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Nurses' experiences using augmentative and alternative communication: A qualitative research

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Abstract:

OBJECTIVE: This study aims to analyze the experiences of nurses using augmentative and alternative communication (AAC) when caring for patients with language communication disorders, providing a foundation for optimizing the clinical application of AAC technology.

METHODS: A purposive sampling method was employed to select seven nurses from two tertiary hospitals in Inner Mongolia Autonomous Region as research participants. Semi-structured interviews were conducted, and the collected data were analyzed using Colaizzi's seven-step method to identify key themes.

RESULTS: The experiences of nurses using AAC were summarized into three core themes and corresponding sub-themes: (1) Factors influencing the use of AAC: patient-related factors (e.g., stage of illness, family support), nurse-related factors (e.g., recognition of AAC value, familiarity with different AAC tools), and hospital-related factors (e.g., the impact of environmental and resource availability on AAC efficiency). (2) Application and optimization of digital technology in nurse-patient communication: initial effectiveness of digital devices in improving communication, the potential of artificial intelligence technologies to enhance nurse-patient interactions, and cross-disciplinary integration, innovation of digital technologies. (3) Flexible adaptation of personalized nursing in AAC application: transition strategies for communication approaches between acute and stable phases, adjustment methods for personalized nursing in AAC scenarios.

CONCLUSION: The acceptance, proficiency, and effectiveness of AAC technology use among nurses are influenced by multiple factors, including patient characteristics, individual nurse attributes, and institutional-level considerations. Therefore, it is recommended to enhance the user-friendliness and customization capabilities of AAC devices, provide systematic training for nurses on AAC technology, and foster close collaboration and communication among device developers, healthcare professionals, patients, and their families. These measures aim to support nurses in delivering precise and personalized care to patients.

Keywords:

augmentative and alternative communication; nonverbal communication; qualitative research

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1 Introduction

Language communication disorders exert a profound impact on patients' health management, not only limiting their participation in medical decision-making and feedback but also potentially adversely affecting treatment outcomes and prognosis. When patients experience temporary or permanent expressive impairments due to illness or injury, augmentative and alternative communication (AAC) is recognized as a crucial tool for assisting or substituting patients' expressive functions, providing effective communication support [1]. AAC constitutes a comprehensive communication support system that integrates various strategies, technologies, and devices, which can be employed independently or as supplements to traditional communication methods. Based on technological complexity, AAC can be categorized into three types [2]. No-tech AAC refers to communication methods that rely entirely on non-verbal forms of information exchange, such as conveying messages through body movements, facial expressions, and other natural behaviors without involving any electronic tools. Low-tech AAC utilizes simple non-electronic media like pictures, text, and display boards to facilitate communication. In contrast, high-tech AAC leverages advanced scientific technologies, such as brain-computer interfaces and electronic computing devices, to support more complex communication needs [3].

In clinical nursing practice, AAC-based communication approaches offer new avenues for enhancing the quality of nurse-patient interactions. The application of AAC enables nursing staff to more accurately understand patients' needs and emotions. Furthermore, the effective use of AAC can alleviate communication pressures between healthcare providers and patients, thereby optimizing the quality of nursing care services. Currently, AAC technology has demonstrated promising application outcomes in intensive care, dementia care, and rehabilitation for special education populations, proving its significant potential in improving medical communication and meeting personalized care needs [4, 5]. However, the clinical application of AAC in China remains in its nascent stages, with insufficient promotion efforts. As one of the primary users of AAC, nurses' practical experiences with these technologies hold substantial importance for optimizing AAC device design, providing precise improvement directions for technology developers to better align AAC with clinical needs [6]. Therefore, this study aims to explore nurses' experiences in using AAC while caring for patients with language communication disorders, analyze existing challenges and potential improvements, and provide practical evidence to advance the clinical application of AAC technology.

2 Materials and Methods

2.1 General Information

A purposive sampling method was employed to select clinical nurses from two tertiary hospitals in the Inner Mongolia Autonomous Region in 2024 as study participants. The inclusion criteria were as follows: (1) a minimum of 5 years of nursing experience; (2) frequent communication with patients experiencing language expression disorders in their daily practice; and (3) strong verbal expression and communication skills. Nurses currently undergoing advanced training or rotation were excluded from the study. The sample size was determined based on the principle of interview saturation, where data collection ceased when no new themes emerged from the interviews [7]. Ultimately, seven eligible clinical nurses were included in the study. De-

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tailed demographic characteristics of the participants are presented in Table 1.

