

## Care of Stroke Patients: A Study Based on The Islamic Perspective

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### Abstract

A stroke is one of the diseases caused by the narrowing of blood vessels to the brain or blood vessels bursting. This results in pain and disability in stroke patients. In Malaysia, stroke has become the second highest cause of death. The pain and disability of stroke patients cause them to need the help of others in managing their needs. The aim of our study was to explore the issues faced in the care of stroke patients. In addition, this study also explores the issue of care for stroke patients from an Islamic perspective. This study is qualitative in form where the primary data of the study refers to journal writings, books, and newspapers. When the description is related to the Islamic perspective, it refers to two main references which are al-Quran and al-Hadith. The study found that the situation of stroke patients from the point of view of movement limit, communication difficulties, cognitive impairment, emotional changes, and medical management, requires a caregiver who can understand the needs of the patient. This study also found that the Qur'an and al-Hadith emphasize the need to help people suffering from a stroke in the form of order to help people who need help. The findings of this study provide information on issues related to stroke patients. This information can help stroke patient caregivers, especially family members in adjusting patient-centered care and providing better management.

**Keywords:** Stroke, The Issue of Stroke Patient Care, Islam

## **Introduction**

Malaysia is growing rapidly economically and is also facing the problem of an aging population. In Malaysia, people aged 60 and over are considered elderly based on the National Elderly Policy (Dasar Warga Tua Kebangsaan). While in Western countries, people who reach the age of 65 and above are considered senior citizens. With a significant increase in the number of senior citizens, special issues related to care must be considered. Among the ailments faced by the elderly that need attention is the ahmar wind disease.

Stroke is a common health issue affecting millions of people worldwide. According to the World Health Organization, stroke is the second leading cause of death globally, responsible for approximately 11% of all deaths. In 2016, there were an estimated 17 million stroke cases worldwide, with over six million resulting in death. In Malaysia, angina affects approximately 7.6% of the population, with a higher prevalence among older individuals.

The number of patients and deaths due to stroke in the community has increased from time to time. The Malaysian Ministry of Health (KKM) revealed that stroke is the third leading cause of death in Malaysia. A total of 50,000 cases of stroke patients are estimated to increase yearly. Even though the country has achieved progress in terms of technology and the sophistication of medical devices, the issue of care for stroke patients is still hotly discussed.

Therefore, this article tries to discuss the issue of the care of the stroke patient and to analyze the Islamic perspective on the care of the stroke patient.

## **2. Background of the Study**

Every patient is entitled to care and treatment. Hospice is one of the forms of care for chronic patients including stroke patients. The World Health Organization (WHO) recommends hospice care as soon as a patient is diagnosed with a chronic disease. (WHO, 1998a). The Malaysian government through the Ministry of Health Malaysia also treats hospice care as a special treatment for chronic patients. (<https://htwu.moh.gov.my/v3/modules/informasi/item.php?itemid=43>).

The statistics of stroke patients are expected to increase annually. Every day, 50,000 new cases worldwide, equaling 15 million cases annually. In Malaysia, stroke is the third highest cause of death, after heart disease and cancer (Institute for Health Metrics and Evaluation, 2019). WHO (World Health Organization) in 2018 ranked Malaysia 107th in the world for the highest number of deaths due to stroke with 13,799 deaths.

Even though there is serious attention, the success of the implementation of hospice care for stroke patients under treatment in Malaysia is still a question mark. Because there is no empirical evidence to explain its position. Therefore, the issue of hospice care for stroke patients arises, namely whether existing hospice care can improve the level of efficiency and awareness of stroke patients' care in improving the hospice care of stroke patients. This issue arises because there are results of studies that show the implementation of various treatment activities fails to fulfill the wishes of the patients hostically (Khan et al., 2020; Musa & Che Zarrina, 2019; Bernat & McQuillen, 2017). Related failures have sparked concerns about the achievement of the hospice care goal (Mohammad Khan et al., 2020).

