

USE OF AUGMENTATIVE AND ALTERNATIVE COMMUNICATION (AAC) IN THE INTENSIVE CARE UNIT: A SCOPING REVIEW

Rurin Masruroh¹, Yanny Trisyani^{2*}, Etika Emaliyawati³

¹⁻³Faculty of Nursing, Padjadjaran University

Email Korespondensi: yanny.trisyani@unpad.ac.id

Submitted: 09 September 2025 Accepted: 22 November 2025 Published: 01 December 2025
Doi: <https://doi.org/10.33024/mahesa.v5i12.19990>

ABSTRACT

Patients in the Intensive Care Unit (ICU) often experience limitations in verbal communication due to ventilator use, sedation, or other medical conditions. These communication barriers can interfere with the delivery of medical information and affect the quality of patient care. Augmentative and Alternative Communication (AAC) is a potential solution to improve interactions between patients, healthcare providers, and families in the ICU environment. This review aimed to explore the implementation of AAC in the ICU, including its effectiveness, challenges, and impact on the quality of communication and patient care. This study used a scoping review approach following the PRISMA-ScR guidelines. A literature search was conducted through the EBSCOhost Medline, PubMed, and Google Scholar databases, using relevant keywords related to AAC and ICU. Studies that met the inclusion criteria were analyzed thematically to identify key findings. Of the 386 articles identified, 11 articles met the criteria for further analysis. The results showed that implementing AAC in the ICU can improve communication between patients and healthcare providers, reduce patient anxiety, and strengthen the therapeutic relationship. However, there are obstacles to its implementation, such as a lack of training for healthcare providers, time constraints, and a lack of institutional policies that support the systematic use of AAC. Despite the challenges in implementing AAC in the ICU, this technology has great potential to improve patient communication and quality of care. Therefore, a more comprehensive strategy is needed, including training health workers, developing institutional policies, and procuring communication devices that are appropriate to patient needs to support optimal implementation of AAC in the ICU.

Keywords: Augmentative and Alternative Communication, ICU, Communication, Critical Care, Scoping Review.

BACKGROUND

The intensive care unit (ICU) is a special unit in a hospital that is intended to care for patients in critical condition. ICU patients are often in a condition that makes it impossible for them to communicate verbally, either due to the use of a ventilator, the effects of sedatives,

or other medical conditions (Karlsen et al., 2023; Perelló-Campaner et al., 2023). Language barriers between patients and medical personnel can also impair communication, leading to misunderstandings in conveying medical information and the needs

of patients and families (Al Shamsi et al., 2020). Therefore, effective communication is a key element in patient care in the ICU.

In the ICU context, limitations in patient communication require healthcare workers to use a variety of alternative methods, including communication boards, text-based technology, or non-verbal communication such as facial expressions and hand gestures (Karmakar, 2024; Kuruppu et al., 2024). Lack of clear communication can have a serious impact on the quality of patient care. Communication barriers in the ICU, such as patient verbal limitations, high work pressure in the ICU environment, and lack of effective communication systems, can lead to misunderstandings between medical personnel, patients, and families (Karlsen et al., 2023; Perelló-Campaner et al., 2023). This can potentially compromise patient safety and increase their stress and discomfort levels. In contrast, effective communication allows nurses to better understand the patient's condition, detect changes in clinical status earlier, and provide timely interventions (Janson et al., 2020). In addition, good communication also strengthens the therapeutic relationship between patients and medical personnel, which contributes to improving the patient's quality of life during intensive care (Hagens et al., 2017).

Various studies show that the need to bridge communication between ICU patients, health workers, and families is increasing (L. M. Broyles et al., 2012; Freeman-Sanderson et al., 2025; Jansson et al., 2019a). One emerging solution is the implementation of Augmentative Alternative Communication (AAC) Technology, which allows patients with verbal limitations to still be able to communicate through text-

based methods, symbols, or electronic devices that support more effective interactions between patients and medical personnel (L. M. Broyles et al., 2012).

Augmentative Alternative Communication (AAC) technology is a potential solution to communication problems in the ICU. AAC encompasses a variety of tools and techniques designed to help individuals with verbal disabilities communicate more effectively, ranging from symbol- or text-based communication devices to advanced technologies such as eye-tracking and digital communication applications (Alzrayer et al., 2017). Penggunaan AAC di ICU memungkinkan perawat untuk lebih memahami kebutuhan pasien, memberikan perawatan yang lebih responsif, dan meningkatkan interaksi antara pasien dan tenaga kesehatan (Kent-Walsh & Binger, 2018).

