testing, every item had r-calculated values that exceeded the critical value (r = 0.235), which proved that each item was legitimate. Furthermore, reliability analysis showed that the instrument had acceptable internal consistency, with a Cronbach's alpha coefficient of 0.752. Notably, the original structure of the instrument was not substantially changed. The final instrument consisted of 23 items on a 5-point Likert scale, ranging from Strongly Disagree (1) to Strongly Agree (5).

**Research Process**

This study was conducted on two groups of respondents: the intervention group and the control group. Both groups consisted of families of stroke patients who had been discharged from Bukittinggi Brain Hospital. The researcher sought informed consent from respondents in both groups while they were in the hospital, explaining the study's objectives, benefits, and the research process to be conducted. Respondents who agreed signed the informed consent form, after which the researcher administered the


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first questionnaire (pretest) to both groups. Both groups were informed that measurements would be taken three times: the first time while in the hospital, and the second and third times at home. In the intervention group, the researcher, along with community health centre nurses, conducted home visits eight times: once a week for the first two months and once a month thereafter as part of monitoring and evaluation. By involving community health centre nurses, they can directly assess the continuity of patient care following hospitalisation and conduct ongoing monitoring in the future. The intervention was carried out between February and August of 2023, a period of four months. In the control group, data collection from the patients' families' caregivers was conducted in the second and fourth months when the respondents returned to the hospital for follow-up visits. Data collection took place in the neurology outpatient clinic. The research has obtained research permit number 256.1/KEPK.F1/ETIK/2022.

Researchers ensure continuity of care through information provided by hospital nurses to patients and their families, as well as the existence of a patient discharge plan. When patients are discharged, relevant patient data—including clinical status and care plans—are shared with the researchers and serve as baseline data for the researchers to implement interventions for the intervention group. Subsequently, through home visits, the researchers, together with community health centre nurses, monitored the patients' progress and provided ongoing support to family caregivers during the four-month home care period.

**Home Visit**

The intervention used in this study was a structured nurse-led home visit programme adapted from existing transitional care and family caregiver support approaches. The intervention was not newly developed but was modified to fit the local context and the needs of families caring for post-stroke patients in Bukittinggi and Agam.

The intervention in this study consisted of home visits to the families of post-stroke patients. Home visits were conducted over four months, with visits occurring once a week for the first two months and once a month during the third month. The home visits were conducted by the researchers in collaboration with community health center nurses in the Bukittinggi City and Agam Regency areas. Each visit session lasted 30–45 minutes and utilized lecture, demonstration, and counselling methods. The material presented covered post-stroke home care, such as joint exercises, self-care, prevention of recurrent stroke, and stress management. Educational materials included videos, home stroke care modules, and demonstration tools such as self-care equipment. Families were provided with workbooks. These workbooks were monitored by researchers and community health center nurses. In the workbooks, families recorded the activities performed by family members, the family's feelings, and the challenges encountered regarding what had been taught by the researchers and the team. During the second month of visits, families were given a questionnaire, and again in the fourth month.

## RESULTS AND DISCUSSION

### RESULTS

1. Demographic Characteristics of Patients and Family Caregivers

Table 1. Demographic Characteristics of Post-Stroke Patients (n=56)

| Variables | Characteristics | Control (n=28) | % | Intervention (n=28) | % | p-value |
|---|---|---|---|---|---|---|
| Age | Adult | 18 | 64.3 | 7 | 25.0 | 0.009 |
| | Elderly | 10 | 35.7 | 21 | 75.0 | |
| Gender | Male | 17 | 60.7 | 13 | 46.4 | 0.292 |


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| | | | | | | |
|---|---|---|---|---|---|---|
| | Female | 11 | 39.3 | 15 | 53.6 | |
| Employment | Employed | 7 | 25.0 | 3 | 10.7 | 0.169 |
| | Unemployed | 21 | 75.0 | 25 | 89.3 | |
| Socioeconomic | Middle-high | 7 | 25.0 | 5 | 17.9 | 0.524 |
| | Low | 21 | 75.0 | 23 | 82.1 | |
| Education | No formal | 1 | 3.6 | 1 | 3.6 | 0.910 |
| | Primary | 11 | 39.3 | 9 | 32.1 | |
| | Junior high | 4 | 14.3 | 5 | 17.9 | |
| | Senior high | 7 | 25.0 | 10 | 35.7 | |
| | University | 5 | 17.9 | 3 | 10.7 | |