The next issue that is also a universal problem is the dropout of caregivers within the families of chronic respiratory disease patients rather than caregivers. Mainstream newspaper reports indicate a lack of interest from family members in the care of the patients, leaving them to be cared for in hospitals and nursing homes. Although chronic stroke patients expect to end their lives under family care (Mohammad Khan et al., 2020). Chronic stroke patients have to accept the fact of being constantly hospitalized or nursing home (Najmi,

2020). Likewise, there are complaints of many stroke patients who are left in nursing homes and not visited by family members for a long time (Nurul, 2022; [https://youtu.be/Kzzhx\\_E9pO8](https://youtu.be/Kzzhx_E9pO8)).

This indicates the need for the treatment of stroke patients needs to involve family members (Breitbart, 2006). Mendieta & Buckingham (2017) state that caregivers need to understand patients from cultural, religious, physical, emotional, and spiritual perspectives. Khalid (2019); Knecht-Sabres et al (2019); Lindley et al (2020); Hudson et al (2021) stated that there are too few studies that discuss hospice care from a spiritual perspective. The study findings of Musa & Che Zarrina (2019) support the results of this study. From the research conducted, it was found that the Islamic psychotherapy approach (elements of the tawhid paradigm) can help patients reduce the stress experienced by breast cancer patients. This phenomenon continues to shackle the care for stroke patients despite various efforts and programs run by various agencies (Najmi, 2020).

The findings of past studies have focused on the study of the neglect factors of elderly patients (Husin, 2018), improving the quality of life of chronic patients (Hudson et al., 2021), ending the good life Khalid (2019); Alias et al (2019), the role of therapy in hospice care Knecht-Sabres et al (2019), an Islamic psychotherapeutic approach in managing chronic patient distress (Musa & Saâ~ari, 2019). Although there are many scientific studies conducted on stroke patients in Malaysia, there are still gaps in previous studies that need to be filled through this study. This is because many past studies are in the form of descriptive studies or review studies that focus on the care of stroke patients (Husin, 2018; Hudson et al., 2021; Knecht-Sabres et al., 2019; Musa & Saâ~ari, 2019).

Taking care of a stroke patient is crucial as it not only affects their physical health but also their mental well-being. Chronic stroke patients require long-term care as they may suffer from physical and cognitive impairments. Children may not want to take care of a family member affected by stroke due to the time, effort, and financial constraints involved.

Therefore, this study is conducted to open a new dimension for studying the issue of hospice care for stroke patients.

### 3. Issues Faced in Hospice Care of Stroke Patients

After suffering from a stroke, patients often face a range of psychological challenges. Stroke patients may face psychological challenges such as depression and anxiety due to their condition (Perna & Harik, 2020). These challenges can vary depending on the severity of the stroke, the area of the brain affected, and the individual patient's personality and coping skills. Here are some common psychological situations faced by stroke patients:

- a. **Depression:** Depression is a common psychological condition that affects stroke patients. It is often linked to the sudden change in lifestyle and abilities, as well as the physical changes caused by the stroke.
- b. **Anxiety:** Anxiety is also a common psychological challenge for stroke patients. The fear of having another stroke, worries about recovery, and feelings of uncertainty can all contribute to anxiety.
- c. **Post-Traumatic Stress Disorder (PTSD):** For some stroke patients, the experience of the stroke can be traumatic, leading to symptoms of PTSD. These can include flashbacks, nightmares, and avoidance behaviors.
- d. **Emotional Instability:** Emotional instability is another psychological challenge faced by some stroke patients. This can include sudden outbursts of crying or laughing, or difficulty controlling emotions.

- e. **Loss of Self-Esteem:** A stroke can cause significant changes in a patient's abilities and appearance, leading to a loss of self-esteem and feelings of worthlessness.
- f. **Cognitive Impairment:** Depending on the area of the brain affected by the stroke, patients may experience cognitive impairment, such as memory loss, difficulty with language, and difficulty with decision-making.

It's important to note that stroke patients may experience a combination of these psychological challenges, and the severity and duration of these challenges can vary from person to person. Treatment and support from healthcare professionals, family, and friends can help patients cope with these challenges and improve their overall well-being.

A healthy diet is essential for stroke patients to promote their recovery, and they may require therapy to regain their physical abilities (Lieber et al., 2018). Caretakers must remain patient and understanding, as stroke patients may take a long time to recover fully.

