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Augmentative and alternative communication in the SUS: a scoping review and proposal of indicators in assistive technology

Comunicação aumentativa e alternativa no SUS: scoping review e proposta de indicadores em tecnologia assistiva

Comunicación aumentativa y alternativa en el SUS: revisión exploratoria y propuesta de indicadores en tecnología de asistencia

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ABSTRACT

Objective: to map evidence on the use of augmentative and alternative communication (AAC) in children with cerebral palsy (CP), analyzing the effectiveness of interventions and the barriers to their implementation, as well as proposing quality indicators for monitoring public healthcare services. **Method:** a scoping review was conducted in accordance with JBI and the PRISMA extension, with searches carried out in October 2025 across six databases. Of the 714 records identified, 22 studies were included. **Results:** evidence indicates that AAC is effective in expanding expressive skills and promoting participation among children with CP. A total of 20 quality indicators were proposed, organized into four dimensions: participation, access, training, and technology. **Final considerations:** AAC constitutes a strategic component in public health policies. The proposed indicators may support managers in monitoring equity, quality, and evidence-based decision-making.

Descriptors: Public Health; Quality Indicators, Health Care; Cerebral Palsy; Communication; Self-Help Devices.

RESUMO

Objetivo: mapear evidências sobre o uso da Comunicação Alternativa e Aumentativa (CAA) em crianças com Paralisia Cerebral (PC), analisando a eficácia das intervenções e as barreiras para sua implementação, além de propor indicadores de qualidade para o monitoramento de serviços em saúde pública. **Método:** revisão de escopo conduzida segundo o *Joanna Briggs Institute* e a extensão PRISMA, com buscas realizadas em outubro de 2025, em seis bases de dados. Dos 714 registros, 22 estudos foram selecionados. **Resultados:** as evidências indicam que a CAA é eficaz na ampliação das habilidades expressivas e na promoção da participação de crianças com PC. Foram propostos 20 indicadores de qualidade, organizados em quatro dimensões: participação, acesso, capacitação e tecnologia. **Considerações finais:** a CAA constitui elemento estratégico nas políticas públicas de saúde. Os indicadores propostos podem subsidiar gestores no monitoramento da equidade, qualidade e na tomada de decisão orientada por evidências.

Descritores: Saúde Pública; Indicadores de Qualidade em Assistência à Saúde; Paralisia Cerebral; Comunicação; Tecnologia Assistiva.

RESUMEN

Objetivo: mapear la evidencia sobre el uso de la comunicación aumentativa y alternativa (CAA) en niños con parálisis cerebral (PC), analizando la efectividad de las intervenciones y las barreras para su implementación, así como proponer indicadores de calidad para el monitoreo de servicios de salud pública. **Método:** revisión de alcance realizada de acuerdo con el JBI y la extensión PRISMA, con búsquedas realizadas en octubre de 2025 en seis bases de datos. De los 714 registros identificados, se incluyeron 22 estudios. **Resultados:** la evidencia indica que la CAA es eficaz para ampliar las habilidades expresivas y promover la participación en niños con PC. Se propusieron 20 indicadores de calidad organizados en cuatro dimensiones: participación, acceso, capacitación y tecnología. **Consideraciones finales:** la CAA constituye un componente estratégico en las políticas públicas de salud. Los indicadores propuestos pueden apoyar a los gestores en el monitoreo de la equidad, la calidad y la toma de decisiones basada en evidencia.

Descriptores: Salud Pública; Indicadores de Calidad de la Atención de Salud; Parálisis Cerebral; Comunicación; Dispositivos de Autoayuda.

INTRODUCTION

Communication is a fundamental element for development, quality of life, and social participation. The presence of complex communication needs (CCN), characterized by the inability to effectively communicate needs and symptoms, may impose significant barriers to social interaction and access to healthcare services[1].

