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Knowledge and Attitude among Students towards Post-Stroke with Hemianopia

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Abstract
A stroke occurs when blood flow to the brain is disrupted, or a vessel ruptures. Occipital strokes can cause visual field deficits like homonymous hemianopia. This study assessed the awareness and perceptions of 204 MSU students regarding stroke and hemianopia. Using a modified Thapa et al. (2016) questionnaire, results showed 96.1% awareness of stroke, with 30.4% having a personal connection. While 83.3% correctly identified the brain as affected, misconceptions remained. A weak positive correlation ($r = 0.26$, $p < 0.001$) between knowledge and attitudes suggests persistent misunderstandings, likely due to complex medical terminology.

Keywords: Knowledge; Attitude; Stroke; Hemianopia

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1.0 Introduction

A stroke occurs when the brain's blood supply is interrupted due to a blockage or rupture of a blood vessel, leading to oxygen deprivation and subsequent neuronal damage (National Heart, Lung, and Blood Institute, 2022). This condition is a medical emergency that can cause lasting disabilities or even be fatal. In Malaysia, stroke is among the leading causes of death, with a growing number of cases affecting individuals under the age of 65. Reports indicate a 53.3% increase in stroke cases among men and 50.4% among women in the 35-39 age group (Tan & Venketasubramanian, 2022). Additionally, more than 75% of stroke survivors suffer from some form of disability, including visual impairments such as homonymous hemianopia, which affects approximately 16% of cases (Luu, Lee, Daly & Chen, 2010). These vision-related deficits significantly impact daily activities, including reading, mobility, and driving, ultimately diminishing the quality of life for stroke survivors. Despite the growing prevalence of stroke, awareness about its vision-related complications remains limited, particularly among university students, including those in health sciences. Many stroke education initiatives primarily focus on prevention, risk factors, and motor rehabilitation, with little emphasis on post-stroke visual impairments. Consequently, misconceptions about the impact of stroke on vision persist, even among future healthcare professionals. Since university students, particularly those in health-related fields, are potential frontline responders in stroke management, equipping them with comprehensive knowledge of post-stroke visual deficits is essential. This study seeks to evaluate students' understanding of post-stroke hemianopia and underscore the importance of incorporating visual impairment education into existing stroke awareness programs. By

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improving education in this area, future healthcare professionals can provide better support and rehabilitation strategies for stroke survivors.

2.0 Literature Review

Hemianopia is a visual impairment caused by disruptions in the central nervous system's visual pathways. Visual stimuli are received by retinal cells and transmitted via the optic nerves to the optic chiasm, where retinal fibers divide into nasal and temporal fibers. The nasal fibers cross at the optic chiasm, enabling contralateral visual information processing (Goodwin, 2014). Homonymous hemianopia (HH) with an afferent pupillary defect indicates an optic tract lesion, while HH with macular sparing suggests primary visual cortex damage due to dual blood supply from the middle and posterior cerebral arteries (Goodwin, 2014). HH affecting daily functions like reading and navigation (Goodwin, 2014). It significantly reduces quality of life and increases fall risk (Rowe et al., 2019). Despite its impact, awareness among the public and students remains limited (Papageorgiou et al., 2020; Bowers et al., 2022). Limited knowledge may hinder early recognition and rehabilitation support. This study explores MSU students' knowledge and attitudes toward post-stroke patients with HH, addressing a gap in local research and contributing to improved awareness and education in the healthcare field.

3.0 Methodology

3.1 Study Design

The study was conducted by the protocol approved by the Ethics Committee of the Management and Science University (MSU-RMC-02/FR01/01/L2/002). A cross-sectional study was initiated from March to April 2023, utilizing a convenience sample of Malaysian residents. A sample size of 200 respondents was calculated using G Power software, which supports sample size and power calculations for various statistical methods (F, t, χ^2, z, and exact tests). The questionnaire was piloted with 10 respondents to test its reliability, and the data obtained from the pilot study were not included in the final analysis. The study employed a remote data collection (RDC) method, using Google Forms to gather data. The remote survey allowed only one response per person, and data encryption was employed to protect personal data confidentiality. The respondents of this study consisted of undergraduate students currently enrolled at Management and Science University (MSU), particularly from health sciences and related academic programs. These students were selected to assess their knowledge and attitudes toward post-stroke patients with hemianopia. The inclusion criteria required participants to be 18 years and above, currently pursuing diploma or degree programs at MSU, able to comprehend English, and willing to voluntarily provide informed consent. Students were excluded if they were postgraduate students, undergoing clinical training or internship off-campus during data collection, had incomplete questionnaire responses, or had previously participated in similar studies to avoid response bias.

