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Original Article

The effect of Maslow's theory-based case management model on the care of stroke patients

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Abstract: Objective: To explore the application value of a case management model based on Maslow's theory in stroke patients. Methods: A total of 136 stroke patients admitted in the Number Two Hospital of Baoding from November 2019 to January 2023 were selected retrospectively. Based on the nursing measurements, 68 patients receiving conventional care were assigned to the control group, and 68 patients receiving case management nursing based on Maslow's theory were assigned to the observation group. The basic information of two groups of patients were compared; besides, the neurological function, daily living ability (ADL), quality of life (Stroke Impact Scale, SIS), self-care ability, functional outcomes (Modified Rankin Scale, mRS), complications, and nursing satisfaction of two groups of patients were also compared before and after nursing care. Results: After nursing, the observation group showed more significant improvements in neurological function, daily living ability, quality of life, self-care ability, and functional outcomes (all $P<0.05$), but lower incidence in complications ($P<0.05$) than the control group. In addition, the patient satisfaction rate was significantly higher in the observation group than that in the control group. Conclusion: Case management guidance based on Maslow's theory for stroke patients can improve patient rehabilitation outcomes and satisfaction with care. The model achieves continuity of information, resources, and personnel for stroke patients after discharge, coordinates multidisciplinary management, and ensures the rational utilization of medical resources. It is an effective way of health care and worthy of clinical promotion.

Keywords: Case management, Maslow's theory, stroke

Introduction

Stroke is known as a type of cerebrovascular accident [1]. Due to the blockage of blood vessels, blood cannot flow into the brain normally, or the sudden rupture of brain blood vessels causes brain tissue damage. It can be divided into ischemic and hemorrhagic strokes [2]. If not treated promptly and effectively, it will lead to various complications such as cognitive impairment, limb dysfunction, and even death [3]. Research has found that the majority of stroke patients still experience varying degrees of dysfunction and sequelae after treatment, requiring self-rehabilitation care at home after discharge [4]. In the routine care model, through communication, patients and their family members understand the occurrence, development, and prognosis of stroke, and nursing staff encourage them to actively cooperate with treatment, establish confidence in overcoming the disease, and provide antidepressant treatment to patients with depression according to medical advice [3]. However, this uniform nursing model is not applicable to everyone, resulting in unsatisfactory overall nursing outcomes. Most patients have a poor prognosis and frequent complications [5].

According to reports, stroke has become the most common cause of death in China [5]. There are at least 7 million stroke patients nationwide, and 70% to 80% of survivors have hemiplegia, aphasia, cognitive impairment, and other disabilities. According to the survey, the recurrence rate of stroke within one year is 6.6% to 8.0%, the recurrence rate within 2-5 years is 25% to 33%, and the mortality rate of reoccurrence within 30 days is 20% to 30% [6]. The burden of disability and medical resource

consumption caused by stroke have become serious social and economic issues, attracting the attention of the national health and medical departments. Under current medical conditions, it is becoming a demand to reasonably coordinate and utilize limited care resources to provide high-quality health care services for stroke patients while effectively controlling medical costs and improving efficiency [7].

Many studies have proven that case management models plays an important role in promoting patient recovery and reducing medical costs [8]. It has become the most widely used and widely concerned new management care model in the field of chronic diseases and tumors abroad [9]. It is defined as a fully collaborative process that includes evaluation, planning, execution, coordination, supervision, and evaluation to select medical services to meet the health needs of patients. Through frequent communication and multiple selections of treatment conditions, high-quality medical services are achieved, with reasonable fees [10]. Scholars believe that the case management model is a patient-centered and multidisciplinary care approach that provides holistic, sustained, and coordinated care for patients, including standardized application of resources, providing a continuous medical care plan, and continuously monitoring to achieve predetermined goals [11]. Recently, Maslow, a famous psychologist known as "the father of humanistic psychology", put forward the theory of the level of human basic needs [12].