The length of time required to care for a stroke patient may lead to conflicts between caretakers and family members, as they may have differing opinions on the best course of action. Caretakers may also face challenges balancing the needs of the patient with their own personal and professional responsibilities.

Managing stroke patients can present a number of challenges for caregivers, as stroke can cause a range of physical and cognitive impairments that require ongoing care and support. Some of the common issues that caregivers may have to manage when caring for stroke patients include:

- a. **Physical limitations:** Stroke patients may experience weakness, paralysis, or loss of coordination, which can make it difficult for them to perform everyday tasks like bathing, dressing, and eating. Caregivers may need to assist with these tasks, as well as provide physical therapy to help the patient regain strength and mobility.
- b. **Communication difficulties:** Stroke can also affect a patient's ability to speak, understand language, or communicate effectively. Caregivers may need to use alternative methods of communication, such as gestures, pictures, or electronic devices, to help the patient express their needs and desires.
- c. **Cognitive impairments:** Stroke can cause cognitive impairments such as memory loss, confusion, or difficulty with problem-solving. Caregivers may need to provide cues, reminders, or prompts to help the patient remember important information or complete tasks.
- d. **Emotional changes:** Stroke can also cause emotional changes such as depression, anxiety, or irritability. Caregivers may need to provide emotional support to help the patient cope with these changes and maintain a positive outlook.
- e. **Medical management:** Stroke patients may require ongoing medical management, including medication management, monitoring of vital signs, and management of any other medical conditions they may have. Caregivers may need to work closely with medical professionals to ensure that the patient's medical needs are being met.

Overall, caring for a stroke patient requires a great deal of patience, empathy, and flexibility on the part of the caregiver. It is important for caregivers to communicate openly with the patient, seek support when needed, and take care of their own physical and emotional well-being as well.

#### 4. The Need to Take Care of Stroke Patients According to the Islamic Perspective

A family situation in which there is time to manage a stroke patient typically involves a supportive and involved family who are willing to work together to provide care for their loved

one. Stroke patients often require a significant amount of assistance with activities of daily living such as bathing, dressing, and eating, as well as physical therapy and medical care.

In such a family, there may be one or more family members who can take on the role of primary caregiver, responsible for coordinating the patient's care, administering medications, and providing emotional support. Other family members may take on secondary caregiver roles, assisting with tasks as needed.

To make sure that the patient receives the best care possible, family members in this situation may need to be flexible with their schedules and make adjustments to their routines to accommodate the patient's needs. They may also need to communicate regularly with medical professionals and other caregivers to ensure that everyone is on the same page regarding the patient's care.

Ultimately, a family situation that has time to manage a stroke patient requires a strong commitment to the patient's well-being and a willingness to work together as a team to meet their needs.

According to Islamic teachings, taking care of the sick is a highly regarded act. The Quran emphasizes the importance of caring for others, stating, "Whoever saves one life, it is as if he has saved all of humanity." (5:32). The Prophet Muhammad (PBUH) also encouraged caring for the sick, stating, "The best among you are those who are best to their families, and I am the best to my family." Thus, caring for a stroke patient is considered a noble act in Islam.

#### 4.1 How to Care for Stroke Patients According to the Quran

The Quran emphasizes the importance of caring for those who are ill or in need of help. It teaches that caring for others is a way to show compassion and kindness and that helping those in need is a way to earn the pleasure of Allah.

This is in line with the words of Allah SWT:

"Help ye one another in righteousness and piety but help ye not one another in sin and rancor: fear Allah. for Allah is strict in punishment." (Surah al-Maidah: 2)

The above verse instructs humans to help each other in doing good. Helping stroke patients in the form of treatment and taking care of their needs is included in helping in virtue and brings reward for those who do it.

In addition, the Qur'an through surah al-Kahf verse 95 also urges Muslims to do good:

"He (Zulkarnain) said: "(The power) in which my Lord has established me is better (than tribute): Help me therefore with strength (and labor): I will erect a strong barrier between you and them."

The above verse shows the situation of Zulkarnain who tries to help other human beings who need help. The Qur'an urges people to do good, including stroke patients who need the help of others. This is because the condition of the patient requires the help of family members and others to facilitate their needs.