**Note:** Chi-square test used. p<0.05 significant**.**

The results showed that most baseline characteristics between the control and intervention groups were comparable (p > 0.05), including gender, employment status, socioeconomic status, and education level. However, a statistically significant difference was observed in age distribution (p = 0.009), where the intervention group was predominantly elderly, while the control group consisted mostly of adults. This lack of homogeneity in age distribution suggests that age may have confounded the study outcomes. Most participants were male, unemployed, of low socioeconomic status, and had completed high school education.

**Table 2. Demographic Characteristics of Family Caregivers (n=56)**

| Variables | Characteristics | Control (n=28) | % | Intervention (n=28) | % | p-value |
|---|---|---|---|---|---|---|
| Age | Adult | 25 | 89.3 | 25 | 89.3 | 0.786 |
| | Elderly | 3 | 10.7 | 3 | 10.7 | |
| Gender | Male | 11 | 39.3 | 6 | 21.4 | 0.152 |
| | Female | 17 | 60.7 | 22 | 78.6 | |
| Occupation | Civil servant | 2 | 7.1 | 2 | 6.9 | 0.221 |
| | Private employee | 4 | 14.3 | 2 | 6.9 | |
| | Trader | 5 | 17.9 | 3 | 10.7 | |
| | Farmer | 4 | 14.3 | 4 | 14.3 | |
| | Laborer | 1 | 3.6 | 1 | 3.6 | |
| | Other | 6 | 21.4 | 5 | 17.9 | |
| | Unemployed | 6 | 21.4 | 11 | 39.3 | |
| Socioeconomic | Middle-high | 2 | 7.1 | 4 | 14.8 | 0.397 |
| | Low | 26 | 92.9 | 24 | 85.2 | |
| Education | No formal | 0 | 0 | 1 | 3.6 | 0.900 |
| | Primary | 6 | 21.5 | 3 | 10.7 | |
| | Junior high | 2 | 7.1 | 5 | 17.9 | |
| | Senior high | 13 | 46.4 | 13 | 46.4 | |
| | University | 7 | 25.0 | 6 | 21.4 | |
| Relationship | Wife | 9 | 32.1 | 2 | 7.1 | 0.007 |
| | Husband | 3 | 10.7 | 4 | 14.3 | |
| | Parent | 15 | 53.6 | 16 | 57.1 | |
| | Parent-in-law | 1 | 3.6 | 4 | 14.3 | |
| | Other | 0 | 0 | 2 | 7.1 | |

**Note:** Chi-square test used. p<0.05 significant.

The analysis demonstrated that most caregiver characteristics were homogeneous between the two groups (p > 0.05), including age, gender, occupation, socioeconomic status, and education level. However, a statistically significant difference was identified in the relationship between caregivers and patients (p =


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0.007). This suggests that caregiving roles differed between groups, which may influence caregiving dynamics and should be considered when interpreting the results. In general, caregivers were predominantly adults, female, had low socioeconomic status, and had completed secondary education.

2. **Bivariate**

Figure 1. Trends in Family Caregiving Skills Among Post-Stroke Patients in the Intervention and Control Groups

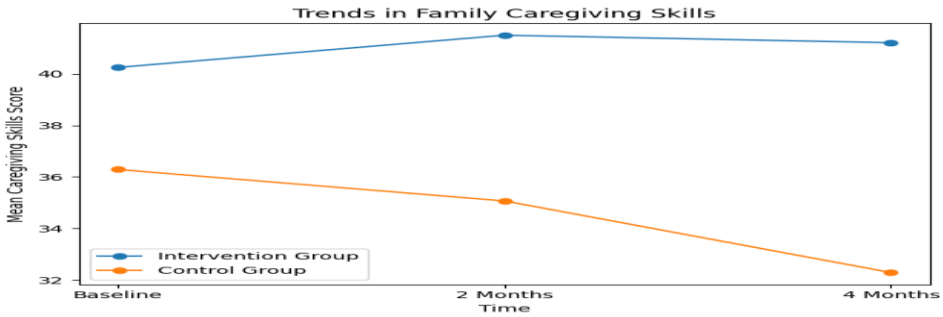


Figure 1 shows that the intervention group experienced an increase in caregiving skills from baseline to two months, which was maintained at four months. In contrast, the control group demonstrated a gradual decline over time. These findings indicate that the home visit intervention was effective in improving and sustaining caregiving skills among family caregivers.