In order to better understand the application effect of case management nursing based on Maslow's theory in stroke patients, we conducted a retrospective study on 136 stroke patients who received treatment in the Number Two Hospital of Baoding from November 2019 to January 2023, and evaluated the performance of this nursing model. The innovation of this study is to combine Maslow's theory with the case management model, enriching the clinical management model and helping nurses provide seamless and refined nursing services for patients.

Methods

General data

One hundred and thirty-six stroke patients admitted in The Number Two Hospital of Baoding from November 2019 to January 2023 were selected retrospectively. Inclusive criteria: ① Patients with initial attack who met the diagnostic criteria for stroke [13]; ② Patients aged 50-80; ③ Patients with clear consciousness and certain understanding and cognitive abilities. Exclusion criteria: ① Those with severe bleeding tendencies or concomitant intracranial hemorrhagic diseases; ② Patients with severe heart failure, diabetes or malignant tumor history; ③ Patients with history of long-term bed rest or hemiplegia; ④ Patients with severe cognitive or consciousness impairments. Based on the nursing measurement, 68 patients receiving conventional care were classified into the control group, and 68 patients receiving case management nursing based on Maslow's theory were regarded as the observation group. This study was approved by the Ethics Committee of the Number Two Hospital of Baoding.

Conventional nursing

The control group received routine nursing care. Specifically, the control group patients were routinely guided upon discharge by the responsible nurse and followed up by phone at 1st month, 3rd month, and 6th month after hospitalization. The care provider regularly queried the patient's recovery status and provided guidance on diet, rest, medication adherence, and rehabilitation training.

The case management model based on Maslow's theory

The observation group adopted a case management model based on Maslow's theory of nursing, with the attending physician, head nurse, responsible nurse, and psychiatrist jointly forming a case management group. The nursing plans were designated based on the patient's physiological needs, safety needs, love and belonging needs, respect needs, and self-actualization needs. Specialized nurses who have been trained and qualified with at least 10 years of clinical nursing experience in stroke were selected as full-time follow-up personnel responsible for coordinating and contacting patients. The specific contents are as follows.

Satisfy the physiological needs of patients: (1) Maintain unobstructed respiratory tract, clean oral cavity, and timely remove secretions; as

well as guide patients to use methods such as adjusting deep breathing rhythm, changing body position, and turning over and tapping the back to smoothly expel phlegm from the body. For patients whose oxygen saturation has not reached the expected level, sputum suction care and oxygen inhalation should be immediately given; and for patients with respiratory muscle paralysis, timely tracheal intubation/tracheotomy should be performed, and mechanical ventilation should be performed. (2) Nutrition intake. Foods rich in high-quality protein and fiber should be provided according to the dietary habits and personal tastes of different patients; as well assist patients in eating in a semi supine/sitting position to prevent food reflux and coughing; and for patients with swallowing disorders, an appropriate amount of liquid can be added to solid food and use a cooking machine to make it into a paste/mud shape; also adding a thickener to liquid food/drinking water and increase viscosity by stirring to become honey like or fruit tea like. The dietitian is responsible for making individualized adjustments to the patient's daily food patterns and eating patterns according to the patient's specific conditions. (3) Ensure sleep quality. Create a warm, clean, and comfortable hospitalization environment. Turn off the lights on time at night and control the alarm sound of equipment such as ventilators, monitors, telephones, as well as keep down the sound of speaking, opening and closing doors, to the lowest possible level, ensuring that the noise at night is less than 35 dB, and concentrating medical operation time as much as possible. (4) Ensure normal urination. Listen to the sound of flowing water and gently massage the patient's lower abdomen to promote urine discharge; and if the above methods are invalid, catheter should be retained. (5) Prevent constipation. Guide patients to eat foods rich in vitamins, fiber, and high-quality protein, drink plenty of warm water, and install screens on each bed to create an independent and private space for patients, which is beneficial for them to relax.