In caring for a stroke patient, it is important to approach the task with compassion and patience, recognizing that the patient may be experiencing physical and emotional challenges. The Quran teaches that caring for the sick is a noble act and that those who do so with sincerity will be rewarded.

In addition, the Quran emphasizes the importance of seeking knowledge and understanding, which can help care for a stroke patient. This may involve learning about the patient's medical condition and how to provide proper care, as well as seeking guidance from medical professionals and other caregivers.

Ultimately, caring for a stroke patient according to the Quran involves approaching the task with kindness, compassion, and a desire to serve Allah by helping those in need.

The Quran emphasizes the importance of being patient when caring for the sick. The caretaker should be compassionate and understanding towards the patient's needs. The Quran also advises feeding the hungry and providing water to the thirsty, which is applicable when caring for a stroke patient.

#### 4.2 How to Care for Stroke Patients According to Al-Sunnah

In Islam, the sunnah refers to the teachings and examples set by Prophet Muhammad (peace be upon him), which guide how to live a righteous and compassionate life.

According to the sunnah, caring for the sick is a virtuous act, and Prophet Muhammad (peace be upon him) encouraged his followers to provide care and support for those who are ill. In caring for a stroke patient, some general principles that can be drawn from the sunnah include:

- a. Showing compassion and empathy: Prophet Muhammad (peace be upon him) was known for his kindness and compassion towards those who were ill or in need of help. When caring for a stroke patient, it is important to approach the task with empathy and understanding, recognizing the physical and emotional challenges the patient may be facing.
- b. Providing physical assistance: Prophet Muhammad (peace be upon him) encouraged his followers to provide physical assistance to those in need, including helping them with everyday tasks. When caring for a stroke patient, this may involve assisting with bathing, dressing, and other activities of daily living.
- c. Offering emotional support: In addition to physical assistance, the sunnah emphasizes the importance of offering emotional support to those who are ill. This may involve listening to the patient's concerns, providing words of encouragement and comfort, and being present to offer companionship and care.
- d. Seeking knowledge and guidance: The sunnah emphasizes the importance of seeking knowledge and understanding in all areas of life, including healthcare. When caring for a stroke patient, it may be helpful to seek guidance from medical professionals and other caregivers and to learn about the patient's medical condition and how to provide proper care.

Overall, caring for a stroke patient according to the sunnah involves approaching the task with kindness, compassion, and a desire to serve others following the teachings and example set by Prophet Muhammad (peace be upon him).

The Prophet Muhammad (PBUH) recommended that the caretaker should visit the patient regularly, provide emotional support, and assist with their daily activities. The Prophet (PBUH) also advised using natural remedies such as honey and black seed oil to aid in the patient's recovery. Even the Prophet Muhammad (PBUH) took it upon himself to help people who needed help.

That's why the Qur'an and the Sunnah of the Prophet command us to do good by taking care of and helping people suffering from stroke patients. Stroke patients' conditions need to receive right support from family members and community members.

#### **Conclusion**

In conclusion, caring for stroke patients is essential, not only from a medical perspective but also from a moral and religious standpoint. The Quran and Al Sunnah guide how to care for

the sick, emphasizing compassion, patience, and understanding. Caretakers must be prepared to face the challenges of caring for stroke patients, including psychological issues, diet, and therapy, and remain patient and understanding throughout the process.

Attention needs to be paid by all parties to address the issue of stroke patient care. The understanding of caregivers and nurses of stroke patients is expected to be able to provide information on the issue of dropping out of the care of stroke patients. Therefore, stroke patients hope that their immediate family members can provide attention and affection during their care. Islam encourages and promises rewards for those who care for and treat stroke patients. The government also needs to pay attention to the care of stroke patients. This is in line with Islamic teachings, which recommend helping fellow humans, especially family members, to ensure that patients receive services during treatment and therapy.

Step into a realm where strokes cease to be mere medical challenges and instead become portals to delve deeply into the complexities of the human psyche. This research intricately examines the psychological struggles that stroke patients grapple with, unveiling the enigmatic layers of depression, anxiety, and resilience after trauma. In this portrait, the mind's enduring strength unfolds amidst the context of medical care.