In the context of cerebral palsy (CP), the leading cause of physical disability in childhood, with a global prevalence of 2 to 3 per 1,000 live births, it is estimated that approximately 40% of children in Brazil present severe speech impairment[2]. This prevalence represents a challenge for the Brazilian Unified Health System (SUS - *Sistema Único de Saúde*), as

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communication difficulties may be associated with delays in diagnosis, inappropriate treatments, and potential health risks, resulting in social and economic costs[3].

Augmentative and alternative communication (AAC) encompasses a set of systems, strategies, and resources that can complement or replace speech, being recognized as a central intervention for individuals with CCN[4]. Recent evidence supports the effectiveness of AAC in expanding expressive skills, facilitating social interaction, and promoting participation among children with CP[5,6].

The relevance of AAC extends beyond the therapeutic context, positioning it as a strategic assistive technology for promoting functional communication, autonomy, and social participation among people with disabilities. In the context of Brazilian public policies, its adoption enhances comprehensive care and aligns directly with the principles of universality, integrality, and equity of the SUS, contributing to the reduction of communication barriers that historically compromise access, continuity of care, and social justice[6].

Although the body of evidence regarding AAC effectiveness has grown consistently in recent decades, significant gaps remain between scientific advancement and its effective incorporation into public healthcare and education services. These challenges include heterogeneity in professional training, insufficient standardized protocols, limited availability of devices, and the absence of indicators to guide assistive technology management. Such factors hinder large-scale implementation and highlight the need for structured actions aimed at assessment, monitoring, and qualification of practices[7].

Access to resources and services is often inconsistent, professional training may be insufficient, and there is a lack of standardized tools to monitor service quality. These disparities in implementation may compromise equity in access to healthcare and the right to inclusion[8,9].

Recently, the Brazilian legislative scenario has advanced with the approval of Bill 4,102/2024, which provides for the installation of low-technology AAC systems in public spaces. This legislative initiative, pending presidential approval, underscores the need to structure the provision and monitoring of AAC within public policies[10].

In this context, this study aimed to map evidence on the use of AAC in children with CP, analyzing the effectiveness of interventions and barriers to implementation, as well as proposing quality indicators for monitoring public healthcare services.

METHOD

This study is characterized as a scoping review based on JBI[11] methodological guidelines and structured according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses-Extension for Scoping Reviews (PRISMA-ScR)[12]. The review protocol was registered on the Open Science Framework platform under the identifier https://osf.io/w6hkg and remains temporarily embargoed due to the journal's blind review requirements.

A scoping review aims to map the available scientific literature on a given topic, identifying key concepts, knowledge gaps, types of evidence, and practices in broad and complex areas, especially those that are still underexplored or heterogeneous[13].

The guiding question was developed using the PCC strategy, considering as population individuals with CCN, with emphasis on children with CP; as concept, the use of AAC; and as context, scientific evidence on effectiveness and implementation in healthcare and education settings. Thus, the guiding question was: "What is the scientific evidence on the effectiveness and implementation of AAC for children with CP in healthcare and education settings?".

The bibliographic search was conducted in October 2025 in the databases PubMed, Web of Science, Embase, Scopus, Virtual Health Library (VHL), and *Coordenação de Aperfeiçoamento de Pessoal de Nível Superior* (CAPES), with no time restriction. Search strategies were adapted for each database using Health Sciences Descriptors and Boolean operators. In PubMed, the following expression was used: ((Augmentative Alternative Communication) AND (cerebral palsy)) AND (children OR child). In Web of Science, the search was structured as: Augmentative Alternative Communication (Topic) AND cerebral palsy (All Fields) AND children OR child (All Fields). For Embase, the combination applied was: ('augmentative and alternative communication'/exp) AND 'cerebral palsy' AND (children OR 'child'). In Scopus, the following was used: (TITLE-ABS-KEY (Augmentative Alternative Communication) AND TITLE-ABS-KEY (cerebral palsy) AND TITLE-ABS-KEY (children OR child)), with filters for articles, English or Portuguese language, and open access. In VHL, the strategy used was: (augmentative alternative communication) AND (cerebral palsy) AND (children OR child) AND instance: "lilacsplus". Finally, in the CAPES Theses and Dissertations Catalog, the strategy applied was: *Comunicação alternativa aumentativa* AND *paralisia cerebral* AND *criança* OR *crianças*.