Satisfy the safety needs of patients: (1) Prevention of bed falls/falls. Install bedside lights and guardrails at the head and edge of the bed, keep the floor dry and clean, place anti slip signs in prominent positions, and install corridor handrails. (2) Prevention of pressure ulcers. Assist the patient in turning over and guide caregivers to scrub their body every 2 hours; and if necessary, use pressure reducing stickers; as well as ensure that the bed sheets are dry, clean, and synchronized with oral care. (3) Prevent respiratory and urinary system infection. Ensure that the temperature and humidity in the ward are constant and comfortable and disinfect with ultraviolet radiation once a day; with open windows twice a day to ensure air circulation in the ward. If the patient's sputum is relatively thick, nebulize inhalation according to medical advice; disinfect the ventilator pipeline properly; use fast hand disinfectants and strictly follow the "Seven Step Washing Technique" disinfection standards [6]; preventive use of antibiotics. (4) Prevent accidental ingestion and aspiration. For patients with reduced cognitive level caused by stroke, ensure that they are 'taken to the mouth', observe the patient's swallowing reflex level, and if necessary, carry out nasal feeding.

Satisfy the needs of patients for love and belonging: nurses should communicate, listen, care, and take care of the patients from their perspective and help them establish positive attitude, and explore together how to solve immediate problems. Actively encourage patients' relatives and friends to visit and chat for 30 minutes every day, fully mobilize social system personnel such as patients' relatives, neighbors, and colleagues, and provide them with physical and mental support from family, friends, and society. Every week, ask patients with good recovery to describe their process of overcoming the disease and improve their treatment beliefs.

Satisfy the patient's respect needs: nurses and caregivers should praise and acknowledge the progress of patients, allowing them to receive positive and timely feedback on their positive attitudes and behaviors; and when providing treatment and nursing operations, pay attention to protecting the patient's personal privacy in all aspects, patiently explain the purpose of each operation to them, and improve cooperation. In addition, timely grooming of patients every day ensures a clean and tidy appearance, and enhances their sense of self-esteem.

Satisfy the need for self-actualization: patients admitted to the hospital have an increased sense of dependence, sometimes exceeding

the needs of their condition. They also need others to do what they can do for them, and their psychological defense mechanisms have degenerated. In the Orem self-care model, it is proposed that people have the ability to take care of themselves through learning behavior. Acute stroke patients can undergo early rehabilitation training and daily life ability training 48 hours after onset and when their vital signs are stable, in order to achieve reasonable and effective treatment moderate and gradual rehabilitation is recommended, including placement of good limb positions, massage of affected limbs, passive and active activities, from distal to proximal, from coarse to fine, 20-30 minutes per session, twice per day. In addition to physical rehabilitation, attention should also be paid to language, cognitive, psychological, occupational, social, and other rehabilitation to maximize the improvement of their neurological functions and self-care abilities, return to life, work, and society, and approach life optimistically.

Observation indicators

Compare and evaluate the effectiveness at admission and after 3 weeks of treatment and nursing.

The primary indicators: (1) Neurological function: NIHSS was used to assess the neurological function with a total score of 0-35 [14]. (2) Ability of Daily Living (ADL): Assessed using the Barthel Index (BI) [15]. (3) Quality of life: Stroke Impact Scale (SIS), mainly includes strength, limb function, movement ability, daily activity ability, communication ability, social participation function, emotional and emotional control ability, as well as thinking and memory ability, with a total of 8 aspects and 59 items. Each item had a maximum score of 5 points, and the total score was converted to 100 points through a dedicated formula, the above scales were distributed by follow-up personnel. In principle, patients were required to independently fill out according to their actual situation. For those who were inconvenient to fill out, follow-up personnel should inquire and assist them in filling out. When retrieving the questionnaire, each item should be reviewed in a timely manner to avoid omissions or errors [16].