Surpassing the physical aspects of caregiving, this study goes beyond borders, interweaving threads of cultural comprehension and spiritual discernment. Through the prism of Islamic teachings, it casts a spotlight on the sanctity of tending to stroke patients, shedding illumination on an honorable undertaking that resonates through realms of faith, empathy, and perpetual healing. This composition resonates as a symphony not limited to medical procedures, but as an amalgamation of compassion and affection, enhancing the lives of both caregivers and patients alike.

This research invites us to look beyond the physical realm of caregiving and venture into the intricate landscapes of the human psyche. It reveals the psychological battles of depression, anxiety, and resilience that stroke patients face, highlighting the indomitable strength of the human spirit. Through the lens of Islamic teachings, the act of caregiving is illuminated as a sanctified duty, enriching both the caregiver and the patient in a harmonious symphony of faith and empathy.

In this journey, let us recognize that caring for stroke patients is not just a clinical task but a profound expression of our shared humanity. It is an honorable mission that weaves together cultural insights and spiritual wisdom, transforming medical care into an act of perpetual healing and compassion. By committing ourselves to this noble cause, we enhance the lives of those we care for and, in turn, enrich our own lives with purpose and grace.

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### **References**

- Alias, F., Kassim, P. N. J., & Hussain, M. M. (2019). Managing End-Of-Life Care in Malaysia: The Economic Considerations from The Ethical and Islamic Perspectives. *Al-Shajarah: Journal of the International Institute of Islamic Thought and Civilization (ISTAC)*, 24(1), 131-157.
- Al-Munziri, Abdul Adhim bin Abdul Qowiy. (n,d). *Al-Targhib wa al-Tarhib*, 4/203. Arab Saudi: Baitul Afkar Ad-Dauliyah.
- American Heart Association Stroke Council. (2016). Guidelines for Adult Stroke Rehabilitation and Recovery. *Stroke*47(6): e98–e169.

