

Study on the Application Effect of Graphic Demand Communication Cards in Stroke Patients with Aphasia

Lian Yu, Qiong Wen*

The First People's Hospital of Jingzhou, Jingzhou, China
Email: 18163135932@163.com, *18972161237@163.com

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Abstract

Objective: To explore the clinical value of graphic demand communication cards in hospitalized patients with post-stroke aphasia, break down barriers in nurse-patient communication, improve patients' medical experience and nursing satisfaction, and reduce the incidence of nursing adverse events. **Methods:** A total of 86 patients with post-stroke aphasia admitted to the Department of Neurology of our hospital from January 2025 to December 2025 were selected and equally divided into an observation group and a control group (43 cases in each group) by random number table method. The control group received routine nursing communication, while the observation group was provided with standardized graphic demand communication cards on the basis of routine nursing. The effective communication rate, nursing satisfaction, incidence of adverse events and length of hospital stay were compared between the two groups. **Results:** The effective communication rate of the observation group was 93.02%, which was higher than 67.44% of the control group; the total nursing satisfaction of the observation group was 95.35%, higher than 72.09% of the control group. The incidence of adverse events such as restlessness, unplanned extubation and falling out of bed was lower, and the hospital stay was shorter in the observation group, with all differences statistically significant ($P < 0.05$). **Conclusion:** Graphic demand communication cards are simple and intuitive to use, which can effectively resolve communication disorders in patients with post-stroke aphasia, eliminate potential nursing safety risks and improve nursing quality. However, this is a single-center small-sample study, and the satisfaction scale was self-developed by our department, which limits the extrapolation of the research findings. The results can only serve as clinical reference for neurology wards at the same level.

*Corresponding author.

Keywords

Graphic Communication Card, Stroke, Aphasia, Nurse-Patient Communication, Nursing Safety

1. Introduction

Stroke is a highly prevalent cerebrovascular disease, commonly known as apoplexy. It occurs when cerebral blood vessels rupture or become occluded, leading to interrupted blood supply to brain tissue and neurological deficits, characterized by high morbidity, high disability rate, high recurrence rate and high mortality. Post-stroke aphasia (PSA) refers to acquired language impairment caused by damage to the language areas of the dominant hemisphere. Patients suffer varying degrees of impairment in spontaneous speech, auditory comprehension, repetition, naming, reading and writing. The incidence of aphasia after the first stroke can reach 32% [1], which is categorized into motor aphasia, sensory aphasia and mixed aphasia. Although patients remain conscious, they are unable to verbally express demands such as pain, eating and toileting, and tend to become irritable, refuse treatment or perform unplanned extubation, which greatly increases nursing risks [2]. Conventional communication relying on verbal inquiry and hand gestures is ambiguous and inefficient, and may easily lead to misunderstanding of patients' demands. Graphic demand communication cards visualize patients' various needs through simple pictures and concise text, enabling information exchange without verbal communication [3]. In this study, self-designed graphic communication cards were applied to hospitalized patients with post-stroke aphasia based on clinical practice to observe their communication and nursing effects. Relevant findings are reported as follows.

2. Materials and Methods

2.1. General Data

A total of 86 inpatients with post-stroke aphasia admitted to the Department of Neurology of our hospital from January 2025 to December 2025 were enrolled. Inclusion criteria [4]: ① Stroke confirmed by cranial CT or MRI; ② Presence of aphasia and inability to carry out normal oral communication; ③ Clear consciousness, normal eyesight and picture comprehension ability, capable of pointing at cards independently; ④ Hospital stay ≥ 3 days; ⑤ Voluntary participation of patients or their family members. Exclusion criteria: Severe cognitive dysfunction, severe visual impairment, advanced mental illness, and tetraplegia that prevented patients from pointing at cards. All subjects were divided into an observation group and a control group using the random number table method, with 43 cases in each group.

Supplementary Baseline Data Observation group: 24 males and 19 females, aged 51 - 78 years with a mean age of (64.32 ± 7.15) years. Classification of aphasia: 22

cases of motor aphasia, 13 cases of sensory aphasia, and 8 cases of mixed aphasia. Comorbid underlying diseases: 31 cases of hypertension, 16 cases of type 2 diabetes mellitus, and 7 cases of coronary heart disease. Control group: 22 males and 21 females, aged 50 - 79 years with a mean age of (63.87 ± 7.42) years. Classification of aphasia: 20 cases of motor aphasia, 14 cases of sensory aphasia, and 9 cases of mixed aphasia. Comorbid underlying diseases: 29 cases of hypertension, 18 cases of type 2 diabetes mellitus, and 6 cases of coronary heart disease. There were no statistically significant between-group differences in baseline data including age, gender, aphasia classification and underlying comorbidities ($P > 0.05$), indicating comparable baseline characteristics between the two groups.

