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Visual supports to create child-friendly environments in a pediatric hospital: A mixed-methods study

Anabella Escalante[1], *Celina Lejarraga*[2], *Estela C. Rodríguez*[2]

ABSTRACT

Introduction. Effective communication between patients and healthcare workers (HCW) is central to the healthcare process; it affects the quality of care, safety, outcomes, and satisfaction of both patients and HCW. Visual aids (VAs) facilitate communication by reducing anxiety and promoting more tolerable experiences within the hospital.

Objective. To describe the acceptance of the use of VAs to anticipate medical procedures in a pediatric hospital by families and HCWs.

Population and methods. Descriptive, cross-sectional, and qualitative-quantitative study. Frequent medical procedures and their corresponding VAs were selected, and HCWs were trained in their use. Acceptance of the VAs was assessed among caregivers and HCWs through semi-structured surveys and qualitative analysis of field notes.

Results. Seventy-two surveys were collected from caregivers and 24 from healthcare providers. All healthcare providers used VAs at least once; 23/24 reported that patients understood the situation better, and 18/24 reported reduced stress and a simplified procedure. Among caregivers, 69/72 reported some degree of improvement in understanding the procedure, reduced stress, and greater tolerance of the experience. Qualitative analysis revealed strong acceptance of VAs, greater patient participation, and difficulties due to time constraints and organizational challenges.

Conclusion. The findings suggest good acceptance and provide preliminary information to guide future studies in other institutional settings.

Keywords: *pediatrics; health communication; hospital communication systems; patient-centered care; audiovisual resources.*

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[1] *Hospital General de Agudos José María Ramos Mejía, Autonomous City of Buenos Aires, Argentina;* [2] *Interdisciplinary Neurodevelopment Clinics Service, Hospital de Pediatría S.A.M.I.C. Prof. Dr. Juan P. Garrahan, Autonomous City of Buenos Aires, Argentina.*

Correspondence to *Anabella Escalante: ase.escalante@gmail.com*

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INTRODUCTION

Communication is central to the healthcare process. It is essential for accessing medical care, participating in decision-making, and ensuring quality care.[1] It affects the safety, outcomes, and satisfaction of patients and healthcare teams. The healthcare process is emotionally threatening for children and adolescents, who are especially susceptible to experiencing emotions such as fear and anxiety due to the characteristics of the hospital environment: constant movement, care by unfamiliar healthcare personnel, lack of anticipation about what will happen, and invasive procedures. This can be associated with disruptive attitudes, withdrawal, and/or a lack of cooperation, affecting the patient's, family's, and HCWs' experience, leading to dissatisfaction, delayed treatment, and prolonged care times.[2,3]

To mitigate this negative emotional impact during care, it is essential to inform the patient and their family in advance about the procedures to be performed, ensuring their understanding. When patients and their families know what to expect, they experience less fear and anxiety.[4] This guarantees the right to receive information related to well-being and health, in accordance with the principles of the Convention on the Rights of the Child and reflects the "patient- and family-centered care" approach.[5]

Strategies for creating more understandable and user-friendly healthcare environments can be summarized under the concept of accessibility, which means something is easy to access. Cognitive accessibility is the characteristic of environments, products, services, and processes that allow for easy understanding and visual communication.[6] Augmentative and alternative communication (AAC) systems are tools that facilitate communication and understanding of processes and environments. They promote temporal organization, reduce memorization, and create accessible environments.[7] Visual aids (VAs) are a form of AAC that convert verbal information into visual information, and the graphic symbol representing an action or object is called a pictogram (*Supplementary Material 1*).

Despite the importance of AAC in health care, research remains in its infancy. Some studies evaluating their use in pediatric patients suggest a positive impact on the patient experience,[8-10] focusing mainly on nursing staff use.[4,8-10]

It is suggested that AAC be included among the communication tools available in hospitals and other healthcare institutions.[11,12]

This research project seeks to promote the use of AAC systems by HCWs.

OBJECTIVES

- Primary: to describe the acceptance of the use of VAs to anticipate medical procedures in a pediatric hospital by families and healthcare professionals.
- Secondary: to identify positive aspects, difficulties, and necessary modifications in its use; to explore the perception of usefulness and feasibility in different sectors of the hospital.

POPULATION AND METHODS

The study was conducted at the Hospital de Pediatría S.A.M.I.C. Prof. Dr. Juan P. Garrahan in the Autonomous City of Buenos Aires (Argentina) between October 2022 and September 2023.

It is a descriptive, cross-sectional, mixed-method, qualitative-quantitative study. It was carried out through a research grant awarded by the Sociedad Argentina de Pediatría.