The secondary indicator: (1) Modified Barthel Index (MBI): The MBI scale has good validity, reliability, and sensitivity. The evaluation content includes 10 items: decoration, bathing, eating, using the restroom, dressing, bowel and bowel control, and sitting in a wheelchair, and so on. Each evaluation item of this scale is divided into 5 levels and detailed scoring rules are developed based on the patient's level of assistance. The total score is 100 points, with higher scores indicating lower dependence [17]. (2) Modified Rankin Scale (mRS): mRS is commonly used to evaluate functional outcomes in stroke patients today with a range of 0-6 points. Assessments can be conducted directly with patients, as well as remote assessments through telephone follow-up. The lower the patient's score, the better their functional recovery [18]. (3) Complications. Specifically, the complications, including pressure sore, respiratory system, urinary system and other complications, that occurred in both groups of patients were calculated. (4) Satisfaction: patient satisfaction, satisfied and dissatisfied, was evaluated using a questionnaire survey. (5) The influencing factor of patient's prognosis: based on the occurrence of complications, 33 patients were assigned into the poor prognosis group, and 103 patients were assigned into the good prognosis group. The logistic analysis was used to analyze the influencing factors of stroke patient's prognosis.

Statistical analysis

SPSS 26.0 software was applied for statistical analysis. The counting data was described in the number of cases and rate (%) and were compared with χ^2 test. The measurement data were represented as $x \pm s$, and the inter-group was compared by t-test. $P<0.05$ was considered as a significant difference.

Results

Comparison of the general data

As shown in **Table 1**, the general data were analyzed. The results showed that there was no distinct difference in the clinical data between the control and observation group (all $P>0.05$).

Comparison of NIHSS

There was no difference in NIHSS between the two groups of patients before treatment ($P>0.05$). After nursing, both groups of patients

Table 1. Comparison of the general data between the control group and the observation group

Index	Control group (n=68)	Observation group (n=68)	t/χ^2	P
Gender (male, %)	37 (54.41%)	39 (57.35%)	0.119	0.703
Age (year)	61.76±6.37	61.79±6.86	-0.026	0.979
BMI (kg/m^2)	24.53±1.49	24.71±1.45	-0.701	0.485
Course of disease (month)	12.41±2.13	12.31±1.99	0.291	0.772
Hypertension (case, %)	31 (45.59%)	35 (51.47%)	0.471	0.493
Diabetes (case, %)	30 (44.12%)	28 (41.18%)	0.120	0.729

Note: BMI, Body mass index.

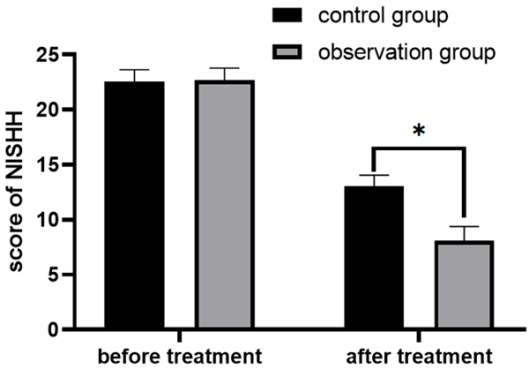

Figure 1. Comparison of National Institutes of Health Stroke Scale (NIHSS) between the control group and the observation group. *, P<0.05.

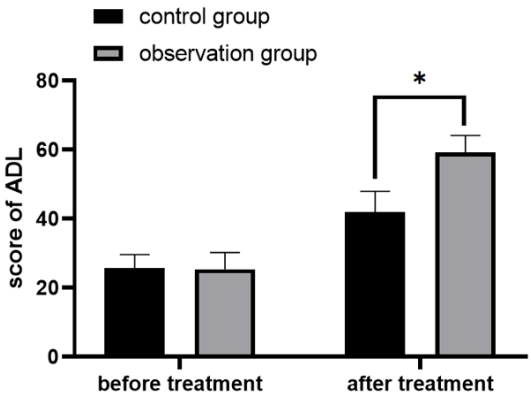

Figure 2. Comparison of Daily Living Ability (ADL) between the control group and the observation group. *, P<0.05.

showed improvement in NIHSS (P<0.05), and the improvement in the observation group was more significant (P<0.05). See **Figure 1**.

