DOI:10.4274/tnd.2023.30633
Turk J Neurol 2023;29:52-59

Original Article / Özgün Araştırma

The Relationship Between Acute Stroke Management and the Knowledge of Evidence-based Care and Attitudes Toward Stroke Care Among Emergency Nurses and Emergency Medical Services Personnel in Ardabil City in 2021

2021'de Erdebil Şehrindeki Acil Hemşireleri ve Acil Sağlık Hizmetleri Personelinin Akut İnme Yönetimi ile Kanıta Dayalı Bakım Bilgisi ve İnme Bakımına Yönelik Tutumları Arasındaki İlişki

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Abstract

Objective: Stroke is a major cause of disability worldwide. Therefore, it is necessary to investigate the aspects of knowledge, attitudes, and management among emergency nurses to provide quality care for patients with acute stroke.

Materials and Methods: This correlational research was conducted on 285 hospital emergency department nurses and emergency medical services (EMS) personnel in Ardabil city in 2021. The data collection tools included demographic information questionnaires, warning signs, nurses' knowledge of evidence-based care, attitudes toward stroke care, and acute stroke management. The data were analyzed using the SPSS-26 software using descriptive statistics and the t-test, F-test, linear regression analysis, and the one-way analysis of variance test. The significance level was set at $P < 0.05$.

Results: The knowledge of evidence-based care and acute stroke management was more favorable in hospital emergency nurses than in EMS personnel ($P < 0.05$). The results of the multivariate regression model showed that knowledge of stroke warning signs and the attitude toward stroke care were stronger predictors in acute stroke management. Knowledge of evidence-based care, attitudes toward stroke care, age, work experience, and participation in stroke retraining courses were significantly correlated with the nurses' care management of patients with acute stroke.

Conclusion: Since acute stroke management can be predicted by the knowledge of evidence-based care, attitudes toward stroke care, age, and experience of working with patients with stroke, the evaluation of these characteristics in emergency nurses and EMS personnel who provide care to these patients can affect their management methods. Therefore, the aforementioned variables can be used to evaluate and empower nurses in acute stroke management and improve patient care programs.

Keywords: Stroke, attitude, acute stroke management, evidence-based care

Öz

Amaç: İnme dünya çapında önemli bir sakatlık nedenidir. Bu nedenle, akut inmeli hastalara kaliteli bakım sağlamak için acil hemşirelerinin bilgi, tutum ve yönetim yönlerinin araştırılması gerekmektedir.

Gereç ve Yöntem: Bu ilişkisel araştırma, 2021 yılında Erdebil şehrinde 285 acil servis hemşiresi ve acil sağlık hizmetleri (ASH) personeli üzerinde yapılmıştır. Veri toplama araçları arasında demografik bilgi anketleri, uyarı işaretleri, hemşirelerin kanıta dayalı bakım bilgileri, inme bakımına yönelik tutumlar ve akut inme yönetimi mevcuttu. Veriler SPSS-26 programı kullanılarak tanımlayıcı istatistikler ve t-testi, F-testi, lineer regresyon analizi ve tek yönlü varyans analizi testi kullanılarak analiz edilmiştir. Anlamlılık düzeyi $P < 0,05$ olarak belirlenmiştir.

Bulgular: Kanıta dayalı bakım ve akut inme yönetimi bilgisi, acil hemşirelerinde ASH personeline göre daha iyiydi ($P < 0,05$). Çok değişkenli regresyon modelinin sonuçları, inme uyarı işaretleri bilgisinin ve inme bakımına yönelik tutumun akut inme tedavisinde daha güçlü belirleyiciler olduğunu göstermiştir. Kanıta dayalı bakım bilgisi, inme bakımına yönelik tutumlar, yaş, iş deneyimi ve inme mesleki eğitim kurslarına katılım, hemşirelerin akut inmeli hastalara bakım yönetimi ile anlamlı şekilde ilişkiliydi.