Table 1 Basic information of the study population

Number	Age	Years of Nursing Experience	Education Level	**Professional Title**
N1	47	26	Bachelor's	Chief Nurse
N2	37	13	Bachelor's	Nurse-in-Charge
N3	40	15	Bachelor's	Nurse-in-Charge
N4	44	15	Master's	Associate Chief Nurse
N5	39	10	Bachelor's	Nurse-in-Charge
N6	49	28	Bachelor's	Chief Nurse
N7	35	11	Bachelor's	Nurse-in-Charge

2.2 Methods

2.2.1 Development of the Interview Guide

This study employed a phenomenological research approach. Based on a review of relevant literature and aligned with the research objectives, a preliminary interview guide was developed. Subsequently, the guide was refined and finalized through pre-interviews with two clinical nurses. The finalized interview guide included the following questions:(1)What communication strategies and methods do you commonly use in your clinical nursing practice? (2) What has been your experience using AAC, and how has it influenced communication outcomes? (3) In your opinion, what role does AAC play in facilitating nurse-patient communication? (4) What factors do you think influence nurses' willingness and effectiveness in using AAC? (5) What specific measures do you believe should be taken to promote the clinical application and enhance the effectiveness of AAC?

2.2.2 Data Collection

Prior to the interviews, the researcher explained the study's purpose and methodology to the participants and provided an overview of AAC and its background to ensure their understanding of the research context. Face-to-face interviews were conducted in a quiet meeting room. After obtaining informed consent, the interviews were carried out following the predetermined guide, and all sessions were audio-recorded. To protect participants' privacy, their identities were replaced with codes (N1 to N7). During the interviews, the researcher adapted the guide flexibly based on participants' responses, explored relevant topics in depth, and carefully observed participants' emotional states, facial expressions, and tone changes, making supplementary notes as needed. Each interview lasted between 45 and 60 minutes.

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2.2.3 Data Analysis

Within 24 hours of each interview, two researchers transcribed the audio recordings verbatim. The data were then analyzed using Colaizzi's seven-step method [8]. The two researchers independently coded and analyzed the data, identifying and categorizing recurring ideas to derive key themes and subthemes. In cases of discrepancies during the analysis, a third member of the research team provided an independent review to ensure objectivity and consistency. Finally, codes sharing common characteristics and concepts were consolidated to define the study's themes and subthemes.

3 Results

3.1 Theme 1: Factors Influencing AAC Use

3.1.1 Patient-Level Factors

3.1.1.1 Disease Stage

The selection and application of AAC are influenced by the patient's condition at different stages of their illness. N1 stated, "During the manic phase, the patient couldn't understand or cooperate, similar to someone with cognitive impairment. However, after a few days, they could comprehend speech. We used gestures, such as tapping the table or bed, to help them understand. For patients with receptive aphasia, we relied on body language, while for those with expressive aphasia, we encouraged them to speak."

3.1.1.2 Family Support

Active family involvement significantly enhances nurses' communication enthusiasm and efficiency. N3 explained, "Sometimes, family members can assist in communication. They may better interpret the patient's intentions due to their long-term familiarity." N2 added, "In my over ten years of nursing, I've never had conflicts. Empathy is the key to effective communication—it resolves many issues and makes tasks easier." N4 noted, "Given the shortage of staff, family members should become active helpers, saving time and resources during patient interactions."

3.1.2 Nurse-Level Factors

3.1.2.1 Recognition of AAC Value

Nurses generally acknowledged AAC's potential to improve communication quality but expressed concerns about device functionality. N3 remarked, "Without understanding AAC, the inability to obtain accurate patient information may delay treatment and care." N5 suggested, "AAC should include a series of detailed questions to help patients express their needs. We can categorize responses—first, using yes/no or nodding for quick judgments, and second, collaborating with family members for further clarification."

3.1.2.2 Familiarity with Different AAC Tools

Nurses currently prefer low-tech, non-assisted tools due to their immediacy and convenience. N2 shared,

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"In the morning, we draw a smiling sun to prompt patients to perform physical exercises." N5 emphasized, "Low-tech AAC is the most practical for its timeliness and ease of use." N6 added, "We frequently use gestures for common activities like eating, brushing teeth, or administering eye drops."