2.2. Ethical Statement after Admission

The primary nurses fully informed all subjects of the research objectives, intervention measures, observation indicators, potential benefits and risks through both written documents and verbal explanations. Aphasic patients with intact cognitive ability signed paper informed consent forms on their own. For patients with intact cognition but speech impairment who could not sign independently, their immediate family members (legal representatives) signed the informed consent on their behalf. All subjects reserved the right to withdraw from the study unconditionally at any time, and withdrawal would not interfere with their routine clinical treatment. The whole research strictly complied with the ethical standards set forth in the Declaration of Helsinki.

2.3. Nursing Interventions

2.3.1. Control Group

Routine Nursing and Communication Regimen Patients received fundamental neurological nursing, condition monitoring, medication guidance and rehabilitation education. For communication, nurses asked patients oral questions and guided them to express demands via nodding, shaking heads or hand gestures; family members helped interpret patients' needs. No standardized communication tools were adopted. When communication barriers occurred, nurses repeatedly inquired and guessed patients' demands subjectively.

2.3.2. Observation Group

Routine Nursing plus Graphic Demand Communication Cards 1) Card design. The cards were made of waterproof hard cardboard with a size of 25 cm × 18 cm, divided into four modules: physiological demands, therapeutic nursing, psychological emotion and rehabilitation. The pictures were clear with bold enlarged text. Each demand was matched with hand-drawn sketches and text within four Chinese characters. Markers of "Worse/Better" were added to distinguish the severity of discomfort. 2) Standardized application procedures. Education on card usage was conducted within 1 hour after admission. Cards were fixed beside the bed for 24-hour access. Graphic cards were prioritized for communication during nursing operations or when patients called for help, followed by nurses' restate-

ment to confirm understanding. Illustrations were dynamically added or removed according to patients' conditions. Information about card usage and patients' frequent demands was recorded during shift handovers.

2.4. Observation Indicators

2.4.1. Effective Communication Rate

Communication was defined as effective if patients' demands could be accurately identified in a single conversation; communication was regarded as ineffective after repeated inquiries still failed to clarify patients' requirements. Observation period: The entire hospital stay of each patient.

2.4.2. Nursing Adverse Events [5]

Only actual adverse events were counted. High risk of pressure ulcers assessed by the Braden Scale was listed as an independent screening indicator and not included in adverse event statistics:

- ① Agitation and crying: Patients presented persistent irritability, loud crying and resistance to nursing operations, with each episode lasting ≥ 5 minutes;
- ② Unplanned extubation: Patients spontaneously pulled out gastric tubes, urinary catheters, intravenous indwelling needles and oxygen tubes;
- ③ Bed fall: Falling out of bed during hospitalization. Uniform observation period for all adverse events: Recorded continuously from the day of admission to the day of discharge. Supplementary risk indicator: High risk of pressure ulcer (Braden score ≤ 12 points), which only served as a skin risk screening indicator and was not counted in the number of adverse events. Nursing satisfaction: Evaluated 1 hour before discharge with a self-designed satisfaction scale of the department, which contained four grades: Very satisfied, Satisfied, Fair, Dissatisfied. Total satisfaction rate = (Number of very satisfied cases + Number of satisfied cases)/Total number of cases $\times 100\%$.

2.5. Average Length of Hospital Stay

Total days from admission registration to discharge settlement.

2.6. Statistical Analysis

SPSS 22.0 software was used for data processing. The test level was set at $\alpha = 0.05$, and a P value less than 0.05 indicated statistically significant differences.

Measurement data (age, length of hospital stay) were expressed as mean $\pm$ standard deviation. The independent samples t-test was adopted for between-group comparisons. Prior to statistical testing, the Shapiro-Wilk normality test and Levene's homogeneity of variance test were performed. All measurement data in this study conformed to normal distribution and homogeneity of variance, so the t-test could be directly applied.

Binary enumeration data (effective/ineffective communication, occurrence/non-occurrence of adverse events) were analyzed using the Pearson χ^2 test. The theoretical frequency of each cell was verified before testing; the standard chi-square test

was used when the theoretical frequency was ≥ 5 .

The ordinal polytomous enumeration data (four satisfaction grades) formed a 2×4 contingency table. Since some cells had theoretical frequencies less than 5, the Pearson chi-square test was not applicable. Therefore, Fisher's exact test was adopted for intergroup comparisons in this study.

3. Results

3.1. Comparison of Effective Communication Rates between the Two Groups (Table 1)

Table 1. Comparison of effective communication rates of patients in two groups [n (%)].

Group	Number of cases	Effective communication	Ineffective communication	Effective rate
Control group	43	29 (67.44)	14 (32.56)	67.44%
Observation group	43	40 (93.02)	3 (6.98)	93.02%
χ^2	—	—	—	8.87
P	—	—	—	<0.05

3.2. Comparison of the Incidence of Nursing Adverse Events between the Two Groups (Table 2)

Table 2. Comparison of adverse event occurrence in patients of the two groups [n (%)].

Group	Number of cases	Adverse events occurred	No adverse events	Total incidence rate
Control group	43	13 (30.23)	30 (69.77)	30.23%
Observation group	43	4 (9.30)	39 (90.70)	9.30%
χ^2	—	—	—	5.865
P	—	—	—	<0.05

3.3. Comparison of Nursing Satisfaction between the Two Groups (Table 3)

Table 3. Comparison of nursing satisfaction of patients in the two groups [n (%)].