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Received/Geliş Tarihi: 27.10.2022 **Accepted/Kabul Tarihi:** 30.01.2023

Sonuç: Akut inme yönetimi kanıta dayalı bakım bilgisi, inme bakımına yönelik tutumlar, yaş ve inmeli hastalarla çalışma deneyimi ile tahmin edilebileceğinden, bu hastalara bakım veren acil hemşirelerindeki ve ASH personelindeki bu özelliklerin değerlendirilmesi onların yönetim metodlarını etkileyebilir. Bu nedenle, yukarıda belirtilen değişkenler, akut inme yönetiminde hemşireleri değerlendirmek ve güçlendirmek ve hasta bakım programlarını iyileştirmek için kullanılabilir.
Anahtar Kelimeler: İnme, tutum, akut inme yönetimi, kanıta dayalı bakım

Introduction

Stroke is a major cause of disability all over the world, including Iran (1). The World Health Organization reported that the incidence of stroke is about 130 per 100,000 people (2). In Iran, the incidence of stroke varies from 22 to 140 strokes per 100,000 patients, which is significantly higher than those of most western countries (3). The study of knowledge, attitudes, and practices is crucial to increase awareness about stroke, risk factors management, the administration of appropriate treatment, and further secondary prevention (4).

Stroke is a medical emergency, and early treatment with reperfusion therapy may inverse acute symptoms (5,6) However, reperfusion therapy can only be utilized within a narrow period. The most important aspect of acute stroke management is time, which shows the urgency of treating acute stroke (7). Studies show that reperfusion treatment is delayed in developing countries (5,8). The reason for this is the inability to diagnose the symptoms early, lack of knowledge among personnel on the treatment process, lack of infrastructure, and the inappropriate referral of patients (6,9,10). A study in Dublin, Ireland, by Mellon et al. (11) on 96 hospital staff found that less than half of them were aware of thrombolytic therapy for acute ischemic stroke (AIS), and only 48% of the staff could identify the time window for thrombolysis administration.

Furthermore, medical personnel play a vital role in timely and correct diagnosis, the reduction of side effects, the rapid transfer of patients to an equipped medical center, and quick hospital treatment (5,12). Delays in the early and effective treatment of the disease worsen its prognosis (8,13). Medical personnel should use evidence-based care methods in patients with stroke in the acute and rehabilitation phases to achieve a positive outcome (14). Despite the availability of clinical guidelines on quality stroke care, practical evidence shows gaps in providing effective care to patients (12). The main barriers to provide evidence-based stroke care include insufficient skill and knowledge among stroke care providers, insufficient knowledge of clinical care protocols, and inadequate tools in area of acute stroke (5,15).

Studies have shown that equipping the thrombolysis team with trained nurses can effectively improve the rate of intravenous thrombolysis and reduce the door-to-needle time (16,17).The nurse practitioner may significantly impact patient outcomes during the prehospital, acute, and post-hospital phases of care (17). Therefore, nurses need continuous training in stroke management, which can change their knowledge and attitudes toward comprehensive care for patients (18,19). Liyew et al. (20) showed a positive correlation between nurses' level of professional knowledge and their attitude and quality of patient care. However, this study found limited data on stroke awareness among healthcare providers, especially in its acute management. Therefore, this study was conducted to determine the relationship between acute stroke management and the knowledge of evidence-based care and attitudes toward stroke care among emergency nurses and emergency medical services (EMS) personnel in Ardabil city in 2021.

Materials and Methods

This is a correlational study, and the population includes hospital emergency nurses and EMS personnel (n = 285) who were recruited using the census method. The inclusion criteria were as follows: nurses and EMS personnel with a bachelor's degree or higher, at least 6 months of experience in the relevant ward, and providing written informed consent. The exclusion criteria were as follows: not answering more than 5% of the questionnaire and the unwillingness to participate in this study. A five-part questionnaire was used to collect information.

A) Socio-demographic characteristics: This included gender, age, position, work experience, history of participation in stroke care training courses, and awareness of alarming signs of stroke.

B) Warning signs questions: This scale was designed and developed by Zhao et al. (21). It consists of 8 three-point Likert scale questions ("yes", "no", and "I do not know"), focusing on the knowledge of stroke symptoms. The reliability of this tool was confirmed using Cronbach's alpha technique (0.80). In this study, internal consistency was estimated using this technique (0.87).