Although AAC technology has great potential to improve patient communication in the ICU, in reality, there are still many nurses who do not know or apply its use optimally. Lack of training and socialization regarding AAC is a major obstacle, so many health workers are not used to or feel less confident in using it in the ICU environment (McNaughton et al., 2019). In addition, time constraints and high workloads in the ICU often make nurses rely more on conventional communication methods, although they are not always effective for patients with verbal limitations.

Therefore, it is important to conduct a scoping review to explore the various communication strategies used in the ICU, with a focus on the effectiveness of AAC technology in improving interactions between patients, healthcare workers, and families. Given the limited implementation of AAC in the

ICU environment due to the lack of training and awareness of healthcare workers, this review can provide a more comprehensive understanding of the challenges, opportunities, and recommendations for more effective AAC implementation. Thus, the results of this scoping review are expected to contribute to the development of policies and clinical practices that support ICU patient communication, thereby improving the quality of care and patient experience during intensive care.

LITERATURE REVIEW

Intensive Care Unit (ICU)

An Intensive Care Unit (ICU) is a special unit within a healthcare facility designed to provide intensive care to patients with life-threatening medical conditions (Khan et al., 2021). The ICU serves as a stabilization centre for patients with impaired vital functions, such as respiratory, circulatory, or neurological disorders, who require continuous medical supervision and intervention (Sayde et al., 2020). The unit is equipped with advanced technology, including ventilators, cardiac monitors and other life support devices, which enable the medical team to provide optimal care for patients in critical condition (Bonney-Cudraz et al., 2017).

Patients admitted to the ICU generally meet certain criteria that reflect the severity of their condition. Severe respiratory distress requiring mechanical ventilation or intensive oxygen therapy is one of the main indications (El-Mashad et al., 2020). In addition, patients with cardiovascular instability, such as shock, severe arrhythmias, or acute heart failure, often require intensive care to maintain hemodynamic stability. Severe neurologic disorders, including coma, traumatic

brain injury, or massive stroke, are also conditions that require close monitoring and intervention in the ICU (Muradov et al., 2021). The ICU is a place for patients who are at high risk of experiencing rapid deterioration while providing the best opportunity for recovery through integrated and multidisciplinary care (Etemadifar et al., 2021).

Augmentative and Alternative Communication (AAC)

Augmentative and Alternative Communication (AAC) is an approach designed to support individuals who have limited speech abilities or are unable to speak at all (Tönsing & Soto, 2020). AAC includes all forms of communication, both technology-based and non-technology-based, that are used to replace or complement verbal communication skills (Waydhas et al., 2024). These systems can be symbol boards, software-based applications, or specialized hardware designed to optimize the user's interaction with the surrounding environment. The basic concept of AAC emphasizes empowering individuals to communicate functionally, effectively, and meaningfully in a variety of situations, including critical health contexts such as intensive care units (Brumberg et al., 2018).

In healthcare, the principles of AAC focus on sustainability, personalization, and collaboration. AAC should be tailored to each patient's specific needs, taking into account factors such as their physical, cognitive, and emotional conditions (Light & McNaughton, 2012). Continuity in communication is a priority, and AAC must enable patients to communicate their medical needs in a timely manner (Huang et al., 2021). In addition, the success of AAC implementation

depends on collaboration between health workers, patients, and families to ensure that the tools or methods used can be applied optimally. This requires adequate training and education for AAC users and the health team involved (Quinn et al., 2020).

RESEARCH METHODS

The design used in this study is a scoping review, which is a flexible methodological approach to explore and analyze new, rapidly developing topics (Peterson et al., 2017). The scoping review framework includes five main stages, namely formulating review questions, identifying relevant research, selecting studies, mapping data, and compiling, summarizing and reporting findings (Peterson et al., 2017).

The article selection process for this review was carried out by three reviewers based on PRISMA Extension for Scoping Review (PRISMA-ScR) (see Figure 1) (Page et al., 2021). Research questions and eligibility criteria for research articles using the PCC approach (Population, Concept, and Context).