Figure 2. Trends in Family Caregiver Burden among Post-Stroke Patients in the Intervention and Control Groups

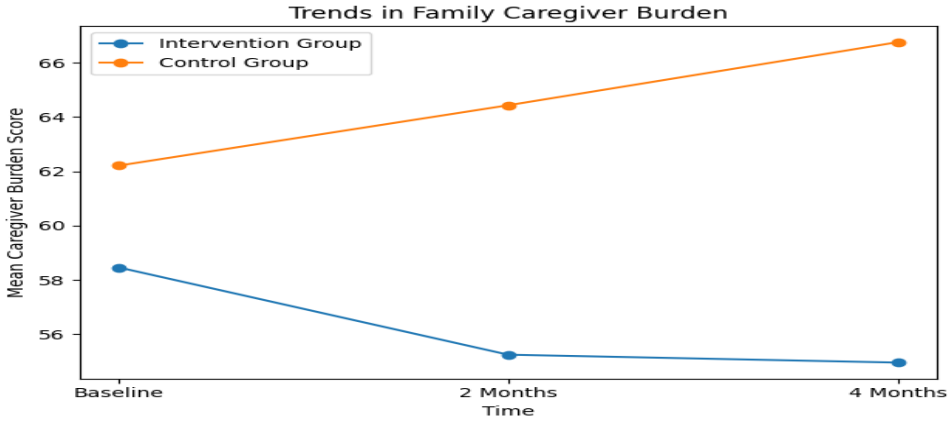


Figure 2 shows that caregiver burden decreased in the intervention group but increased in the control group over time. These findings indicate that the home visit intervention was effective in reducing caregiver burden among family caregivers of post-stroke patients.

**Table 3. Changes in Caregiving Skills and Burden (n=56)**

| Variable | Time | Intervention Mean±SD | MD | p-value | Control Mean±SD | MD | p-value |
|---|---|---|---|---|---|---|---|
| Skills | Baseline | 40.25±7.73 | | | 36.29±10.05 | | |
| | 2 months | 41.50±5.85 | -1.25 | 0.048 | 35.07±9.76 | 1.22 | 0.015 |
| | 4 months | 41.21±6.19 | -0.96 | 0.073 | 32.29±8.17 | 4.00 | <0.001 |
| Burden | Baseline | 58.46±8.50 | | | 62.21±11.96 | | |
| | 2 months | 55.25±9.25 | 3.21 | 0.001 | 64.43±11.23 | -2.21 | <0.001 |
| | 4 months | 54.96±9.57 | 3.50 | <0.001 | 66.75±11.14 | -4.53 | 0.001 |


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**Note:** Paired t-test used.

In the intervention group, caregiving skills significantly improved from baseline to two months (p = 0.048), indicating a positive effect of the home visit intervention. This improvement was maintained at four months (p > 0.05), suggesting sustained benefits over time. In contrast, the control group experienced a significant decline in caregiving skills over time (p < 0.05), indicating that without intervention, caregiving capacity tends to deteriorate. In the intervention group, caregiver burden significantly decreased from baseline to two months and continued to decrease at four months (p < 0.05), demonstrating the effectiveness of the intervention. Conversely, the control group showed a significant increase in caregiver burden over time (p < 0.05), indicating worsening caregiver strain in the absence of structured support.

**Table 4. Differences in Caregiving Skills Between Groups**

| Time | Control Mean | Intervention Mean | Difference | p-value |
|---|---|---|---|---|
| Baseline | 36.29 | 40.25 | -3.96 | 0.120 |
| 2 months | 35.07 | 41.5 | -6.43 | 0.001 |
| 4 months | 32.29 | 41.21 | -8.98 | <0.001 |

**Note:** Independent t-test used.

At baseline, there was no significant difference between the intervention and control groups (p = 0.120), indicating comparable initial conditions. However, significant differences emerged at two months (p = 0.001) and became more pronounced at four months (p < 0.001), with the intervention group showing higher caregiving skill scores. This confirms the effectiveness of the home visit intervention in improving caregiving skills.