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The search strategy included filters to ensure access to full texts, with no time restriction, in order to comprehensively cover relevant production on AAC. Open access articles and theses/dissertations indexed in CAPES, published in Portuguese, English, or Spanish, that investigated the application of AAC in individuals with CCN, with an emphasis on children and adolescents with CP between 0 and 18 years of age, were included. Studies describing interventions, devices, communication strategies, or outcomes related to the use of AAC were eligible.

Duplicate records, studies that did not directly address AAC or the population with CCN, as well as publications without full text availability, were excluded. Secondary works and theoretical studies lacking empirical data were also disregarded, including opinion articles, editorials, letters to the editor, brief communications, narrative or integrative reviews, and research protocols without published results.

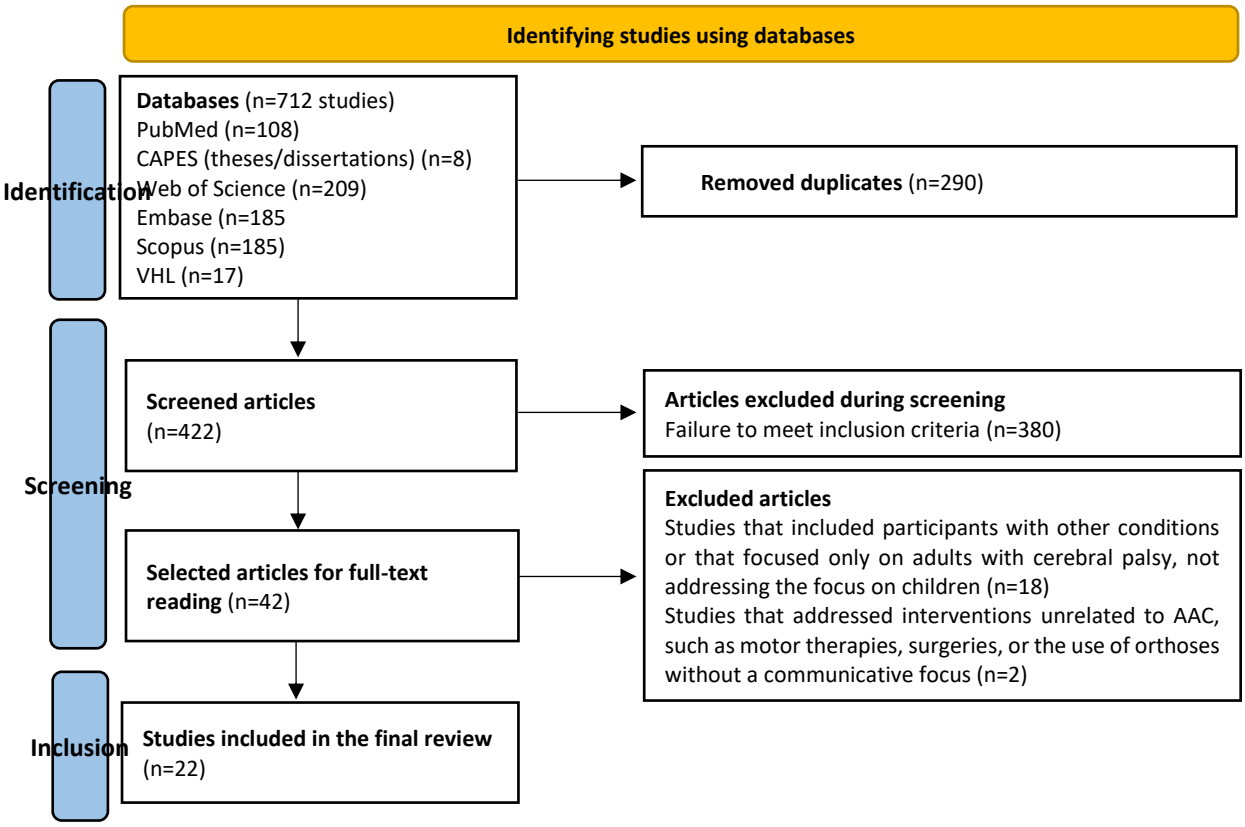
This was followed by thematic content analysis[14], resulting in three analytical categories: AAC Resources and Technologies; Implementation, Intervention, and Communication Partners; and Contexts, Development, and Participation. In addition, quality indicators for implementation were developed based on the synthesis of the collected evidence, grounded in the Donabedian Structure–Process–Outcome model, a classical framework for healthcare quality assessment[15,16].