P (Population): Nurses or Healthcare professionals

C (Concept): Augmentative and Alternative Communication, AAC, Communication Aids, Assistive Communication Technology

C (Context): Intensive Care Unit, ICU, Critical Care

In this review, full-text articles that were not accessible, publications not in English, and secondary studies were excluded. The inclusion criteria in this review were full-text articles that were accessible and published in English and articles with quantitative and qualitative designs that discussed the use of AAC by nurses. Furthermore, this review did not

have a publication year limitation criterion because it identified relevant studies comprehensively.

Data Collection and Analysis

Search Strategy

The article identification process was carried out systematically by utilizing three main databases, namely EbscoHost: Medline Ultimate, PubMed, as well as one search engine, namely Google Scholar. The keywords used were "*Nurses OR Intensive Care Nurses OR Critical Care Nurses OR ICU Nurses AND Augmentative and Alternative Communication AND Intensive Care Unit OR ICU OR Critical Care*". The author uses the Boolean operators "AND" and "OR" to trim or expand the search results for different forms of a word.

All authors independently selected studies that met the eligibility criteria using the Independent Article Review (IAR) advanced approach, ensuring a systematic, transparent, and unbiased selection process. The selection was conducted following the PRISMA for scoping review guidelines to enhance methodological rigour. The initial step involved duplication checks using the Mendeley reference manager. Subsequently, the authors meticulously screened titles, abstracts, and full texts to evaluate their relevance to the research topic while strictly applying the inclusion and exclusion criteria. The IAR advance method reinforced objectivity by incorporating independent cross-validation among researchers. Notably, all authors reached a consensus without any disagreements regarding study eligibility.

In this review, data from the analyzed studies were extracted using a table that detailed all findings relevant to the topic

discussed. Information in the extraction table includes study characteristics, such as author name and year of publication, country, study design, sample size, and research results. The studies analyzed in this review consisted of observational studies and qualitative designs. Therefore, data analysis was carried out thematically with an exploratory descriptive approach. The data analysis process began by identifying and presenting data in tabular form based on the reviewed articles. After the data was collected, all authors analyzed and interpreted each finding based on the extraction results. As a final step, the authors rechecked the included studies to ensure data accuracy and minimize potential errors in the extraction stage.

RESEARCH RESULTS

Study Selection

In the initial stage, an article search was conducted through EBSCO-host Medline (n=60), PubMed (n=26), and the Google Scholar search engine (n=300), resulting in a total of 386 articles. After 98 articles were removed due to duplication, 288 articles remained to be selected based on title and abstract. From this process, 264 articles did not meet the criteria and were excluded, leaving 24 articles. The twenty-four articles were then further examined to ensure completeness of information and compliance with the inclusion criteria (population, context, concept, and language). As a result, 13 articles were again excluded because the publication was not available in English or Indonesian (n=8) because it did not discuss AAC implementation (n=5), and the population was not eligible (n=1). Thus, 10 articles remained eligible to be accessed in full-text form and further analyzed in the manuscript.

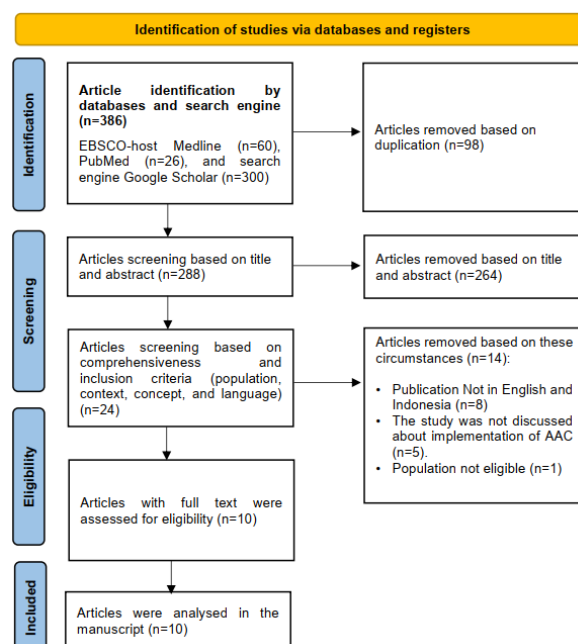


Figure 1. PRISMA Flow Diagram

Notes: The PRISMA figure was adapted from Page MJ, McKenzie JE, Bossuyt PM, et al. The PRISMA 2020

statement: an updated guideline for reporting systematic reviews. *BMJ*.

2021; 372: n71. Creative Commons (Page et al., 2021).