C) Nurses' knowledge of evidence-based care for patients with stroke questionnaire: Harper's standard questionnaire (2007) was used to assess the emergency department nurses' awareness of evidence-based care for patients with stroke. This tool consisted of 10 four-choice items. In this tool, two points were given to each correct answer, and the maximum score was 20. The validity and reliability of this instrument were confirmed in Harper's (22) study. In the study by Yeganeh et al. (23), the face and content validity indices were confirmed, and their reliability score was 0.93, using the test-retest technique. In this study, the reliability of the instrument using the test-retest method was 0.87.

D) Attitude to stroke care questionnaire: This questionnaire was designed by Borhani Haghighi et al. (24), and it contains 15 five-point Likert scale items ranging from "strongly disagree" to "strongly agree." The score range in this domain is 15–75, and it is a self-report tool that measures attitudes toward caring for patients with stroke. In this tool, the closer the score is to 75, the more positive it is. The validity and reliability of this tool have been confirmed by Borhani Haghighi et al. (24). In this study, the reliability of this instrument using Cronbach's alpha technique was 0.91.

E) Acute stroke management questionnaire: This tool was designed by Sim et al. (10) to evaluate the ability of nurses in acute stroke management. This questionnaire contains 29 five-choice Likert scale items (strongly agree = 5 and strongly disagree = 1) and has three domains. The first domain is "general stroke knowledge", with 10 items (1–10), and its score range is 10–50. The second domain is "hyper acute stroke care," with nine items (11–19), and its score range is 9–45. The third domain is "advanced stroke management", with 10 items (20–29), and its score range is 10–50. The total achievable score range of the instrument is 29–145, and the closer the average score is to 145, the better

the acute stroke management. The validity and reliability of this instrument were confirmed by Sim et al. (10) Cronbach's alpha coefficient of the whole instrument was 82%. After translating the scale into Persian, the items were retranslated into English by another expert. The face validity and content validity of the tool were confirmed by 10 faculty members of the School of Nursing and Midwifery using the Walters and Basel technique (content validity ratio = 0.8, content validity index = 1) (25). In this study, the internal consistency of the instrument was confirmed using Cronbach's alpha method (α = 0.81).

This study was registered with the ethics code IR.ARUMS.REC.1400.102 at Ardabil University of Medical Sciences Ethical Committe. Obtaining informed written consent from the participants, explaining the research objectives, observing the principle of confidentiality in disseminating information, and the freedom of research units to withdraw from the study were among the ethical principles observed in this research.

Statistical Analysis

The data were analyzed using the SPSS-26 software using descriptive statistics (frequency and mean and standard deviation), analytical statistics (one-sample t-test, independent t-test, the One-Way analysis of variance test, and Pearson's correlation coefficient), multiple linear regression, and analysis of covariance (ANCOVA).

The significance level was set at 0.05 in all cases. The mean scores of the items related to attitudes, assessment of nurses' knowledge of evidence-based care in patients with stroke, and acute stroke management and its subcomponents were compared with the criterion score. The following formula was used to calculate the criterion score: maximum score - minimum score ÷ two + minimum score (26).

Results

Out of 300 questionnaires distributed among the participants, 285 questionnaires were completed and returned (return rate: 95%). The results showed that the majority of the participants were female (55.1%) and married (57.5%). The mean age and work experience of hospital emergency nurses and EMS personnel were 31.05 ± 6.05 and 7.11 ± 5.48 years, respectively. The majority of them (61.4%) had experience caring for patients with stroke, and 39.6% of them participated in stroke retraining. Other demographic characteristics are presented in Table 1.

As shown in Table 2, the mean score of nurses' knowledge of evidence-based care (15.61 ± 2.42) was significantly higher than the criterion score (15) (P = 0.017). Furthermore, the mean score of acute stroke management (114.60 ± 11.49) was significantly higher than the criterion score (87) (P = 0.001). The knowledge of evidence-based care was significantly higher in emergency nurses (15.61 ± 2.42) than in EMS personnel (14.90 ± 1.79) (P < 0.017). Moreover, the mean score of acute stroke management was significantly higher in emergency nurses than in EMS personnel (P < 0.001).