This model assumes that quality results from the relationship between structure (available resources and conditions), process (actions and practices performed), and outcomes (impacts on the user), enabling the identification of weaknesses, guiding decision-making, and supporting the development of objective and comparable indicators[15,16].

For data extraction and summarization, a data collection instrument was developed including author(s), year/country, objective, study design, and conclusions. As this is a scoping review using publicly available data, ethical approval by a Research Ethics Committee was not required.

RESULTS

The initial search identified 712 studies. The process of identification, screening, and selection of studies was systematized according to the PRISMA flowchart, which summarizes each stage of the review until the final sample composition (Figure 1).



Notes: adapted from Preferred Reporting Items for Systematic Reviews and Meta-Analyses -Extension for Scoping Reviews (PRISMA-ScR): Checklist and Explanation[12].
Figure 1: Flowchart for identifying the process of selecting studies included in the review. Maringá, PR, Brazil, 2025.

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After removing duplicates (n=290) and screening (n=380), 42 studies were fully assessed. Eligibility criteria were then applied, and 22 studies were included (21 articles and one dissertation).

The 22 studies were published between 2007 and 2025 and originated from seven countries: Brazil (n=8), United States (n=5), United Kingdom (n=3), Norway (n=3), Sweden (n=2), South Africa (n=1), and Uruguay (n=1). Figure 2 summarizes the main characteristics and contributions of each selected study.