Based on Table 1. studies were conducted with various methodological approaches, ranging from qualitative studies (e.g., phenomenological-hermeneutic in Holm et al., 2021 and in-depth interviews in Kyranou et al., 2022), pre-post quasi-experiments (Momennasab et al., 2023), to quantitative surveys (Jansson et al., 2019) and pilot studies (Astuti et al., 2023). There were also studies using qualitative secondary analysis (Broyles et al., 2012) and exploratory descriptive designs with

combined qualitative and quantitative analysis (Patak et al., 2006).

All studies were conducted in ICU units or ICU-related environments, with varying samples. Several studies involved nurses (e.g., eight nurses in Holm et al., 2021; 45 nurses in Momennasab et al., 2023; and 194 nurses in Al-Yahyai et al., 2021), health workers, and critically ill patients. This reflects the focus on the role and interaction between the medical team and patients in the context of communication in the ICU.

Table 1. Ekstraksi Data

Author & Year	Count y	Design	Set tin g	Sample	Result
(Holm et al., 2021)	Denm ark	Qualit ative study (pheno menol ogical-herme neutic)	ICU	8 nurses (nurse communi cation guides)	1. The nurses reported that the AAC intervention provided a conceptual framework that helped them understand the communication process in the ICU. 2. The results showed increased awareness and room for reflection, although there were challenges in adapting the intervention to individual communication styles and the ever-changing condition of patients.
(Momenn asab et al., 2023)	Iran	Quasi-experi mental (one-group pre-post)	ICU	45 ICU nurses	1. The AAC training program significantly increased the nurses' communication knowledge ($p < 0.05$). 2. Evaluation using the Kirkpatrick model at levels three and four showed increased AAC usage, satisfaction, and ease of communication, which had a positive

					impact on nurse-patient interactions ($p < 0.001$).
(Kyranou et al., 2022)	Cyprus	Qualitative (in-depth interviews)	ICU (4 hospitals)	14 ICU nurses	1. Nurses used a combination of communication strategies, both with the assistance of tools (e.g., communication boards, paper) and without. 2. However, the effectiveness of AAC was hindered by the use of personal protective equipment (PPE) that limited non-verbal cues and by a lack of specialized AAC training, reducing the optimality of its implementation.
(L. Broyles et al., 2012)	USA	Qualitative secondary analysis	ICU	Data from 93 patients (41 with AAC involvement)	1. Content analysis showed that family involvement in communication with patients via AAC occurred in about 44% of patients. Written methods were the most commonly used. 2. The results emphasized that nurse guidance is crucial for enhancing the effectiveness of AAC usage, particularly in addressing families' unpreparedness and limited understanding.
(Jansson et al., 2019a)	Sweden	Quantitative survey study	ICU	83 healthcare professionals	1. The survey revealed variations in knowledge about AAC among healthcare professionals. 2. More experienced personnel tended to use AAC effectively, especially in pain management, while less experienced staff relied more on sedation. 3. This emphasizes the need for comprehensive training to improve AAC implementation in managing patients with communication difficulties.

(Handberg & Voss, 2018)	Denmark	Qualitative (descriptive interpretation)	ICU (5 units)	48 healthcare professionals	1. Although healthcare professionals recognize the potential of AAC to improve communication, a biomedical culture that prioritizes efficiency and a competent image often overlooks humanistic aspects. 2. This resulted in a low priority on communication, meaning that AAC implementation did not run optimally despite its conceptual importance for patient safety and well-being.
(Al-Yahyai et al., 2021)	Oman	Pilot study/survey	ICU and related units	194 nurses	1. The study indicated that although various communication methods were used, the systematic implementation of AAC was still low. 2. The results suggest a need to develop guidelines and specialized training to optimize AAC usage, especially to reduce patient anxiety and improve the quality of interactions in the ICU environment.
(Astuti et al., 2023)	Indonesia	Pilot pre-post study (one-group)	ICU	Patients under ventilator (number not mentioned)	1. The AAC intervention significantly reduced patients' anxiety levels. Anxiety scores decreased from a moderate level to no anxiety, with a 2-point difference. 2. The Wilcoxon Signed Rank test showed statistical significance ($p = 0.001$) with a moderate effect size (Cramer's $v = 0.21$), while physiological parameters remained stable during the intervention.
(Sii & Swann, 2015)	UK	Qualitative (semi-structured)	ICU (Ward 118,	13 patients and 18 healthcare	1. Findings showed a discrepancy between patients and staff regarding the