As shown in Table 3, the scores of knowledge of evidence-based care (15.71 ± 2.53), attitudes toward stroke care (55.35 ± 10.09), and acute stroke management (115.42 ± 11.69) were significantly higher in female nurses than in male nurses (P < 0.05). The results showed that the scores of knowledge of evidence-based care (15.79 ± 2.52), attitudes toward stroke care (56.42 ± 8.73), and acute stroke management (115.08 ± 10.09) were significantly higher in nurses who participated in the stroke retraining course (P < 0.053). There was a significantly positive correlation between age (r = 0.25) and work experience (r = 0.23) and acute stroke management (P < 0.001). The relationship between attitudes and marital status by controlling age, using ANCOVA, was not significant (P = 0.295).

To investigate the relationship between all the studied variables and acute stroke management in emergency nurses, the stepwise multiple linear regression model was used. The results showed that all variables had a significant effect on acute stroke management among nurses and that the knowledge of stroke warning signs and attitude toward stroke caring were stronger predictors than other variables in nurses' acute stroke management. Knowledge of the warning signs of ischemic stroke care explained 19% of changes in acute stroke management, and attitudes toward stroke caring explained 0.17% of the changes. Furthermore, the results showed a significant relationship between acute stroke management and gender, marital status, stroke patient care experience, history of participating in stroke retraining courses, age, and work experience (P < 0.001) (Table 4).

Table 1. Frequency distribution and mean (standard deviation) characteristics of nurses working in the emergency department

Demographic groups		Number (%)
Gender	Female	157 (55.1%)
	Male	128 (9/44%)
Marital status	Married	164 (57.5%)
	Single	121 (42.5%)
Position	Head nurse	4 (1.4%)
	Nurse	218 (76.5%)
	Senior technician	28 (9.8%)
	Second technician	35 (12.3%)
	Associate degree	25 (8.8%)
Education	Undergraduate	249 (87.4%)
	Master's degree	11 (3.9%)
Experience in caring for patients with stroke	Yes	175 (61.4%)
	No	110 (38.6%)
Existence of a stroke medical team at work	Yes	113 (39.6%)
	No	124 (43.5%)
	I do not know	77 (27%)
Participated in stroke retraining	Yes	113 (39.6%)
	No	171 (60.4%)
Existence of stroke care protocol in the workplace	Yes	151 (53%)
	No	73 (25.6%)
	I do not know	61 (21.4%)
Age	6.05 ± 31.05	
Job experience	7.11 ± 5.48	

Discussion

This study was conducted to determine the relationship between acute stroke management and the knowledge of evidence-based care and attitudes toward stroke care among emergency nurses and EMS personnel in Ardabil city, Iran. The results showed that emergency nurses' knowledge of evidence-based care in patients with stroke was significantly higher than the criterion score. Ram (18) reported a significant increase in the knowledge and attitude scores of nurses regarding the comprehensive care of patients with acute stroke. Asadi et al. (27) showed that the personnel had good knowledge of ischemic stroke. Moreover, Yeganeh et al. (23) reported that nurses working in the emergency department had insufficient knowledge of evidence-based care instructions for stroke patients. Furthermore, Karadeniz and Yılmaz (14) indicated that the nurses' inadequate knowledge of evidence-based care for patients with stroke was due to the lack of participation in scientific programs related to stroke.

In addition, knowledge of evidence-based care was significantly higher in hospital emergency nurses than in EMS nurses, which is consistent with the results of the study by Zidan et al. (28). They showed that hospital nurses had better knowledge of the stroke care protocol (28). Asadi et al. (27) reported that the knowledge of EMS nurses about evidence-based care about stroke was not sufficient. In the study by Gorchs-Molist et al. (29) in Italy, the EMS personnel had poor knowledge about stroke care, including the recognition of its symptoms and signs, stroke code activation, and stroke treatment and management. This finding was not consistent with the results of Forouzan et al. (13). They showed that EMS personnel had the highest level of knowledge of ischemic stroke and that that was related to the correct diagnosis and transfer of a patient with ischemic stroke during its golden time (less than 3 hours) (13). Increasing general knowledge of stroke can enable the correct identification of its signs and symptoms and add value to other technical knowledge related to it and its management (4). Good knowledge of evidence-based care in hospital emergency nurses can be a result of holding practical training courses on care for patients with acute stroke.