Main author[n], Country/Year	**Design**	**Main findings**
Rodrigues V[17], Brazil, 2016	Case study	Augmentative and alternative communication increased student participation in pedagogical activities, expanding expression, engagement, and meaning-making, strengthening their school inclusion.
Manzini MG[18], Brazil, 2021	Multiple baseline design	Partner training increased the diversity, frequency, and functionality of communicative acts, favoring the generalization and maintenance of communication in different natural contexts.
Manzini MG[19], Brazil, 2015	Action research	The maternal training program enhanced the daily use of augmentative and alternative communication at home, expanding interactions, promoting the child's active participation, and strengthening the mother's role as a communication partner.
Lillehaug HA[8], Norway, 2023	Registry study	Despite the high need, the provision of augmentative and alternative communication showed great variability among services, highlighting structural inequalities and an urgent need for national guidelines to standardize practices.
Deliberato D[20], Brazil, 2011	Intervention research	Augmentative and alternative communication generated important gains in communicative skills, strengthening its role as a facilitator of social participation and linguistic development in inclusive school contexts.
Savaldi-Harussi G[21], USA, 2019	Longitudinal study	Users of Speech-Generating Devices develop sentence structures similar to typical development, although influenced by device design and navigability.
Almeida MA[22], Brazil, 2005	Experience report	Adaptations of the Picture Exchange Communication System improved functional communication and expanded classroom interactions, promoting communicative autonomy and social participation in students with cerebral palsy.
Fiske SI[23], Norway, 2020	Psychometric validation	The Computer-Based Instrument for Low motor Language Testing demonstrated excellent psychometric properties, enabling accurate assessment of language comprehension in children with severe motor impairments.
Watson RM[24], United Kingdom, 2014	Survey	Research has shown that therapists use multimodal approaches focused on functionality, but face challenges such as lack of standardization, limited training, and resource constraints.
Buckeridge K[25], United Kingdom, 2024	Meta-synthesis	The review identified three central themes—communicative experiences, adaptation processes, and the construction of autonomy—revealing the emotional, social, and practical impacts of augmentative and alternative communication on families and children.
O'Regan E[9], Sweden, 2023	Cross-sectional study	Low frequency of cognitive assessments, discrepancies in access to linguistic support, and underutilization of augmentative and alternative communication were evident.
Kristoffersson E[26], Sweden, 2020	CPUP registry	Communicative methods varied according to age and motor level, showing that children at all levels of the Communication Function Classification System benefit from communicative multimodality.
McFadd ED[27], USA, 2020	Quantitative study	Children with severe speech deficits presented low vocal production and insufficient access to augmentative and alternative communication, suggesting structural gaps that hinder the provision of assistive resources.
Gómez AJV, Arcos FR[28], Uruguay, 2021	Case study	Teachers reported that Augmentative and Alternative Communication Systems reduced social isolation and anxiety, although technological barriers and limitations in device accessibility persisted.
Sousa AF[29], Brazil, 2015	Qualitative study	Despite the observed benefits, the implementation of augmentative and alternative communication in specialized educational support was limited by a lack of resources, reduced planning time, and poor working conditions.
Silva RLM[30], Brazil, 2013	Quanti-qualitative study	The intervention broadened communicative links, fostered greater engagement of the mother-child dyad, and strengthened responsiveness in interactions.
Caron JG[31], USA, 2025	Single-case study	The adapted literacy intervention significantly improved performance in letter-sound correspondence, demonstrating the potential of personalized programs.
Johnson E[32], South Africa, 2015	Focus groups	Professionals face difficulties in recognizing and communicating pain in non-speaking children, highlighting the need for cultural pain vocabularies.
Webb EJD[33], United Kingdom, 2019	Discrete choice experiment	Professionals made trade-offs by prioritizing attributes such as motivation and expected child progression in the choice of augmentative and alternative communication systems, revealing complex decision-making patterns.
Koopmans[34], USA, 2022	Non-parametric study	Individuals at the highest levels of the Communication Function Classification System presented severe communicative deficits, and literacy goals were prioritized over specific augmentative and alternative communication goals.
Cesa CC[35], Brazil, 2010	Qualitative study	The active participation of the family proved essential for the generalization of strategies, and the dialogical approach favored the joint construction of meanings and intersubjectivity.
Caron J[36], USA, 2025	Qualitative study	Augmentative and alternative communication introduction demanded family reorganization, producing new dynamics of cooperation and adjustments to achieve homeostasis.

Figure 2: Presentation and summary of the main findings of the studies included in the review. Maringá, PR, Brazil, 2025.

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Regarding study designs, 15 were quantitative, six qualitative, and one mixed. The thematic analysis allowed the identification of three central axes related to AAC implementation in public healthcare services. The first axis, Resources and Technologies[9,20–24,26,27,31,33,34], showed that the effectiveness of interventions depends on the alignment between the technology used—whether low- or high-complexity—and the children's motor and cognitive needs. In addition, it was observed that language acquisition among AAC users follows patterns similar to those of speaking children, reinforcing the importance of early intervention. In this sense, healthcare services must ensure equitable provision of the most appropriate technology, rather than merely the lowest-cost option.

The second axis, Implementation and Communication Partners[18,19,28,30,35], demonstrated that AAC interventions significantly increase the frequency and quality of communicative interactions. Active family participation and continuous training emerged as essential factors for generalizing and maintaining AAC use in home and community environments. Thus, the effectiveness of interventions requires a comprehensive care model that includes the preparation of family members and educators as a structural component of the healthcare service.