3.1.3 Hospital-Level Factors

3.1.3.1 Impact of Environment and Resources on AAC Efficiency

Limited human resources and equipment shortages hinder the effective use of AAC tools. N2 noted, "Nurses strive to understand patients, but factors like staffing shortages, time constraints, and inconsistent information sharing with doctors affect AAC efficiency." N3 added, "We have communication manuals, pictures, and data, but high-tech AAC devices are not yet available in our hospital."

3.2 Theme 2: Application and Optimization of Digital Technology in Nurse-Patient Communication

3.2.1 Initial Effectiveness of Digital Devices

Digital devices have shown preliminary success in improving communication efficiency and quality in clinical settings. N4 observed, "Through literature review, we realized that we are already using AAC, including internet-based tools and PDAs, though these were already in use in Singapore nine years ago." N2 added, "Attending research workshops revealed that current AAC technologies are quite advanced, and integrating digital methods with clinical care is becoming more common."

3.2.2 Potential of AI in Enhancing Nurse-Patient Communication

Integrating AI technology could enhance the intelligence of digital devices in nurse-patient communication. Participants emphasized the need for nurses to actively participate in software design to better align with clinical needs. N4 stated, "AI applications in education are growing. Nursing educators should introduce such courses to students, highlighting AI's clinical relevance." N4 further suggested, "Nurses should be involved in software development to ensure AAC tools effectively meet patient needs."

3.2.3 Cross-Disciplinary Integration and Innovation in Digital Technology

Successful digital transformation in other fields offers valuable insights for optimizing nurse-patient communication. N4 shared, "During a lecture, I saw how digital reforms in oncology operating rooms were exemplary. Many researchers have translated related patents into clinical applications, showcasing interdisciplinary collaboration—a model worth emulating for AAC development."

3.3 Theme 3: Flexible Adaptation of Personalized Nursing in AAC Applications

3.3.1 Transition Strategies for Acute and Stable Phases

Nurses adopt different AAC strategies for patients in acute versus stable phases. For acute-phase patients, low-tech tools are prioritized to quickly assess conditions, while stable-phase patients benefit from more lifestyle-oriented communication. N5 explained, "In emergencies, rapid assessment is critical, but some patients

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cannot articulate their conditions. Indirect communication and low-tech tools are useful here. For chronic or post-critical patients, communication needs to be more lively, and systematic speech and corresponding tools can be developed according to the characteristics of different patients."

3.3.2 Application Adjustments for Personalized Nursing in AAC Scenarios

Nurses emphasized the need to adapt communication methods based on patient conditions to meet personalized needs. N3 noted, "Patients' conditions and needs vary. When communication breaks down, we often involve another nurse to interpret the patient's intentions. However, for agitated or nonverbal patients, restraints may be necessary to prevent tube removal, which can hinder expression and lead to conflicts." N4 added, "Some patients are intubated, and in the ICU's closed environment, where family presence is restricted, communication becomes challenging, necessitating auxiliary tools." N5 shared, "Sometimes, we convey encouragement through eye contact or subtle facial expressions. Even with masks, widening our eyes or using micro-expressions can communicate reassurance to conscious patients."

4 Discussion

4.1 Nurses' Willingness to Flexibly Use AAC

As a critical strategy for addressing nonverbal communication barriers in critically ill patients, AAC demonstrates significant auxiliary value in clinical nursing practice. The findings of this study reveal that most nurses can flexibly select appropriate AAC tools based on the patient's disease stage, individual preferences, usage habits, and acceptance of AAC. For instance, patients exhibit diverse communication needs at different stages of their illness, and nurses can tailor personalized AAC solutions by considering these specific needs and experiences, thereby optimizing information exchange between patients and healthcare providers. However, the proficiency of nurses in operating AAC devices significantly influences the effectiveness and frequency of their use [9]. This study found that nurses tend to prefer low-tech AAC tools, such as pictures, gestures, and writing aids, in their daily practice. This preference not only highlights the widespread adoption of low-tech devices due to their simplicity but also reflects a gap in the application and training of high-tech AAC tools [9]. High-tech AAC tools, such as gesture recognition systems, communication applications, and eye-tracking systems, offer potential advantages in enhancing patient communication due to their efficiency and convenience [10]. Nevertheless, the use of no-tech and low-tech AAC is often constrained by factors such as patients' physical limitations and staffing shortages. Therefore, enhancing nurses' proficiency in various AAC types through targeted training is essential to promote the clinical application of high-tech AAC tools.