		red intervi ews)	Roya l Infir mary)	re professio nals	effectiveness of the communication method. Patients preferred AAC aids such as picture boards to express their needs, while staff tended to use closed-ended questions (yes/no) and lip reading. 2. This suggests the need to align communication methods to meet both the emotional and physical needs of patients.
(Patak et al., 2006)	USA	Explor atory, descrip tive design with qualita tive and quanti tative analysi s	ICU (Car diot hora cic ICU, UCL A Medi cal Cent er)	29 critical patients (patients extubate d within 72 hours)	1. 62% of patients reported high levels of frustration when attempting to communicate during mechanical ventilation. Patients estimated that frustration would be much lower (29.8%) if a communication board (Vidatak EZ Board) was used compared to not using one (75.8%). 2. 69% of patients rated the communication board as very helpful, with suggestions regarding its content and format to support efficiency, expression of emotional needs, and visual as well as literacy requirements.

DISCUSSION

This review aims to explore the use and application of AAC methods in the ICU. Based on the results of the review, it was found that from 10 articles analyzed in this study. The studies analyzed in the table show the diversity of methodological designs, settings, and samples used to evaluate the application of AAC (Augmentative and Alternative Communication) in the ICU environment. This diversity reflects the complexity and multifacetedness of communication in the context of

intensive care, where both technical and humanistic aspects need to be considered.

Qualitative studies, such as those conducted by Holm et al. (2021) and Kyranou et al. (2022), provide an in-depth overview of nurses' experiences and perceptions regarding the use of AAC. Their findings reveal that AAC not only acts as a communication aid but also provides a conceptual framework that allows nurses to understand the dynamics of communication in the

ICU. However, these studies also highlight implementation challenges, such as adjusting interventions to individual communication styles and barriers arising from the use of personal protective equipment (PPE).

On the other hand, quantitative and quasi-experimental approaches such as those conducted by Momennasab et al. (2023) and Jansson et al. (2019) emphasized the importance of training and evaluation of AAC use. AAC training programs have been shown to significantly improve nurses' communication knowledge, which has positive implications for nurse-patient interactions. These findings underscore the need to develop and implement systematic educational programs and operational guidelines to optimize the use of AAC in clinical practice. Studies that combine qualitative and quantitative methods, such as by Patak et al. (2006), provide a comprehensive perspective on the differences in perceptions between patients and healthcare professionals. These differences indicate that although AAC has the potential to improve communication, there is still a gap in how both parties assess the effectiveness of the communication method used. This suggests that AAC implementation strategies must consider the emotional needs of patients as well as the readiness and competence of healthcare professionals.

AAC in the ICU offers unique challenges and opportunities for nurses to provide holistic care (Al-Yahyai et al., 2021; Astuti et al., 2023; L. Broyles et al., 2012; Handberg & Voss, 2018; Jansson et al., 2019b). Qualitative studies examining nurses' perspectives on AAC suggest that this technology helps bridge the communication gap with patients who are unable to

speak. However, nurses' experiences with AAC are strongly influenced by a variety of factors, including nurses' readiness to adopt this technology, the appropriateness of the device to the patient's needs, and the support provided by the work environment (Kulkarni & Parmar, 2017). Experienced nurses generally appreciated AAC as a tool that improves the quality of interactions with patients, although some acknowledged challenges in its implementation, especially in complex and dynamic clinical situations (Kent-Walsh et al., 2015).

The implementation of AAC Communication in the ICU is influenced by various interacting factors, including individual, organizational, and technological aspects. At the individual level, factors such as nurses' knowledge, attitudes, and experience in using AAC are key to the success of its implementation (Rahimi et al., 2022). Nurses who have a good understanding of AAC tend to be more confident and able to adapt communication methods to the specific needs of patients. However, lack of formal training is often a barrier to ensuring nurses' competence in the use of AAC (Tönsing & Soto, 2020).

From an organizational perspective, institutional support plays an important role in the success of AAC implementation. Hospital policies that support the procurement of AAC devices, allocation of training time, and the existence of practical guidelines can facilitate the implementation of this technology (Aydin & Diken, 2020). In addition, the high workload of nurses in the ICU is often a challenge, given the time required to understand and use AAC effectively. A supportive work environment, including interdisciplinary collaboration and

managerial support, can help reduce these barriers (Singh et al., 2020).