Finally, the axis Contexts and Participation[8,17,25,29,32,36] showed that AAC contributes to expanding children's social participation and reducing isolation. However, access remains inconsistent, with underuse of assessments, disparities in resource provision, and barriers related to healthcare professional training, highlighting geographic and socioeconomic inequalities. Therefore, systematic monitoring of AAC implementation is essential to ensure equity and quality in healthcare services.

Based on the synthesis of evidence and the analysis of implementation gaps, a set of 20 quality indicators is proposed (Figure 3).

ID	Indicator	Type (Donabedian[15])	Dimension	Conceptual reference
P1	Social Engagement Rate	Outcome	Participation	Social and functional impact assessment[25]
P2	Family Satisfaction with Communication	Outcome	Participation	Quality of life and acceptance of the intervention[36]
P3	Participation in Health Decision-Making	Process	Participation	Patient safety and autonomy[1]
P4	Augmentative and Alternative Communication Use Index in Non-Therapeutic Contexts	Outcome/Process	Participation	Generalization of communicative ability[18]
P5	Functional Literacy Rate	Outcome	Participation	Cognitive and educational development[31]
A1	Waiting Time for Augmentative and Alternative Communication Assessment	Structure/Process	Access	Early intervention and system responsiveness[8]
A2	Device Coverage Rate	Structure	Access	Equitable provision of assistive technology[8]
A3	Geographic Access Disparity	Outcome/Equity	Access	Assessment of equity and resource allocation[37]
A4	Access to Maintenance and Repair	Process	Access	Continuity of care and assistive technology abandonment[38]
A5	Augmentative and Alternative Communication Abandonment Rate	Outcome	Access	Adequacy of assessment and ongoing support[38]
Tr1	Percentage of Trained Professionals	Structure	Training	Technical quality of the intervention[9]
Tr2	Frequency of Communication Partner Training	Process	Training	Family support and generalization of use[35]
Tr3	Proportion of Multidisciplinary Assessments	Process	Training	Adequacy of the device (complex needs)[24]
Tr4	Adherence Rate to Assessment Protocols	Process	Training	Methodological rigor and standardization of the service[15]
Tr5	Availability of Support Material in Portuguese	Structure	Training	Cultural and linguistic barriers[37]
T1	Ratio of Low vs. High Technology Devices	Structure	Technology	Technology suitability to the need[21]
T2	Technology Suitability to Skill Level	Outcome	Technology	Quality of technological selection and personalization[26]
T3	Technological Infrastructure Update Rate	Structure	Technology	Sustainability and access to innovation[33]
T4	Availability of Access Accessories	Structure	Technology	Overcoming motor barriers[23]
T5	Social Cost-Effectiveness of Technology	Outcome/Economic	Technology	Justification for investment in public health[16]

Notes: *P = Participation; A = Access; Tr = Training; T = Technology

Figure 3: Proposal of 20 quality indicators for augmentative and alternative communication implementation in public health. Maringá, PR, Brazil, 2025.

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The indicators were organized into four dimensions—Participation, Access, Training, and Technology—aligned with the Donabedian Structure-Process-Outcome model[15,16], aiming to provide SUS managers with operational tools for monitoring equity and quality in assistive technology provision.

These four dimensions reflect essential pillars for improving AAC implementation in public healthcare services. The Participation dimension includes indicators related to the social, educational, and communicative effects of interventions, emphasizing engagement, family satisfaction, and functional use of AAC across contexts (P1-P5).

The Access dimension comprises measures related to equity, availability of devices, service responsiveness, and continuity of care, enabling the identification of structural and geographic barriers affecting assistive technology provision (A1-A5). The Training dimension addresses aspects related to healthcare professional qualification, adherence to protocols, and support provided to communication partners, recognizing the central role of multidisciplinary competence in intervention success (Tr1-Tr5).