Comparison of ADL

Figure 2 shows the comparison of the ADL between two groups. After nursing, both groups of patients showed improvement in ADL (P<0.05) with significantly better performance in the observation group (P<0.05).

Comparison of SIS

As shown in **Figure 3**, there was no difference in SIS index between the two groups of patients before treatment (P>0.05). After treatment, both groups of patients showed increase in SIS (P<0.05), and the observation group had significantly higher SIS index than that in the control group (P<0.05).

Comparison of MBI between the control group and the observation group

As shown in **Figure 4**, there was no difference in MBI index between the two groups of patients before treatment (P>0.05). After nursing, both groups of patients showed increase in MBI (P<0.05), and the MBI index in observation group was significantly higher than that in the control group (P<0.05).

Comparison of mRS

Figure 5 shows the comparison of mRS between two groups before and after nursing. After treatment, the mRS was decreased in both groups of patients (both P<0.05), and the mRS in the observation group was significantly lower than that in the control group (P<0.05).

Comparison of complication and satisfaction

The incidence of complications in the observation group was significantly lower than that in the control group (P<0.05), whereas the incidence of satisfaction was higher in the observation group (P<0.05). See **Table 2**.

The influencing factors of the patient's prognosis

Based on the occurrence of complications, 33 patients were assigned into the poor prognosis