3.2 Variables and Instruments of Study

The questionnaire included demographic information on the students, including the last 4 digits of IC, age, gender, race, familiarity with stroke, knowledge of stroke patients, and attitude toward stroke patients. The scoring system utilized in this study is based on the instruments from a previous study by Yusof, Chia, and Yasmin (2014). The total knowledge level is calculated by dividing the respondent's total knowledge score by the maximum possible knowledge score and then multiplying it by 100%. Knowledge levels are classified as follows: 0-50% indicates a poor level of knowledge, 51-70% indicates an intermediate level of knowledge, and 71-100% indicates a good level of knowledge. This method is also employed to determine the level of attitude.

3.3 Study Analysis

Descriptive statistics were employed to characterize the sociodemographic attributes, knowledge, and attitude levels of MSU students. Pearson's correlation coefficient was utilized to examine the relationship between the knowledge and attitudes of MSU students toward post-stroke patients with hemianopia. Statistical analyses were conducted using the Statistical Package for the Social Sciences (SPSS) software version 26.0, with a p-value of <0.05 considered statistically significant.

4.0 Findings

4.1 Demography of Respondents

Table 1 shows the demographic characteristics of participants of the study sample (n=204). They are adults aged between 18 and 30 years old, and the mean age of the participants was 22 years old. Most of the respondents are Malay (63.2%), followed by Indian (19.1%), Chinese (10.3%), and the least other races (7.4%). In terms of familiarity with stroke, 39.7% of the respondents personally know someone with a stroke, 30.4% of respondents are taking a health science course, 23.5% of respondents have a family history of stroke, and only 10% of them have a history of stroke in the neighbours.

Table 1 presents the demographic characteristics of the study participants (n=204). The participants are adults aged between 18 and 30 years, with a mean age of 22 years.

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Table 1: Demographic characteristics

Variable	Frequency x (%)
Gender	
Male	67 (32.80%)
Female	137 (67.20%)
Age	
≤ 22-year-old	126 (61.8%)
> 22-year-old	78 (38.2%)
Ethnicity	
Malay	129 (63.20%)
Chinese	21 (10.30%)
Indian	39 (19.10%)
Others	15 (7.40%)
Familiar with stroke	
Stroke - Family history	48 (23.50%)
Neighbor- History of Stroke	13 (6.40%)
Friends- History of Stroke	81 (39.70%)
Taking health science course	62 (30.40%)

4.1 The Selected Knowledge and Attitude Questions

Table 2 presents the responses of 204 students about knowledge and attitudes toward post-stroke patients having hemianopia. Throughout the data collection, 196 (96.1%) students hear or read about stroke. The majority (83.3%) of them know that stroke falls under a brain disease, and 76.0% of students believe it is a disease of the elderly. The misconception of stroke is also tested through the questionnaire: those who believe stroke is a contagious disease (74.5%), stroke can be inherited (54.4%), and stroke is due to an ancestor's fault (85.8%). The majority of the students (94.6%) knew that the stroke could be treated and prevented (96.1%). Only 47.5% of students understand that vision loss caused by stroke can be homonymous hemianopia, homonymous quadrantanopia, and total vision loss of one eye, except for constricted peripheral vision. In addition, most of the students show a good attitude that they believe family care is crucial (93.6%) and stroke patients still can lead a happy life (80.4%). About 190 (93.1%) students would take the patient to the emergency department in the hospital. High blood pressure (90.2%) and sudden onset of weakness of arm/leg (76.0%) are considered the most common risk factors and symptoms of stroke.

Table 2: Responses of 204 MSU students to the questionnaire.