Finally, the Technology dimension includes indicators that assess adequacy, updating, cost-effectiveness, and accessibility of technological resources, ensuring alignment with users' clinical and motor needs (T1-T5).

DISCUSSION

This scoping review synthesized 22 studies on the use of AAC in children with CP, corroborating its effectiveness and identifying relevant barriers to its large-scale implementation. The main contribution of this study lies in the proposal of 20 quality indicators, structured for application in monitoring assistive technology within the SUS. It is expected that these indicators may improve AAC planning, provision, and assessment in Brazil.

The synthesis of evidence reinforces the potential of AAC for developing communicative competence and promoting social participation among children with CP. However, the disparity observed between accumulated scientific knowledge and clinical practice, especially within public healthcare services, highlights the need for a more robust quality monitoring system. The proposal of the 20 indicators, grounded in the Donabedian model[15], provides a strategic tool for assistive technology management, enabling a multifaceted analysis of implementation challenges.

The findings of this review are consistent with international literature, which, on one hand, highlights the effectiveness of AAC in promoting autonomy and participation[25] and, on the other, emphasizes persistent barriers such as limited training of healthcare professionals and inconsistency in service provision[8]. The distinctive contribution of this study is the translation of this evidence into a practical management tool: a set of quality indicators aligned with the needs of the Brazilian public healthcare system.

To operationalize this tool, the indicators were developed based on the systematic mapping of barriers identified in the 22 included studies. The barrier related to "lack of professional training and absence of standardized protocols," identified across multiple healthcare services, led to the creation of four complementary indicators within the Training dimension: "Percentage of Trained Healthcare Professionals" (Tr1), "Frequency of Communication Partner Training" (Tr2), "Proportion of Multidisciplinary Assessments" (Tr3), and "Adherence Rate to Assessment Protocols" (Tr4). This multidimensional approach captures not only initial training but also continuous qualification and the effective implementation of evidence-based practices.

The proposed indicators, organized into the dimensions of Participation, Access, Training, and Technology, provide an operational framework for SUS managers. For example, the indicator "Waiting Time for Augmentative and Alternative Communication Assessment" (A1) enables measurement of system responsiveness at the point of entry[8], while the indicator "Augmentative and Alternative Communication Abandonment Rate" (A5) may signal failures in follow-up processes or inadequacies in selected technologies[38].

The use of these indicators can provide an empirical basis for identifying bottlenecks, guiding resource allocation, and monitoring the implementation of public policies, such as the forthcoming legislation on communication accessibility[10].

AAC implementation in the SUS requires a systemic and continuous approach. The absence of quality indicators hinders the investment impact assessment and the assurance of equitable access to communication. It is expected that the indicators proposed here may provide healthcare service managers, health councils, and civil society with a tool for social control and continuous improvement of services.

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Moreover, the articulation of the 20 indicators allows managers to identify specific challenges at different levels of the healthcare system, including structure (e.g., availability of devices and trained healthcare professionals), process (e.g., frequency of communication partner training), and outcomes (e.g., low social engagement and high AAC abandonment rates). This approach may contribute to transforming AAC from an isolated intervention into a measurable public policy with assessable social impact.

Evidence indicates that communicative ability is strongly associated with motor skills and the communication method used, reinforcing the importance of the indicator "Technology Suitability to Skill Level" (T2) as a key quality metric[26]. Another relevant finding concerns gaps in cognitive assessment and access to interpreters and AAC resources, as studies indicate significant underutilization of these services even in structured healthcare systems. This supports the need for indicators such as "Adherence Rate to Assessment Protocols" (Tr4) to monitor the regularity and standardization of cognitive assessments within the SUS[9,39].

Additionally, family participation plays a central role in sustaining AAC use. The lack of continuous training compromises the generalization of communicative skills, justifying the inclusion of indicators such as "Frequency of Communication Partner Training" (Tr2) and "Family Satisfaction with Communication" (P2)[35,40].