Technology factors also greatly determine the implementation of AAC in the ICU. AAC devices that are easy to use, practical, and appropriate to the patient's needs are very important to ensure their effectiveness. The suitability of technology and the patient's ability to operate AAC is a major concern, especially for patients with motor or cognitive limitations (Beukelman & Light, 2020). In addition, the presence of devices that are compatible with other systems in the ICU, such as medical monitors or digital devices, can support the integration of AAC into patient care (Singh et al., 2020). Implementation of AAC in the ICU can run more optimally, improve the quality of communication, and provide significant benefits for patients and nurses.

The use of Alternative and Augmentative Communication (AAC) in the ICU has a wide impact on the experiences of patients, families, and healthcare providers. In patients, AAC provides a solution to overcome the verbal limitations that often occur due to ventilator use or other critical conditions (Primavera et al., 2021). With communication aids, patients can communicate their needs, concerns, and emotions more effectively. This helps reduce frustration and increase feelings of being valued, which ultimately contributes to a more positive care experience (Chavers et al., 2021). Additionally, AAC allows patients to be more involved in decisions regarding their care, which can increase their sense of control over what is often a very uncertain situation (Sigafos et al., 2021).

REFERENCES

Al-Yahyai, A. N. S., Arulappan, J.,

On the other hand, AAC also strengthens the relationship between nurses and patients. More effective communication through AAC allows nurses to better understand the unique needs of each patient, which in turn increases empathy and closeness in the therapeutic relationship (Syriopoulou-Delli & Eleni, 2022). Nurses who can respond appropriately to patient needs not only create trust but also provide more individualized and holistic care. AAC serves as an important bridge connecting patient needs with the nurse's ability to provide high-quality care (Wang et al., 2022).

CONCLUSION

In conclusion, this review confirms that despite challenges in terms of training, adaptation to changing clinical conditions, and high workload, the use of AAC in the ICU is a promising strategy to overcome communication limitations in critically ill patients. The integration of AAC into clinical practice should be encouraged through an integrated approach involving capacity building of healthcare workers, provision of adequate tools and resources, and institutional policy support. Thus, the implementation of AAC not only improves communication effectiveness but also has the potential to improve the quality of care, reduce patient anxiety, and strengthen the relationship between patients and the medical team, which will ultimately contribute positively to patient safety and well-being in the ICU environment.

Matua, G. A., Al-Ghafri, S. M.,

- Al-Sarakhi, S. H., Al-Rahbi, K. K. S., & Jayapal, S. K. (2021). Communicating to Non-Speaking Critically Ill Patients: Augmentative and Alternative Communication Technique as an Essential Strategy. *SAGE Open Nursing*, 7. <https://doi.org/10.1177/23779608211015234>
- Al Shamsi, H., Almutairi, A. G., Al Mashrafi, S., & Al Kalbani, T. (2020). Implications of Language Barriers for Healthcare: A Systematic Review. *Oman Medical Journal*, 35(2), e122. <https://doi.org/10.5001/omj.2020.40>
- Alzrayer, N. M., Banda, D. R., & Koul, R. (2017). Teaching children with autism spectrum disorder and other developmental disabilities to perform multistep requesting using an iPad. *Augmentative and Alternative Communication*, 33. <https://doi.org/10.1080/07434618.2017.1306881>
- Astuti, N. L. S., Setiyarini, S., & Rahmat, I. (2023). The Effect of Augmentative Alternative Communication on Anxiety in Patients under Mechanical Ventilators in the Intensive Care Unit: Pilot Study. *Journal of Health Science and Medical Research*, 41(6), 1-11. <https://doi.org/10.31584/jhs mr.2023967>
- Aydin, O., & Diken, I. H. (2020). Studies comparing augmentative and alternative communication systems (AAC) applications for individuals with autism spectrum disorder: A systematic review and meta-analysis. *Education and Training in Autism and Developmental Disabilities*, 55.
- Broyles, L., Tate, J., & Happ, M. B. (2012). Use of Augmentative and Assistive Communication Strategies by Family Members in the ICU. *America Journal Critical Care*, 21(2), 21-32. <https://doi.org/10.4037/ajcc2012752>.Use
- Freeman-Sanderson, A., Istanboulian, L., & Rose, L. (2025). Communication with the critically ill patient: A nexus between patient needs, communication partner skills and the ICU environment. *Intensive and Critical Care Nursing*, 88, 103962. <https://doi.org/https://doi.org/10.1016/j.iccn.2025.103962>
- Hagens, P., Pieterse, M., van der Valk, P., & van der Palen, J. (2017). Effectiveness of intensive smoking reduction counselling plus combination nicotine replacement therapy in promoting long-term abstinence in patients with chronic obstructive pulmonary disease not ready to quit smoking: Protocol of the REDUQ trial. *Contemporary Clinical Trials Communications*, 8, 248-257. <https://doi.org/https://doi.org/10.1016/j.conctc.2017.08.014>
- Handberg, C., & Voss, A. K. (2018). Implementing augmentative and alternative communication in critical care settings: Perspectives of healthcare professionals. *Journal of Clinical Nursing*, 27(1-2), 102-114. <https://doi.org/10.1111/jocn.13851>
- Holm, A., Karlsson, V., & Dreyer, P. (2021). Nurses' experiences of serving as a communication guide and supporting the implementation of a communication intervention in