Questions	Agree responses, n (%)
Knowledge about the stroke	
Have you ever heard/read about stroke?	196 (96.10%)
Do you believe stroke is an old person's disease?	
Do you understand that stroke is a condition affecting the brain?	155 (76.0%)
Do you believe stroke is a contagious disease?	170 (83.30%)
Do you think stroke is hereditary?	152 (74.50%)
Do you believe strokes are caused by the sins of ancestors?	111 (54.40%)
Do you think strokes can be prevented?	175 (85.80%)
Do you think it can be treated?	193 (94.60%)
Do you believe post-stroke patients with vision loss can regain their vision?	196 (96.10%)
	139 (68.1%)
Type of vision loss can happen to stroke patient	
Homonymous hemianopia	35 (17.20%)
Homonymous quadrantanopia	32 (15.70%)
Total vision loss	39 (19.10%)
Constricted visual field	97 (47.50%)
Attitude toward stroke	
Do you believe individuals who have a stroke cannot lead a happy life?	164 (80.40%)
Do you think family care is crucial for the early recovery of stroke patients after discharge?	
	191 (93.60%)
Stroke first aid practice	
What would you do if you witnessed someone having a stroke?	
Take them to the hospital	
Sprinkle water on their face	190 (93.10%)
Wait for spontaneous recovery	193 (96.60%)
	193 (96.60%)
Which of the following are warning signs of stroke?	
Sudden onset of double vision	81 (39.7%)
Sudden onset of loss of vision	106 (52.0%)
Sudden onset of headache	108 (52.9%)

Sudden onset of weakness or numbness of arm or leg	155 (76.0%)
Sudden onset of fainting	105 (51.5%)
Sudden onset of dizziness	102 (50.0%)
Which of the following are risk factors for stroke?	
High blood pressure	184 (90.2%)
Smoking	113 (55.4%)
Diabetes	117 (57.4%)
Alcohol	106 (52.0%)
Over-weight	137 (67.2%)

4.2 Number of Risk Factors and Alarming Signs of Stroke Identified

All participants have the knowledge to recognize at least one factor of the stroke. Only 37 (18.1%) students selected one risk, while about 65.2% identified more than two risk factors. Similarly, the students also can justify the warning symptoms of a stroke. Only 21.2% of them chose one symptom, whereas 61.4% of them identified more than two warning symptoms of stroke. The number of factors and alarming signs of stroke recognized by MSU students is tabulated in Table 3.

Table 3: Number of risks and alarming signs of stroke.

Categories	n (%)
Number of risks	
Five	61 (29.9%)
Four	29 (14.2%)
Three	43 (21.1%)
Two	34 (16.7%)
One	37 (18.1%)
Several alarming signs.	
Six	35 (17.2%)
Five	16 (7.9%)
Four	29 (14.2%)
Three	45 (22.1%)
Two	36 (17.6%)
One	43 (21.2%)

4.3 Level of Knowledge and Attitude Toward Post-Stroke Patients with Hemianopia

The results in Table 4 indicate that out of 204 participants, 3 (1.5%) were confident in their knowledge of stroke, 52 (25.5%) had an intermediate knowledge level, and more than half (73.0%) demonstrated a good knowledge level about stroke.

Table 4: Scores of knowledges

Score of knowledge level	n (%)
Poor knowledge	3 (1.5%)
Intermediate knowledge	52 (25.5%)
Good knowledge	149 (73.0%)

Table 5 presented the scores of attitudes of MSU students toward stroke. It showed that only 12 (5.9%) students have limited attitudes, 42 (20.6%) students have moderate attitudes, and 73.5% of students are considered to have good attitudes toward stroke patients.

Table 5: Scores of attitudes

Score of attitude level	n (%)
Poor attitude	12 (5.9%)
Intermediate attitude	42 (20.6%)
Good attitude	150 (73.5%)

4.4 Relationship Between Knowledge and Attitude Level of Stroke

The relationship between the knowledge and the attitude toward poststroke patients with hemianopia problems among MSU students is evaluated using Pearson's correlation method. According to Table 6, good perceived knowledge was significantly associated with good attitude (r=0.253) in stroke patients. There is a positive but weak correlation between the knowledge and attitude regarding stroke among MSU students.