Group	Cases	Very satisfied	Satisfied	Fair	Dissatisfied	Total satisfaction rate
Control group	43	15 (34.88)	16 (37.21)	9 (20.93)	3 (6.98)	72.09%
Observation group	43	26 (60.47)	15 (34.88)	2 (4.65)	0 (0.00)	95.35%
Test method	—	—	—	—	—	Fisher's exact test
P	—	—	—	—	—	<0.05

3.4. Comparison of Average Length of Hospital Stay between the Two Groups (Table 4)

Table 4. Comparison of average length of hospital stay of patients in the two groups.

Group	Number of cases	Average length of hospital stay	t value	P value
Control group	43	15.72 $\pm$ 3.08	5.812	<0.05
Observation group	43	12.36 $\pm$ 2.14	—	<0.05

4. Discussion

4.1. Graphic Demand Communication Cards Resolve Communication Barriers in Aphasic Patients

Patients with post-stroke aphasia suffer impaired language output, yet most of them retain visual recognition and picture-text comprehension abilities. Conventional verbal inquiry and gesture-based communication are ambiguous and time-consuming, failing to promptly identify patients' demands such as pain and toileting and thus delaying nursing procedures [6]. Graphic communication cards replace verbal expression with images; patients can convey their needs by pointing, and nurses can confirm the demands rapidly, which markedly improves communication efficiency. In this study, the effective communication rate of the observation group was significantly higher than that of the control group, which verifies the clinical value of this tool.

4.2. Reduction of Nursing Adverse Events and Guarantee of Nursing Safety

Long-term failure to express demands tends to cause irritability and fear in aphasic patients, triggering risky behaviors including struggling, unplanned extubation and bed falls [7]. Graphic cards enable timely delivery of patients' needs, relieve negative emotions and reduce hazardous behaviors. The incidence of adverse events was significantly lower in the observation group, proving that this low-cost nursing safety intervention tool is worthy of wide popularization [8].

4.3. Improvement of Medical Experience and Nursing Satisfaction

Inability to communicate easily leads to feelings of helplessness and inferiority among aphasic patients [9]. Graphic communication cards provide patients with an independent channel to express themselves, relieve discomfort caused by repeated inquiries, reduce nurse-patient conflicts and raise recognition from patients and their families. Meanwhile, the tool shortens hospital stay and eases medical financial burdens.

4.4. Advantages and Clinical Promotion Value of the Tool

Graphic demand communication cards feature low production cost, waterproof and durable properties. Nurses do not need professional speech rehabilitation skills to operate them, and new nurses and shift staff can master the usage quickly. The cards facilitate unified communication standards during shift handovers and are applicable to neurology, rehabilitation and geriatric wards [10]. The illustrations can be simplified for patients with severe cognitive dysfunction to expand the applicable population.

4.5. Limitations of the Study

This study has several limitations. First, it is a single-center clinical observation

that only enrolled patients from the Department of Neurology of our hospital. Restricted by the hospital's diagnosis and treatment model, nurses' operating habits and regional population characteristics, the research conclusions cannot be directly generalized to primary hospitals or general hospitals in other regions. Second, the total sample size was only 86 cases, with 43 cases in each group. The small sample size led to limited statistical test power, so multi-center, large-sample cohort studies are required to further verify the results in the future. Third, the nursing satisfaction evaluation scale was self-developed by the department without standardized reliability and validity tests, which brought subjective bias to the evaluation results. Fourth, only short-term indicators including communication status, adverse events and satisfaction during hospitalization were observed. No long-term follow-up after discharge was carried out, so the sustained effects of this tool on patients' long-term speech rehabilitation and psychological status could not be evaluated. Given the above limitations, the conclusions of this study can only serve as a nursing reference for neurology wards in our hospital and hospitals at the same level, and cannot be widely generalized and promoted.

5. Conclusion

Patients with post-stroke aphasia suffer a sudden loss of language function and have poor psychological acceptance, so efficient communication is the core demand of clinical nursing. Within the sample scope of this study, graphic demand communication cards can significantly improve the efficiency of nurse-patient communication, reduce adverse events such as restlessness, unplanned extubation and bed falls, shorten the length of hospital stay, and elevate nursing satisfaction. This tool is economical, simple and highly operable, which can improve the medical experience of aphasic patients and optimize nursing quality. However, restricted by single-center design, small sample size and self-developed evaluation tools, the generalizability of the research conclusions is limited. It is only recommended for reference in neurology wards of the same scale, and multi-center large-sample studies are still needed to verify its long-term application value.

Author Contributions

Conceptualization: Yu Lian, Qiong Wen;
Methodology: Yu Lian;
Investigation: Yu Lian;
Formal analysis: Yu Lian;
Data curation: Yu Lian;
Writing original draft: Yu Lian;
Writing review & editing: Yu Lian, Qiong Wen;
Visualization: Yu Lian;
Supervision: Qiong Wen;
Project administration: Qiong Wen.

All authors approved the final version of the manuscript and agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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