The results showed that the score for acute stroke management in emergency nurses was significantly higher than the criterion score. In the study by Li et al. (16), the process of treatment and management of AIS by emergency nurses in terms of patient preparation time, venous thrombosis treatment time, and patient recovery was reported to be favorable. Zidan et al. (28) reported that a small number of nurses performed satisfactorily in the management of AIS (28). Khatab et al. (30) also showed that most nurses had insufficient information about stroke management during the first golden hours of stroke. Fekadu et al. (31) and Chimatiro and Rhoda (32) reported insufficient thrombolytic treatments, delayed pre-hospital diagnostic assessment and patient transfer, lack of experienced personnel, financial limitations, and a lack of infrastructure as the factors that made it necessary to establish a working group to develop guidelines for pre-hospital nurses. Studies have shown that the status of acute stroke management is not optimal in developing countries (5). The optimal acute stroke management in the above study can be due to the development of skills, continuous clinical training through conferences, clarifying the role of hospital nurses and clinical supervision over ischemic stroke, the importance of rapid triage, and benefiting from trained trainers.

Acute stroke management was more favorable in hospital emergency nurses than in EMS personnel. In the study by Kummarg et al. (33), performing standard care under the individual management of a nurse, the triage time of patients with acute stroke, and treatment with tissue plasminogen activator (TPA) were reported to be favorable. Abd Elmegeid et al. (34) indicated that more than half of the hospital nurses had an optimal level of knowledge about the management of patients with AIS. Furthermore, Mohammed et al. (35) reported that acute stroke management was inappropriate for hospital emergency nurses, which was due to the lack of participation in training courses. Poor acute stroke management in EMS personnel may be due to insufficient conferences, training courses, and practical tasks on acute stroke. Therefore, the education of all EMS personnel in the treatment chain is vital to the efficient and rapid implementation of these treatments.

The results showed that knowledge of evidence-based care, attitudes toward stroke care, and acute stroke management were better in female nurses and those who had participated in a stroke retraining course, which is consistent with the results of the studies by Haki and Demirci (5) and Traynelis (19). Khatab et al. (30) also showed that female nurses who participated in retraining courses related to acute stroke management had better performance. However, Blek and Szarpak (36) reported no significant relationship between gender and EMS nurses' knowledge of and performance in stroke care, which is contrary to this study's results. Good knowledge of evidence-based care, attitude toward stroke care, and acute stroke management in female nurses can be due to their active corporations in in-service trainings. The results showed a significant relationship between acute stroke management and age, general work experience, stroke care experience, and the availability of care protocols. Ab Malik et al. (37) showed a significant relationship between a high mean age and greater efficiency in stroke care. Moreover, Ram (18) showed a significant relationship between stroke care and work experience, professional qualification and experience, and stroke care experience, which improved the nurses' efficiency in providing care for patients with stroke. In the study by Adelman et al. (38), nurses who had more than 10 years of experience working with patients with stroke

Table 2. Comparison of evidence-based care knowledge, attitude, and acute stroke management and their dimensions among emergency nurses

Groups	Hospital emergency nurses	Emergency medical services personnel	*P* value
Characteristics	Mean ± standard deviation	Mean ± standard deviation	
Evidence-based care knowledge	15.61 ± 2.42	14.90 ± 1.79	0.017
Attitude to stroke care	55.23 ± 9.84	54.68 ± 8.39	0.642
Acute stroke management	114.60 ± 11.49	109.28 ± 8.48	0.001

Table 3. Relationship between emergency nurses' demographic characteristics, evidence-based care knowledge, and attitudes to stroke care and acute stroke management