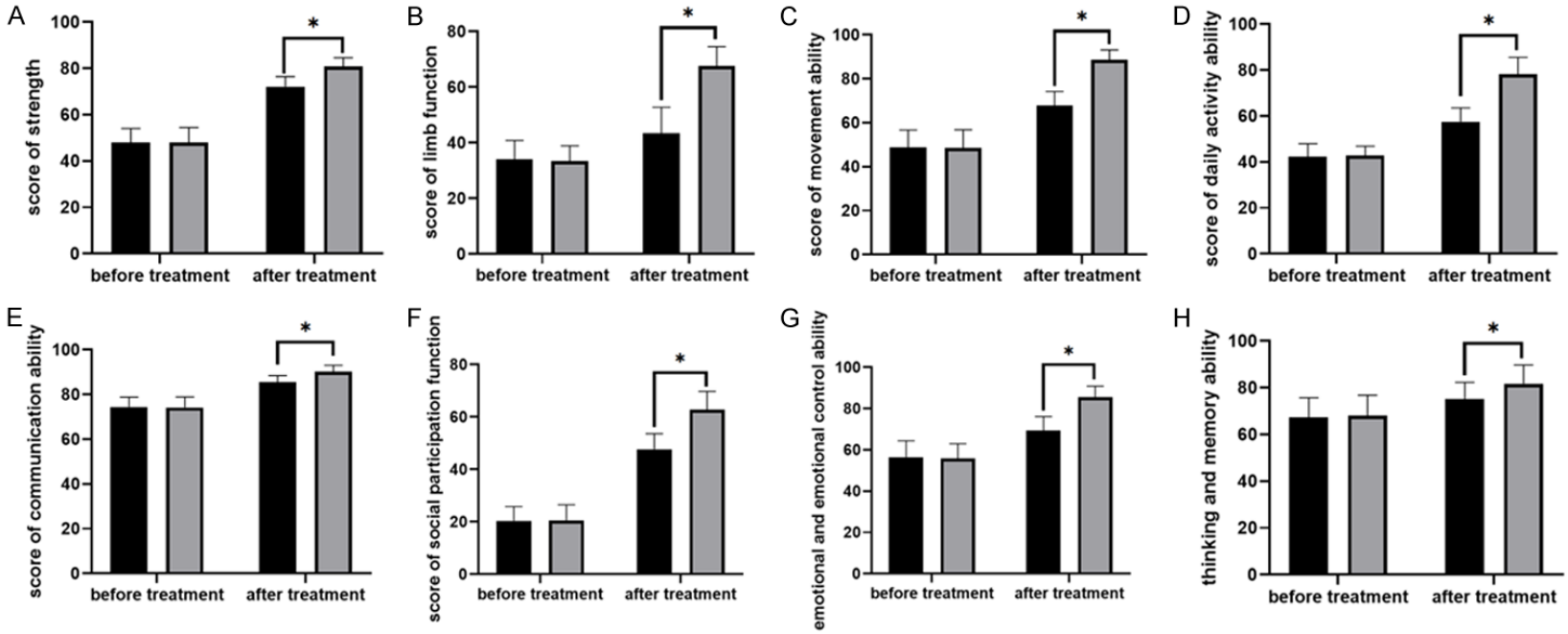

Figure 3. Comparison of Stroke Impact Scale (SIS) between the control group and the observation group. A. Strength; B. Limb function. C. Movement ability; D. Daily activity ability; E. Communication ability; F. Social participation function; G. Emotional and emotional control ability; H. Thinking and memory ability. *, $P<0.05$.

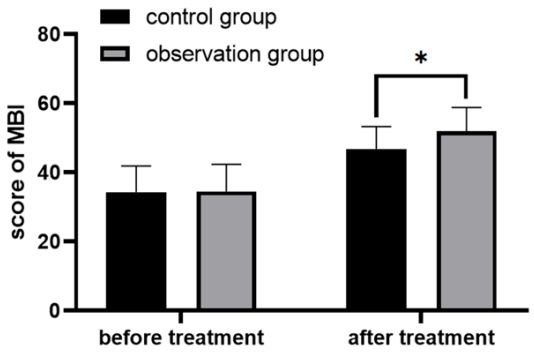

Figure 4. Comparison of Modified Barthel Index (MBI) between the control group and the observation group. *, P<0.05.

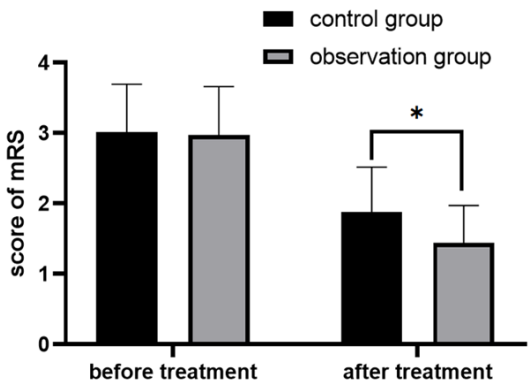

Figure 5. Comparison of Modified Rankin Scale (mRS) between the control group and the observation group. *, P<0.05.

group, and 103 patients were assigned into the good prognosis group. The logistic analysis showed that the nursing model was the influencing factor of the prognosis (P<0.05) (**Table 3**).

Discussion

With the aggravation of the aging in China, the incidence of stroke is increasing annually, which is mainly manifested by sudden numbness, weakness, and sudden fainting of one side of the face, arm, or leg [19]. Due to the complex pathogenesis, there is currently a lack of effective treatment methods for stroke in clinical practice [20]. After discharge, patients and their families need to undergo rehabilitation care on their own, but the effectiveness is limited [21]. The case management model has been widely applied in multiple fields [22]. The Maslow hierarchy of needs theory is one of the modern behavioral science theories, proposing that people have five levels of needs: physiological, safety, social, respect, and self-actualization [23]. Based on this theory, comprehensive nursing interventions can better meet the physiological and psychological needs of patients, which is beneficial for improving nursing quality. However, there is currently limited research on the combined application of Maslow's theory with case management in stroke patients.