**Table 5. Differences in Caregiver Burden Between Groups**

| Time | Control Mean | Intervention Mean | Difference | p-value |
|---|---|---|---|---|
| Baseline | 62.21 | 58.46 | 3.75 | 0.182 |
| 2 months | 64.43 | 55.25 | 9.17 | 0.002 |
| 4 months | 66.75 | 54.96 | 11.78 | <0.001 |

**Note:** Independent t-test used.

At baseline, no significant difference was observed between groups (p = 0.182), indicating comparable initial burden levels. After the intervention, significant differences were found at two months (p = 0.002) and four months (p < 0.001), with the intervention group showing lower caregiver burden compared to the control group. This demonstrates that the home visit intervention effectively reduced caregiver burden.

## DISCUSSION

This study found that family caregiving skills increased in the intervention group following nurse-led home visits. This improvement was evidenced by increased mean caregiving skill scores from baseline to two and four months. At baseline, caregiving skills in both groups were relatively similar. Following the intervention, the intervention group's scores increased (from 40.25 to 41.50 at two months and 41.21 at four months), whereas the control group's scores declined (from 36.29 to 32.29). The difference in family caregiving skills between the two groups was statistically significant at two months (p = 0.001) and became more pronounced at four months (p < 0.001), indicating that the home visit


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intervention was effective in improving caregiving skills. However, given the quasi-experimental design of this study, caution is required in interpreting these findings as definitive causal effects. Future research employing randomized controlled trial (RCT) designs is warranted to provide more robust evidence and strengthen causal inference regarding the effectiveness of nurse-led home visit interventions. Although the observed changes are consistent with the intervention, other unmeasured factors may have also contributed to the outcomes.

Caregiver burden showed a similar tendency. The control and intervention groups differed significantly, according to the statistical test results. After four months, the intervention group's mean burden score dropped to 54.96, whereas the control group's increased to 66.75. At two months ($p = 0.002$) and four months ($p < 0.001$), significant differences were discovered, suggesting that the intervention was successful in lowering caregiver burden. However, given the lack of randomization and the possible impact of confounding variables, these results should be viewed as associative rather than strictly causative. At two months, improvements in caregiving abilities became more noticeable, and by four months, they had stabilized. This may be explained by the fact that both patients and caregivers undergo a parallel adaptation process. In the early stages, caregivers actively learn new skills and knowledge, which eventually become part of their everyday routines. At the same time, patients gradually become more functionally independent, reducing the need for direct caregiving. This transition may contribute to the reduced caregiver burden observed, as patient dependency is one of the strongest predictors of caregiver burden (21); (8). The information that currently exists supports this interpretation by showing that family caregiver competence develops by regular practice and reinforcement rather than instant mastery.

These findings are consistent with previous studies. For example, Gharavi et al. (22) reported that caregivers often experience emotional distress and feel unprepared when they lack adequate knowledge and skills. Training programs such as the Interaction-Skills Training program (IST) have been shown to improve caregivers' sense of competence and reduce burden. Chan et al. (23) demonstrated that transitional care programs improve caregiver preparedness, emotional support, and continuity of care from hospital to home. The current findings contribute to this body of research by demonstrating that structured, home-based support may enhance learning in real-life caregiving situations, an aspect often not fully addressed in hospital-based education alone.

Access to accurate information and knowledge about the disease plays a crucial role in caregiving. A better understanding of the patient's condition not only helps families cope with stress but also improves their ability to provide effective and appropriate care. Duncan et al. (24) emphasized that access to accurate information plays a crucial role in improving caregiving effectiveness. This shows that knowledge by itself can be insufficient unless it is combined with ongoing assistance and helpful advice, such as that which is given through home visits. The comprehensive support provided through home visits—including education, training, and counselling—is responsible for the decrease in caregiver load observed in this study. Such assistance has been shown to lower stress, strengthen coping skills, and improve family functioning. In contrast, the increased load experienced by the control group highlights the challenges faced by families without organised care after hospital discharge. This divergence between groups underscores the potential role of structured follow-up care in mitigating caregiver strain during the post-discharge period.