Variables	Group	Number %	Mean and standard deviation (evidence-based)	*P* value	Mean and standard deviation of attitude to stroke care	*P* value	Mean and standard deviation of acute stroke management	*P* value
Gender	Female	157 (55.1)	2.53 ± 15.71	*P* < 0.015	10.09 ± 55.35	*P* < 0.051	11.69 ± 115.42	*P* < 0.001
	Male	157 (55.1%)	1.17 ± 15.05		8.60 ± 54.73		9.59 ± 110.27	
Marital status	Married	164 (57.5%)	2.12 ± 15.28	*P* < 0.269	9.94 ± 56.13	*P < 0.295	11.59 ± 113.70	*P* < 0.290
	Single	121 (42.5%)	2.48 ± 15.59		8.75 ± 55		10.28 ± 121.30	
	Associate degree	25 (8.8%)	1.70 ± 15.16		9.71 ± 54.20		9.22 ± 108.8	
Education	Undergraduate	249 (87.3%)	2.36 ± 15.40	*P* < 0.462	9.51 ± 55.19	*P* < 0.871	11.21 ± 113.46	*P* < 0.041
	Master's degree	11 (3.9%)	1.32 ± 16.18		7.78 ± 55.72		8.50 ± 116.36	
	Head nurse	4 (1.4%)	1.91 ± 15.50		11.61 ± 61.25		13.62 ± 121.75	
Position	Nurse	218 (76.5%)	2.38 ± 15.61	*P* < 0.070	9.68 ± 55.15	*P* < 0.581	11.26 ± 114.29	*P* < 0.001
	Senior technician	28 (9.8%)	1.78 ± 14.67		7.73 ± 54.89		8.58 ± 111.14	
	Second technician	35 (12.3%)	1.81 ± 14.80		9.06 ± 54.28		8.24 ± 106.28	
Experience in caring for patients with stroke	Yes	175 (61.5%)	2.36 ± 15.73	*P* < 0.161	9.16 ± 54.96	*P* < 0.801	10.62 ± 114.87	*P* < 0.001
	No	110 (38.5%)	2.55 ± 14.91		9.92 ± 55.25		11.20 ± 110.30	
Study on stroke	Over the last year	97 (34%)	2.72 ± 15.69	*P* < 0.002	9 ± 56.01	*P* < 0.001	10.36 ± 114.53	*P* < 0.001
	More than a year ago	134 (47%)	1.91 ± 15.61		9.17 ± 56.26		10.45 ± 115.05	
	Not at all	54 (19%)	2.02 ± 14.44		9.64 ± 50.48		10.84 ± 105.70	
Participated in stroke retraining	Yes	113 (39.6%)	2.52 ± 15.79	*P* < 0.023	8.73 ± 56.42	*P* < 0.041	10.09 ± 115.08	*P* < 0.001
	No	171 (60.4%)	2.08 ± 15.16		9.81 ± 54.18		11.49 ± 111.80	
	Yes	84 (29.5%)	2.73 ± 16.03		9.49 ± 55.72		10.10 ± 118.35	
Existence of a stroke medical team at work	No	124 (43.5%)	1.97 ± 15.15	*P* < 0.012	9.26 ± 55.34	*P* < 0.451	10.43 ± 112.01	*P* < 0.001
	I do not know	77 (27%)	2.09 ± 15.16		9.68 ± 53.94		11 ± 109.14	
	Yes	151 (53%)	2.49 ± 15.62		8.91 ± 55.01		9.94 ± 115.09	
Existence of stroke care protocols in the workplace	No	73 (27.6%)	1.79 ± 15	*P* < 0.161	9.52 ± 54.66	*P* < 0.809	11.94 ± 111.82	*P* < 0.003
	I do not know	61 (21.4%)	2.21 ± 15.40		55.72 ± 10.67		11.71 ± 109.73	
Age			r = 0.07	*P* < 0.191	r = 0.09	*P* < 0.123	r = 0.25	*P* < 0.001
Job experience			r = 0.04	*P* < 0.191	r = 0.08	*P* < 0.173	r = 0.23	*P* < 0.001

*Analysis of covariance

Table 4. Predictors of acute stroke management based on the multivariate linear regression test

Prediction variables	R	R2	F	Non-standard coefficient β	Standard error	Standard coefficient β	T	*P* value
Evidence-based care knowledge	0.29	0.089	27.50	90.88	4.28	0.29	21.21	0.001
Attitude to stroke care	0.42	0.178	60.87	85.9	3.53	0.42	24.27	0.001
Awareness of stroke warning signs	0.44	0.19	70.57	79.82	4.006	0.44	19.92	0.001
Gender	0.23	0.054	16.07	120.56	1.96	0.23	61.30	0.001
Marital status	0.06	0.004	1.10	115.09	1.99	0.06	57.59	0.001
Education	0.14	0.021	6.14	104.18	3.65	0.14	28.49	0.001
Employment status	0.18	0.035	10.21	116.25	1.17	0.18	98.84	0.001
Position	0.25	0.069	19.89	122.48	2.19	0.25	55.79	0.001
Experience in caring for patients with stroke	0.20	0.041	11.99	199.44	1.94	0.20	61.57	0.001
Study on stroke	0.24	0.058	17.33	119.99	1.77	0.24	67.68	0.001
participated in stroke retraining	0.14	0.021	6.10	118.36	2.22	0.14	53.18	0.001
Existence of a stroke medical team at work	0.31	0.10	31.32	122.37	1.75	0.31	69.78	0.001
Existence of stroke care protocols in the workplace	0.20	0.040	11.79	117.74	1.49	0.20	78.76	0.001
Age	0.25	0.062	18.82	98.93	3.32	0.25	29.71	0.001
Job experience	0.23	0.055	16.56	109.73	1.04	0.23	104.96	0.001