- the intensive care unit. *International Journal of Qualitative Studies on Health and Well-Being*, 16(1). <https://doi.org/10.1080/17482631.2021.1971598>
- Huang, L., Chen, S.-H. K., Xu, S., Wang, Y., Jin, X., Wan, P., Sun, J., Tao, J., Zhang, S., Zhang, G., & Shan, C. (2021). Augmentative and alternative communication intervention for in-patient individuals with post-stroke aphasia: study protocol of a parallel-group, pragmatic randomized controlled trial. *Trials*, 22(1), 837. <https://doi.org/10.1186/s13063-021-05799-0>
- Karlsen, M.-M. W., Holm, A., Kvande, M. E., Dreyer, P., Tate, J. A., Heyn, L. G., & Happ, M. B. (2023). Communication with mechanically ventilated patients in intensive care units: A concept analysis. *Journal of Advanced Nursing*, 79(2), 563-580. <https://doi.org/10.1111/jan.15501>
- Karmakar, M. (2024). *Communication Methods Used with Conscious Intubated Patients: Scoping Review*. 1-11. <https://doi.org/10.2174/0118744346349706241112070527>
- Kent-Walsh, J., & Binger, C. (2018). Methodological advances, opportunities, and challenges in AAC research. *Augmentative and Alternative Communication*, 34. <https://doi.org/10.1080/07434618.2018.1456560>
- Kent-Walsh, J., Murza, K. A., Malani, M. D., & Binger, C. (2015). Effects of communication partner instruction on the communication of individuals using AAC: A meta-analysis. *AAC: Augmentative & Alternative Communication*, 31. <https://doi.org/10.3109/07434618.2015.1052153>
- Khan, U., Menezes, C. N., & Govind, N. (2021). Patterns and outcomes of admissions to the medical acute care unit of a tertiary teaching hospital in South Africa. *African Journal of Emergency Medicine*, 11(1), 26-30. <https://doi.org/https://doi.org/10.1016/j.afjem.2020.11.006>
- Kulkarni, S. S., & Parmar, J. (2017). Culturally and linguistically diverse student and family perspectives of AAC. *Augmentative and Alternative Communication*, 33. <https://doi.org/10.1080/07434618.2017.1346706>
- Kuruppu, N. R., Tobiano, G., Ranse, K., Abayadeera, A., & Chaboyer, W. (2024). Facilitators, barriers and acceptability of implementing a communication board in Sri Lankan intensive care units: A qualitative descriptive study. *Intensive and Critical Care Nursing*, 83, 103708. <https://doi.org/https://doi.org/10.1016/j.iccn.2024.103708>
- Kyranou, M., Cheta, C., & Pampoulou, E. (2022). Communicating with mechanically ventilated patients who are awake. A qualitative study on the experience of critical care nurses in Cyprus during the COVID-19 pandemic. *PLoS ONE*, 17(12 December), 1-20. <https://doi.org/10.1371/journal.pone.0278195>
- Light, J., & McNaughton, D. (2012). The changing face of augmentative and alternative