A systematic review conducted by Deyhoul et al. (25) reported that multi-component interventions, including education and counseling, tend to produce more positive outcomes compared to single interventions. These interventions improve caregiver knowledge, caregiving skills, and psychological readiness, enabling families to provide higher-quality care (26). Additionally, training interventions boost caregiver confidence in handling complex care scenarios, which is crucial for long-term stroke care. The current findings support this perspective, as the intervention combined multiple approaches rather than relying on a single educational strategy.

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Up to the fourth month, the caregiving abilities continued to improve, and the load decreased, indicating a cumulative effect of the home visit intervention. This result is in line with earlier research showing that the impacts of interventions grow increasingly noticeable with time, especially when ongoing support is given. Additionally, the findings show that improved caring abilities directly lower caregiver strain. Caregivers who have adequate knowledge and confidence in their abilities tend to manage caregiving challenges more effectively (27). Nevertheless, the temporal link found in this study should be viewed as a trend that needs more validation through a randomised controlled study because it doesn't completely demonstrate causality. Conversely, a lack of knowledge and uncertainty in caregiving can increase stress and burden, as caregivers require continuous support and guidance from healthcare providers. Caregiver burden can significantly affect quality of life and biopsychosocial well-being, ultimately influencing the quality of care provided to patients (28). Additionally, research indicates that caregivers who are more adept at providing care exhibit fewer signs of psychological discomfort, such as depression.

Furthermore, the study results show that the majority of caregivers (89.3%) are adults, with a predominance of women, and are mainly caring for parents (57.1%) with relatively low socioeconomic status. This caregiver profile is associated with a higher risk of caregiver burden (29); (28). Although adult caregivers may have more mature coping abilities (30), Prolonged caregiving responsibilities without adequate support can still lead to physical and emotional strain (31); (32).

The results of this study also suggest that home visit interventions serve as a continuous support system that not only boosts family caregiver involvement and confidence but also acts as a mechanism for knowledge transmission. Frequent communication with nurses enables family caregivers to get answers to questions, receive feedback, and adjust care procedures to meet patients' needs. This ongoing support may explain the steady improvement in caregiving abilities and the gradual decrease in family caregiver burden observed in this study. It also highlights the importance of maintaining strong relationships between families and healthcare professionals to achieve the best possible post-stroke care outcomes. However, care should be taken when interpreting the study's results. Given that older patients often have higher levels of dependency, the substantial difference in age distribution between groups may have influenced the results. Furthermore, the study did not distinguish between first-ever and recurrent strokes. Prior caregiving experience may affect the baseline skills and perceived burden of families caring for individuals with recurrent strokes. Future research should take these characteristics into account, as they may act as confounding variables.

## CONCLUSION

A structured home visit intervention for families of post-stroke patients after hospital discharge was effective in improving caregiving skills and reducing caregiver burden. In the intervention group, caregiving skills improved and were sustained for four months, whereas in the control group, they declined. Family Caregiver burden was significantly reduced in the intervention group but increased in the control group, suggesting that the intervention provided both short-term and long-term benefits.
These findings highlight the importance of integrating structured home visit programs into post-discharge care. Community nurses play a key role in providing continuous education, skills training, and psychosocial support to family caregivers. It is recommended that healthcare services strengthen home-based care programs, particularly in the early post-discharge period. To improve generalizability, future studies should incorporate a wider range of populations and take into account potential confounding variables such as patient age and stroke recurrence.

## LIMITATIONS

There are a number of limitations to this study. First, selection bias could be introduced by the quasi-experimental design without randomisation. Second, a notable disparity in the age distribution of the


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groups could be a confounding factor that affects the outcomes. Third, the results may not be as broadly applicable due to the use of convenience sampling and the restricted study environment in Bukittinggi and Agam. In addition, this study did not distinguish between patients experiencing a first-ever stroke and those with recurrent stroke. Prior caregiving experience may have an impact on the baseline caregiving abilities and perceived stress of families caring for individuals with recurrent strokes. The results of the study could have been impacted by this issue, which was not taken into account in the analysis.

## AUTHOR CONTRIBUTIONS

In addition to being the corresponding author, the first author was in charge of the study's conception, execution, data analysis, writing, and revision. The study design, instrument validation, data analysis, and critical article review were all completed by the second author. The third author was in charge of language editing and enhancing the English manuscript's quality.

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