In this study, Maslow's theory combined with case management was applied in the care of stroke patients, starting from the individual needs of patients [24]. Our study shows that the observation group had better neurological function recovery, daily living ability, and recognition after stroke than the control group. This indicates that the follow-up specialist actively communicated with the patient and their family members, and the patient obtained the correct medical knowledge reserve from the follow-up specialist in the first time, which is conducive to further improving the mastery of relevant stroke knowledge [25]. At the same time, in the later self-care process, special follow-up personnel provided feedback to the case management team, modified the rehabilitation plan based on Maslow's theory, and provided certain suggestions, which was beneficial for patients to improve their neurological recovery and cognitive status of stroke [26]. The comparison between the intervention group and the control group showed that the improvements in daily living ability and functional outcomes in the intervention group were more significant than that in the control group, which were similar with work in Hughes et al. [27]. In the process of tracking and providing feedback to patients, based on Maslows theory, the nurses supervised the execution of treatment and rehabilitation plans for patients, and provide feedback to rehabilitation professionals on the problems and difficulties encountered in patients' rehabilitation, such as strengthening training of distal upper limb joints and abnormal gait that may occur during lower limb movements [28]. Case management nurses need to coordinate with rehabilitation professionals in a timely manner to respond to patients' dizziness complaints, conduct a comprehensive analysis of the symptoms of weakness, coordinate the intervention of specialized physicians, and improve relevant examinations to find the cause. Nutritional risk monitoring shall be car-

Table 2. Comparison of complication and satisfaction between two groups of patients

Index	Control group (n=68)	Observation group (n=68)	χ^2	P
Incidence of complication	22 (32.35%)	11 (16.18%)	4.841	0.028
Satisfaction rate	40 (58.82%)	55 (80.88%)	-9.751	0.002

Table 3. Logistic analysis of the influencing factors of patients' prognosis

Factor	β	SE	*Wald* χ^2	*P*	*OR*	95% *CI*
Gender	0.082	0.724	1.943	0.273	0.475	0.318~0.583
Age	0.062	0.824	1.648	0.184	0.528	0.401~0.837
BMI	0.104	0.529	2.304	0.294	0.485	0.274~0.618
Course of disease	0.194	0.372	4.736	0.082	0.723	0.475~1.103
Hypertension	0.131	0.584	2.563	0.306	0.260	0.069~0.485
Diabetes	0.121	0.602	3.904	0.402	0.379	0.129~0.684
Nursing measurement	0.421	0.118	12.729	0.000	1.523	1.209~1.920

BMI, body mass index.

ried out for patients with dysphagia, and dietitian shall be coordinated to intervene and provide early intervention [29]. Case management nurses establish stable cooperative relationships with patients and their families. On the one hand, patients and their families can obtain accessible medical resources as soon as possible to solve their needs; on the other hand, as a bridge for communication between the medical team, patients, and family members, the nurses help with the communication between patients and various specialties of the medical team, enabling patients to benefit from proactive disease management [30]. Improving the patient's physical and mental state is beneficial for the prognosis of the condition, laying the foundation for overall recovery during the recovery period, thereby enhancing happiness, and achieving good recovery of motor and neurological functions.

In summary, the combination of Maslow's hierarchy of human needs theory and case management guides the application of nursing care for acute stroke patients, fully reflecting the concept of patient-centered and people-oriented nursing, and truly interpreting the modern holistic nursing concept. The combined nursing maximizes the recovery of patient health and social adaptability, reduces the pain and burden of patients and their families, and improves the nurse patient relationship. Transforming the work of nurses from passive to proactive, and gaining a comprehensive understanding the physiological, psychological, and emotional needs of patients can provide patients with better quality care, improve work effectiveness and efficiency, promote a more harmonious nurse-patient relationship, and facilitate better patient recovery. However, this study is a single-center study with small sample, which still needs to be further verified by the multi-center and large sample studies with long follow-up.

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Disclosure of conflict of interest

None.

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