4.2 Multiple Factors Influencing AAC Device Usage

The effectiveness of AAC devices is influenced by a combination of patient characteristics, device performance, and clinical context. The efficacy of AAC devices largely depends on nurses' operational skills and their recognition of the tools' value [6]. Several nurses noted that incomplete functionality and the complexity of application scenarios hinder the efficiency of AAC use. Additionally, many nurses lack sufficient training to fully appreciate the potential of AAC, leading to unmet patient needs. Existing studies have developed alternative communication training programs based on the Kirkpatrick model, demonstrating success in im-

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proving communication between nurses and intubated patients [11]. Other studies have significantly enhanced communication quality between nurses and mechanically ventilated patients by employing the "Plan-Do-Study-Act" quality management tool [12]. Thus, improving nurses' recognition and application capabilities of AAC is crucial to ensure broader patient benefits.

4.3 Vision and Challenges of Integrating Digital Technology into AAC

Several nurses in this study emphasized the potential value of deeply integrating digital technology into the clinical application of AAC. Beyond basic physiological and treatment needs, some patients have emotional needs that cannot be effectively expressed through facial expressions or body language. Therefore, the development of digital AAC devices must closely align with clinical needs to ensure adaptability across diverse scenarios and enhance communication efficiency. For example, high-tech AAC devices could incorporate electroencephalography (EEG) and virtual reality (VR) technologies to enable more intelligent and interactive communication modes. Additionally, integrating clinical big data could facilitate the development of personalized systems with automated configuration functions, dynamically adjusting language models and communication strategies based on the patient's disease stage. Customizable interfaces and voice broadcast features could further meet individualized patient needs. However, despite their advantages, the clinical adoption of high-tech AAC devices remains limited due to factors such as high costs and insufficient market awareness [13-14]. Although some AI-based free applications have shown promise in supporting personalized communication for patients with language barriers, their practical impact is hindered by limited market promotion and inadequate user training [15, 16]. To promote the widespread use of high-tech AAC devices, it is essential to focus on cost control and prioritize user-friendly designs to expand the potential user base.

4.4 Pathways and Optimization Strategies for Personalized AAC

Based on participants' feedback, the implementation of personalized AAC can be approached from several perspectives. First, a precise assessment of the patient's condition—including consciousness level, auditory and visual abilities, language expression, cognitive function, and cultural background—should guide the selection of the most suitable AAC tools. For example, during the acute phase, simple and intuitive low-tech AAC devices may be prioritized, while high-tech AAC tools can be gradually introduced during the recovery phase to adapt to evolving communication needs [17, 18]. Second, the content design of AAC devices should comprehensively address patients' basic needs and emotional expression. Core modules should include daily activities such as eating and toileting, as well as the communication of basic emotions like happiness, pain, and fatigue. Additionally, incorporating personalized content based on patients' interests can enhance engagement and improve the efficiency of AAC use. Studies indicate that 89% of family members consider communication barriers a primary cause of patient frustration and express varying degrees of concern about ineffective communication [19]. Therefore, when guiding patients and their families in using AAC devices, nurses should provide targeted training to improve proficiency and application skills. Such training not only enhances patient outcomes but also increases family involvement in care, alleviating anxiety and stress caused by communication barriers.

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5 Conclusion

This study explored nurses' experiences with AAC devices through in-depth interviews. The results indicate that nurses generally perceive AAC devices as effective tools for enhancing nurse-patient communication. However, factors at the patient, nurse, and hospital levels collectively influence nurses' willingness, ability, and effectiveness in using AAC. Therefore, it is recommended to optimize the user-friendliness and customization features of AAC devices, strengthen systematic training on AAC technology, and foster closer collaboration and communication among device developers, healthcare professionals, patients, and their families. These measures will ensure that AAC devices better meet clinical needs, boost nurses' confidence in using AAC, and enable more precise interpretation of patient needs, ultimately supporting the delivery of personalized care.

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