Table 6: Pearson's correlation between the knowledge and the attitude scores

Correlations		Knowledge score	Attitude score
Knowledge score	Pearson Corr.	1	0.253**
	Sig. [2-tailed]		.000

	N	204	204
Attitude score	Pearson Corr.	0.253**	1
	Sig. [2-tailed]	.000	
	N	204	204

**. Correlation is significant at the 0.01 level (2-tailed).

5.0 Discussion

This study explores stroke awareness, including risk factors, warning signs, and its impact on students at Management and Science University (MSU). Participants, all of whom have a tertiary education, were randomly selected for the survey. Findings indicate that most MSU students possess a strong understanding of stroke, with 96.1% reporting prior knowledge from reading or hearing about it. This awareness may be attributed to varied backgrounds, including a family history of stroke (23.5%), personal connections to stroke survivors (39.7%), and enrolment in health science courses (30.4%).

Regarding overall stroke knowledge, 98.5% of respondents demonstrated intermediate to high proficiency, an improvement compared to previous studies. This difference is likely due to participants' higher education levels, which correlate with better stroke literacy (Abutaima et al., 2021). When evaluating risk factor awareness, 100% of students identified at least one risk factor, aligning with findings from Jordan, where 98.1% of participants exhibited similar recognition (Barakat et al., 2021). The American Heart Association identifies risk factors such as hypertension, hyperglycemia, obesity, renal dysfunction, and hyperlipidemia, along with behavioral risks including sedentary lifestyles, smoking, and unhealthy diets. In this study, the most frequently recognized risk factors were high blood pressure, obesity, diabetes, smoking, and alcohol consumption. High blood pressure emerged as the most common risk factor, consistent with studies in Jordan (92.1%) and Morocco (55.7%). However, diabetes was less frequently recognized, as observed in prior research (Kharbach et al., 2020).

All participants were able to identify at least one symptom of stroke, surpassing the 95.5% recognition rate reported in Jordanian studies. The most commonly identified symptom was sudden weakness or numbness in the limbs, aligning with previous research conducted in Nepal. In contrast, an Australian study found that sudden blurred or double vision and vision loss were the most frequently recognized symptoms. However, in this study, only 52% of students acknowledged stroke-related vision impairments.

Regarding stroke's impact on vision, 47.5% of students correctly identified that stroke does not cause a constricted peripheral visual field but can result in homonymous hemianopia, homonymous quadrantanopia, or total vision loss in one eye. While 52% of students recognized sudden vision loss as a possible stroke symptom, only 47.5% fully understood its implications. Interestingly, 68.1% believed that stroke patients experiencing vision loss could regain their sight, which, while theoretically possible, depends on intensive visual rehabilitation training (Stroke Foundation, 2023).

When responding to a stroke emergency, 93.1% of MSU students indicated they would take the affected person to a hospital, whereas a small number would opt for sprinkling water on the patient's face or waiting for spontaneous recovery. Previous studies reported similar findings, with most respondents favoring emergency medical intervention (Reeves, Hogan, & Rafferty, 2002).

Students with a strong understanding of stroke, its risk factors, and warning signs were more likely to respond appropriately in an emergency. Pearson's correlation analysis ($r=0.253$, $p<0.001$) revealed a significant but weak positive association between stroke knowledge and attitudes. Previous research also supports this relationship, indicating that greater knowledge enhances awareness and promotes swift medical intervention (Thapa et al., 2016).

This study has several limitations. The sample size, limited to 204 participants, may not fully represent a broader population, potentially introducing bias. Additionally, the questionnaire contained general stroke-related questions with unequal distribution across sections, which may affect the assessment of students' knowledge and attitudes. The online survey format also presents challenges related to data reliability and authenticity, as opposed to in-person assessments. Prior research by Siti Noorkhairina Sowtali et al. (2017) highlights stroke awareness deficiencies in Malaysia, despite its high mortality and disability rates. Factors such as education, age, and socioeconomic status significantly influence stroke knowledge.