- communication: past, present, and future challenges. *Augment. Altern. Commun.*, 28.
<https://doi.org/10.3109/07434618.2012.737024>
- McNaughton, D., Light, J., Beukelman, D. R., Klein, C., Nieder, D., & Nazareth, G. (2019). Building capacity in AAC: A person-centered approach to supporting participation by people with complex communication needs. *Augmentative and Alternative Communication*, 35.
<https://doi.org/10.1080/07434618.2018.1556731>
- Momennasab, M., Mohammadi, F., DehghanRad, F., & Jaber, A. (2023). Evaluation of the effectiveness of a training programme for nurses regarding augmentative and alternative communication with intubated patients using Kirkpatrick's model: A pilot study. *Nursing Open*, 10(5), 2895-2903.
<https://doi.org/10.1002/nop2.1531>
- Muradov, O., Petrovskaya, O., & Papathanassoglou, E. (2021). Effectiveness of cognitive interventions on cognitive outcomes of adult intensive care unit survivors: a scoping review. *Aust Crit Care*, 34.
<https://doi.org/10.1016/j.auc.2020.11.001>
- Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., ... Moher, D. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *The BMJ*, 372, 1-11.
<https://doi.org/10.1136/bmj.n71>
- Patak, L., Gawlinski, A., Fung, N. I., Doering, L., Berg, J., & Henneman, E. A. (2006). Communication boards in critical care: patients' views. *Applied Nursing Research*, 19(4), 182-190.
<https://doi.org/10.1016/j.apnr.2005.09.006>
- Quinn, E., Kaiser, A., & Ledford, J. (2020). Teaching preschoolers with Down syndrome using augmentative and alternative communication modeling during small group dialogic reading. *Am J Speech Lang Pathol*, 29.
https://doi.org/10.1044/2019_AJSLP-19-0017
- Rahimi, S. A., Dery, J., Lamontagne, M.-E., Jamshidi, A., Lacroix, E., Ruiz, A., Ait-Kadi, D., & Routhier, F. (2022). Prioritization of patients access to outpatient augmentative and alternative communication services in Quebec: a decision tool. *Disability and Rehabilitation: Assistive Technology*, 17(1), 8-15.
<https://doi.org/10.1080/17483107.2020.1751314>
- Sayde, G. E., Stefanescu, A., Conrad, E., Nielsen, N., & Hammer, R. (2020). Implementing an intensive care unit (ICU) diary program at a large academic medical center: Results from a randomized control trial evaluating psychological morbidity associated with critical illness. *General Hospital Psychiatry*, 66, 96-102.

- <https://doi.org/10.1016/j.genhosppsych.2020.06.017>
- Sigafoos, J., Roche, L., & Tait, K. (2021). *Challenges in providing AAC intervention to people with profound intellectual and multiple disabilities BT - Augmentative and alternative* 76. *Communication: challenges and solutions* (B. Ogletree (ed.)). Plural Publishing Inc.
- Sii, S., & Swann, D. (2015). Communication With Ventilated Patients In ICU: Perceptions On Existing Communication Methods And Needs. *Res Medica*, 23(1), 2. <https://doi.org/10.2218/resmedica.v23i1.1216>
- Singh, S. J., Diong, Z. Z., & Kamal, R. M. (2020). Malaysian teachers' experience using augmentative and alternative communication with students. *Augmentative & Alternative Communication*, 36. <https://doi.org/10.1080/07434618.2020.1785547>
- Syriopoulou-Delli, C. K., & Eleni, G. (2022). Effectiveness of Different Types of Augmentative and Alternative Communication (AAC) in Improving Communication Skills and in Enhancing the Vocabulary of Children with ASD: a Review. *Review Journal of Autism and Developmental Disorders*, 9(4), 493-506. <https://doi.org/10.1007/s40489-021-00269-4>
- Tönsing, K. M., & Soto, G. (2020). Multilingualism and augmentative and alternative communication: examining language ideology and resulting practices. *Augmentative and Alternative Communication*, 36(3), 190-201. <https://doi.org/10.1080/07434618.2020.1811761>
- Wang, M., Muthu, B., & Sivaparthipan, C. B. (2022). Smart assistance to dyslexia students using artificial intelligence based augmentative alternative communication. *International Journal of Speech Technology*, 25(2), 343-353. <https://doi.org/10.1007/s10772-021-09921-0>
- Waydhas, C., Ull, C., Cruciger, O., Hamsen, U., Schildhauer, T. A., Gaschler, R., & Weckwerth, C. (2024). Behavioral pain scale may not be reliable in awake non-verbal intensive care patients: a case control study. *BMC Anesthesiology*, 24(1), 84. <https://doi.org/10.1186/s12871-024-02472-2>