- Bernat, J. L., & McQuillen, M. P. (2017). Physician-Assisted Death in Chronic Neurologic Diseases. *Neurology*, 88(16), 1488-1489.
- Breitbart, W. (2006). The goals of palliative care: Beyond symptom control. *Palliative & Supportive Care*, 4(1), 1-2.
- Fitriansyah, N., & Tsurayya, R. V. (2020). Tauhidic Paradigm Sebagai Basis Dalam Mewujudkan Umat Beragama Yang Toleran Dan Moderat. *Al-Mada: Jurnal Agama, Sosial, Dan Budaya*, 3(1), 50-63.
- Guerrero, J. G. (2019). Nurses' Care Approach (NCAp): Connecting Differences to Islamic Believer Patients in the Arab World. *Open Journal of Nursing*, 9(3), 221-230.  
<https://www.bharian.com.my/rencana/komentar/2020/11/759896/isu-penuaan-penduduk-wajar-diberi-perhatian>). Diakses pada 5 Januari 2022.
- Hudson, P., Collins, A., Boughey, M., & Philip, J. (2021). Reframing Palliative Care to Improve the Quality of Life of People Diagnosed with A Serious Illness. *The Medical Journal of Australia*, 215(10), 443-446.
- Husin, S. Z., & Alavi, K. (2018). Kerja Sosial Di Hospital: Meneroka Pengabaian Dalam Kalangan Pesakit Warga Emas (Social Work in Hospital: Exploring Negligence among Elderly Patients). *e-Bangi*, 13(5).
- Karim, A. K. A., & Suhaini, N. (2020). Kepentingan teori dan ilmu sosiologi dalam konteks pendidikan menurut perspektif Ibnu Khaldun. *Jurnal Tuah*, 1(1).
- Khalid, D. S. (2019). End of Life Care: The Islamic Perspective. *International Journal for Human Caring*, 23(3), 254-259.
- Khalid, H. M., Hasan, A., Sulaiman, A., Ahmad, S., & Jalal, H. A. (2021). Tawhidic Paradigm Index as a Measuring Tool of Tawhidic Practice: A Research in Universiti Tun Hussein Onn Malaysia. *Advances in Humanities and Contemporary Studies*, 2(2), 168-177.
- Knecht-Sabres, L. J., Weppner, A., Powers, C., & Siesel, B. (2019). Do Healthcare Professionals Really Understand the Role of Occupational Therapy in Hospice Care? *American Journal of Hospice and Palliative Medicine*, 36(5), 379-386.
- Kurniawati, H., Retnowati, S., Riyono, B., & Widyawati, W. (2018). Literature Review of Spiritual Care in Islamic Cultural Perspective. *IBDA: Jurnal Kajian Islam Dan Budaya*, 16(2), 350-368.
- Lindley, L. C., Keim-Malpass, J., Svyarenko, R., Cozad, M. J., Mack, J. W., & Hinds, P. S. (2020). Pediatric Concurrent Hospice Care: A Scoping Review and Directions for Future Nursing Research. *Journal of Hospice and Palliative Nursing: JHPN: the official journal of the Hospice and Palliative Nurses Association*, 22(3), 238.
- Maskulian. (2021). 10-simptom-ini-mungkin-petanda-anda-sebenarnya-hidap-penyakit-kronik. <https://www.astroawani.com/gaya-hidup/10-simptom-ini-mungkin-petanda-anda-sebenarnya-hidap-penyakit-kronik-330623>. Accessed on 19 January 2022.
- Mendieta, M., & Buckingham, R. W. (2017). A Review of Palliative and Hospice Care in the Context of Islam: Dying with Faith and Family. *Journal of Palliative Medicine*, 20(11), 1284-1290.
- Khan, M. A. N., Johnson, J., & Forgrave, D. (2020). Hospice Care and the Islamic Faith: A Narrative Review. *Middle East Journal of Nursing*, 14(1).
- Murray, T. J., Pipino, L. L., & Gigch, J. P. (1985). A Pilot Study of Fuzzy Set Modification of Delphi. *Human Systems Management*: 6 – 80.
- Musa, N., & Saâ~ari, C. Z. (2019). Pendekatan Psikoterapi Islam Dalam Menguruskan Tekanan Pesakit Kronik. *Jurnal Usuluddin*, 47(1), 1-34.



- Najmi, S. M. (2020). Kenali 5 jenis penyakit membunuh rakyat Malaysia dan bagaimana kita boleh hindari. <https://www.astroawani.com/gaya-hidup/kenali-5-jenis-penyakit-membunuh-rakyat-malaysia-dan-bagaimana-kita-boleh-hindari-237204>. Telah diakses pada 4 Februari 2022.
- Mahmud, N. H. (2022) <https://www.hmetro.com.my/WM/2021/03/688083/> peluang-berbakti-jaga-ibu-uzur. Accessed on 6 February 2023.
- Richey, R. C., & Klien, J. D. (2014). *Design and Development Research*. In Spector, J.M.; Merrill, M.D., Jan Elen & Bishop, M.J. (Eds.) *Handbook of Research on Educational Communications and Technology* (4th Edn.) (pg.141-150). New York: Springer.
- Marican, S. (2005). *Kaedah Penyelidikan Sains Sosial*. Petaling Jaya, Selangor: Pearson Prentice Hall.
- Setiani, S., Rimba, I. R., & Dwinta, E. (2021). Analisis Perbandingan Biaya Perawatan (Cost of illness Stroke Iskemik dan Stroke Hemoragik Pasien Rawat Inap di SUD Panembahan Senopati). *Pharmaceutical Journal of Indonesia*, 7(1), 29-36.
- Tobroni, H. (2018). *Memperbincangkan Pemikiran Pendidikan Islam: Dari Idealisme Substantif Hingga Konsep Aktual*. Kencana.
- Perna, R., & Harik, L. (2020). The role of rehabilitation psychology in stroke care described through case examples. *NeuroRehabilitation*, 46(2), 195-204.
- Lieber, A. C., Hong, E., Putrino, D., Nistal, D. A., Pan, J. S., & Kellner, C. P. (2018). Nutrition, energy expenditure, dysphagia, and self-efficacy in stroke rehabilitation: a review of the literature. *Brain Sciences*, 8(12), 218.