Recent studies also highlight the relevance of device design and technological usability as factors that directly influence language acquisition, indicating that sentence construction in speech-generating devices is sensitive to vocabulary organization and interface structure. These findings support the inclusion of indicators such as "Technological Infrastructure Update Rate" (T3) and "Availability of Access Accessories" (T4)[21,41].

From an international perspective, countries with consolidated national registries demonstrate a greater capacity for monitoring and systematically providing AAC. Experiences from Norway and Sweden highlight the importance of structured databases capable of identifying inconsistencies in cognitive assessment and in device provision. This reinforces the relevance of the structure and process indicators proposed in this review, such as those related to technological coverage and adherence to assessment protocols[8,9]. The comparison between contexts shows that the absence of national registries limits the capacity for quality surveillance, making the use of standardized indicators even more strategic for guiding management decisions.

From a policy perspective, the convergence between evidence and emerging legislation, such as Bill 4,102/2024, highlights the urgency of a regulatory model that ensures not only the availability of communication resources but also their qualified implementation[10]. The indicators proposed in this review provide an operational basis for translating legal guidelines into measurable practices, enabling monitoring of territorial equity, service responsiveness, and technological sustainability. Clinically, the findings reinforce that AAC should be considered a structural component of interdisciplinary care, extending beyond communication to include autonomy, functional literacy, patient safety, and social participation.

The clinical implications of the findings reinforce that AAC should be seen as a structuring component of interdisciplinary care, going beyond its exclusively communicative function to integrate the promotion of autonomy, functional literacy, patient safety, and social participation. Indicators such as social engagement, functional literacy, and participation in health decisions allow these dimensions to be translated into concrete metrics, aligning with the principle of comprehensiveness of SUS and contributing to reducing inequalities in access to communication[25,32].

Study limitations

As a limitation, this review focused on children with CP; however, the proposed indicators are potentially adaptable to other populations with CCN. Future studies should focus on validating and piloting these indicators in different SUS contexts to assess their usefulness for decision-making and their impact on users' quality of life. For nursing, the findings provide relevant support for improving clinical and managerial practices, expanding the role of nurses in the assessment, monitoring, and promotion of effective AAC use as part of comprehensive, patient-centered care.

FINAL CONSIDERATIONS

Scientific evidence gathered in this scoping review demonstrates that AAC is an effective intervention for enhancing communicative skills, promoting autonomy, and strengthening social participation among children with CP. However, the analysis of implementation gaps indicates that its effectiveness depends on robust organizational

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structures, standardized practices, and continuous assessment mechanisms to ensure equitable access and qualified care within public healthcare services.

The twenty proposed quality indicators represent an innovative and pragmatic contribution to strengthening assistive technology policy in the SUS by providing measurable parameters to guide planning, monitoring, and evidence-based decision-making. By operationalizing essential dimensions (participation, access, training, and technology), these indicators have the potential to transform AAC from a fragmented practice into a systematic strategy for communication inclusion. It is expected that such indicators can support the formulation of public policies, improve management, and support the translation of future legislation into qualified access.

Their systematic implementation could support the translation of emerging legislation into effective access, reduce territorial disparities, and promote more transparent and responsive decision-making processes, directly impacting the autonomy and quality of life of children with CP and their families. It is recommended that future studies validate these indicators in different healthcare service contexts, expanding their scalability and contributing to the consolidation of a national AAC monitoring model within the SUS.

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Use of artificial intelligence tools

Authors declare the use of ChatGPT® 5.1 (OpenAI) to exclusively support linguistic writing and text improvement on the manuscript "*Augmentative and alternative communication in the SUS: a scoping review and proposal of indicators in assistive technology*", without intervening in data analysis, interpretation of results, or formulation of scientific conclusions. All intellectual and scientific decisions remain the sole responsibility of the authors.