had sufficient knowledge about the diagnosis of stroke symptoms. Zidan et al. (28) reported a negative correlation between nurses' knowledge, age, and stroke care experience: the lower the age and experience of stroke care, the higher the level of knowledge.

The results showed that the knowledge of stroke warning signs is a stronger predictor than other variables in acute stroke management among nurses. In the study by Yesilbalkan et al. (39), nurses had good knowledge of stroke warning signs, and the majority of them considered unilateral body weakness as the most common warning sign. However, Yang et al. (40) reported that nurses had very poor knowledge of acute stroke management, including the knowledge of stroke warning signs and stroke assessment and management. Knowledge of the warning signs and symptoms is found to be poor among most study populations, especially in developing countries. Poor recognition of these signs and symptoms contributed to delays in seeking emergency treatment (4). It is important for nurses and EMS personnel to be aware of stroke warning signs to diagnose, manage, and treat it on time, for which training courses are necessary.

Furthermore, the results showed that attitudes toward stroke care were a stronger predictor than other variables in acute stroke management in nurses. In the study by Sharma et al. (41), primary caregivers had favorable knowledge of and attitudes toward stroke care. In addition, Das et al. (42) reported that more than half of the nurses had a positive attitude toward caring for patients with stroke, and there was a positive correlation between knowledge and attitude. According to the study by Asadi et al. (27), EMS personnel had poor attitudes toward pre-hospital stroke care. Furthermore, Mohammed et al. (43) showed that two-thirds of nurses had a negative attitude toward monitoring patients with stroke and using TPA during drug administration due to their ineffective training and lack of motivation. One of the reasons for the good attitude of hospital personnel is their excellent knowledge of acute stroke. High levels of knowledge help nursing personnel develop favorable attitudes toward providing accurate care to patients.

Study Limitations

Using the self-report method and the insufficient time to fill out the questionnaires were the major limitations of this research. Moreover, nurses who were more dissatisfied were likely to give negative answers to the attitude questionnaires. Therefore, an attempt was made to control the effects of the mentioned restrictions to a great extent by choosing the right time, providing opportunities, explaining the importance of the study objectives, gaining trust and cooperation, and emphasizing the confidentiality of the questionnaires.

Conclusion

There was a significant relationship between acute stroke management and the knowledge of evidence-based care and attitudes toward stroke care in hospital emergency nurses and EMS personnel. Hospital emergency nurses had better acute stroke management abilities than EMS personnel. There was a significant correlation between acute stroke management and age, gender, marital status, work experience, and experience in caring for patients with stroke. Therefore, it is recommended to hire nurses with more work experience and a history of stroke retraining courses to take care of these patients. Furthermore, the proper training of EMS personnel regarding acute stroke management through training courses based on standard care protocols is recommended to improve the quality of care.

Acknowledgments

The university vice chancellor for research and all the participating nurses are sincerely appreciated.

Ethics

Ethics Committee Approval: This study was registered with the ethics code IR.ARUMS.REC.1400.102 at Ardabil University of Medical Sciences Ethical Committe.

Informed Consent: Obtained informed written consent from the participants.

Peer-review: Externally and internally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: N.M., F.A.K., Concept: M.A.M., R.D.K., Design: M.A.M., Data Collection or Processing: F.A.K., R.D.K., Analysis or Interpretation: M.A.M., Literature Search: N.M., Writing: M.A.M., F.A.K.

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study received no financial support.

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