Moreover, this study reinforces existing findings, demonstrating a weak but positive correlation between stroke knowledge and attitudes, highlighting persistent gaps between awareness and practical application. Another critical takeaway is the importance of early stroke detection and rehabilitation, particularly for addressing long-term complications such as visual field deficits, which are often overlooked in stroke awareness initiatives.

6.0 Conclusion & Recommendations

In conclusion, an online survey was used to shed light on MSU students' attitudes and understanding regarding stroke. According to the survey, students generally have decent attitudes and understanding about stroke, its risk factors, symptoms, and aftereffects. A few misunderstandings are still being spread in the interim. Therefore, carefully thought-out awareness campaigns on stroke, its symptoms, its effects, and visual loss are crucial to society. The frequency of stroke patients who lose their eyesight and the available treatments in Malaysia could be the subject of future studies.

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Paper Contribution to Related Field of Study

This study enhances understanding of optometry, rehabilitation, and public health by identifying gaps in university students' knowledge and attitudes toward post-stroke hemianopia. Findings highlight persistent misconceptions about stroke-related visual impairments, emphasizing the need for targeted education and awareness programs. The weak correlation between knowledge and attitudes suggests that improving health literacy can enhance support for stroke survivors. This research provides a foundation for integrating vision care into stroke rehabilitation strategies and informs curriculum development in health sciences education.

References

Barakat, M., AlSalamat, H. A., Jirjees, F., Al-Obaidi, H., El Hadidi, S., Mansour, S., & Hosseini, H. (2021). Factors Associated with Knowledge and Awareness of Stroke Among the Jordanian Population: A Cross-Sectional Study. F1000Research.

Goodwin, D. (2014). Homonymous hemianopia: challenges and solutions. Clinical Ophthalmology (Auckland, NZ), 8, 1919.

Kharbach, A., Obtel, M., Achbani, A., Bouchriti, Y., Hassouni, K., Lahlou, L., & Razine, R. (2020). Level of knowledge on stroke and associated factors: A cross-sectional study at primary health care centers in Morocco. Annals of Global Health, 86(1).

Luu, S., Lee, A. W., Daly, A., & Chen, C. S. (2010). Visual field defects after stroke: A practical guide for GPs. Australian Family Physician, 39(7), 499-503.

Pickens, J. (2005). Attitudes and perceptions. Organizational behavior in healthcare, 4(7), 43-76.

Reeves, M. J., Hogan, J. G., & Rafferty, A. P. (2002). Knowledge of stroke risk factors and warning signs among Michigan adults. Neurology, 59(10), 1547-1552.

Tadi, P., & Lui, F. (2022). Acute stroke. In StatPearls [Internet]. StatPearls Publishing.

Tan, K. S., & Venketasubramanian, N. (2022). Stroke Burden in Malaysia. Cerebrovascular Diseases Extra, 12(2), 58-62.

Thapa, L., Sharma, N., Poudel, R. S., Bhandari, T. R., Bhagat, R., Shrestha, A. & Caplan, L. R. (2016). Knowledge, attitude, and practice of stroke among high school students in Nepal. Journal of neurosciences in rural practice, 7(04), 504-509.

Soto-Cámara, R., González-Bernal, J. J., González-Santos, J., Aguilar-Parra, J. M., Trigueros, R., & López-Liria, R. (2020). Knowledge of signs and risk factors in stroke patients. Journal of Clinical Medicine, 9(8), 2557.

Sowtali, S. N., Yusoff, D. M., Harith, S., & Mohamed, M. (2017). Comparison of knowledge, attitude, and practice on stroke knowledge in Malaysia and other nations: a review of the literature. Int Med J, 24(2), 168-73.

Stroke Foundation. (2023). Vision loss after stroke.

Yusof, A., Chia, Y. C., & Hasni, Y. M. (2014). Awareness and prevalence of mammography screening and its predictors-a cross-sectional study in a primary care clinic in Malaysia. Asian Pacific Journal of Cancer Prevention, 15(19),8095-8099.

Zhang, Xiaojun, Kedar, S., Lynn, M.J., Newman, N.J. & Biousse, V. 2006. Homonymous hemianopia in stroke. *Journal of Neuro-Ophthalmology 26*(3): 180–183.