Population

The study population consisted of the healthcare team, made up of doctors and nurses, and the caregivers/families of children and adolescents who were treated in the following areas of the hospital: Low-Risk Clinic (walk-in), Residents' Clinic, Emergency Unit (EU), and an inpatient ward (CIM, by its Spanish acronym).

The VAs were used without age restrictions (since they are useful at any age), and, for infants or young children, their use was directed to the caregiver.

The sampling method was convenience sampling. All children and adolescents and their families or caregivers treated in these sectors were included, excluding those who underwent procedures not covered by the study. An average of 10-20 members of the health staff work in each sector. Approximately 130 children and adolescents are treated in the outpatient area per day, 180 in the emergency department, and 20 in the inpatient area.

Incorporation of visual aids

The healthcare teams in these sectors used VAs to anticipate frequent medical procedures, thereby complementing the verbal explanation provided before the procedures. In other words, when informing the patient and their family about the procedure, the professional showed

the corresponding image, either in a previously prepared folder or by pointing to it on the wall.

The research project was carried out in two stages: preparation and implementation. This process is detailed in *Table 1*.

The pictograms were downloaded from the Centro Aragonés para la Comunicación Aumentativa y Alternativa (Arasaac, by its Spanish acronym) website.[13] Some of the images used are shown in *Figure 1*.

Procedure for collecting information

Information about the implementation of VAs was collected in three instances:

Field notes (descriptive): observations on behavior and perceptions during the use of VAs were recorded in writing.

Regular meetings with the healthcare team: open-ended questions were asked about the process, use of the material, characteristics, acceptance, and any difficulties that arose.

A semi-structured survey of families and HCWs was developed *ad hoc* for this project. The surveys were based on the model used in Chebuhar's work,[12] and Chebuhar was consulted for advice on the design. Each survey consisted of seven questions and an optional space for comments. The responses were structured on a

Table 1. Preparatory and implementation stages for the incorporation of visual aids

Stage 1: Preparatory	
Month 1	**1. Informative meetings with healthcare teams:** a total of 19 meetings were held, more than once in each sector, to reach as many staff members as possible, considering staff rotation (residents and fellows). Information about the project and the use of AAC systems. Selection of procedures to be anticipated according to each sector and organization for use (days on which they would be used). The procedures selected were physical examination, anthropometry, blood pressure measurement, nasogastric tube placement, venous access, respiratory mask and nasal cannula, blood collection, oral and intravenous medication administration, electrocardiogram, suturing, and enema. **2. Preparation of visual aids** Virtual meeting with Arasaac: guidance was obtained on the design characteristics of the VAs and strategies for their use. Selection of VAs from the Arasaac website (if no image was available, Arasaac designed it). Assembling the sequence of images to represent each procedure: the AVs were printed in two sizes (A4 or A5, depending on their purpose and frequency of use) and laminated. Each VA had a brief text below it describing the procedure it represented. Calculation of the number of images needed. **3. Approval of the budget for printing and laminating the material.** **4. Pilot test:** use of VAs for one week in each sector. After the first use, some design features were modified, and the usage schedule was restructured. **5. Field notes on the first stage.**
Stage 2: Implementation	
Months 3 to 9	**1. Distribution of material in each sector:** A4-size AVs were posted on the wall, next to the stretchers or scales. Less frequently used procedures were printed on A5 paper and organized into folders, which were distributed in rooms and offices. A total of 180 images were distributed. **2. Implementation began in the third month of the project.** Throughout this stage, meetings were held with healthcare teams across sectors, and field notes were taken on the information collected. **3. Surveys:** Caregivers completed the survey at the end of the care period and within 24 hours before discharge, in the case of those who were hospitalized. HCWs completed the survey once stage 2 was completed. **4. Field notes taken on stage 2.**

AAC: augmentative and alternative communication systems; Arasaac: Centro Aragonés para la Comunicación Aumentativa y Alternativa (by its Spanish acronym); VA: visual aid.

three-point descriptive and ordinal scale for most responses and on a binary scale for only one (*Supplementary Material 2*).

The information collected was subjected to mixed analysis. The survey responses were analyzed using descriptive statistics.

Continuous variables (age) were described using mean, median, and range. Proportions were calculated for categorical variables (gender, procedure, sector, position, and role of the HCW, knowledge about VAs, improvements in understanding, tolerance, and stress) and for the HCWs (frequency of use, likelihood of future use, and interest in the topic).

For the qualitative analysis, a thematic analysis approach was used. The qualitative information obtained through field notes and regular meetings with HCWs was broken down into phrases and sentences and condensed into dimensions or units of meaning. These were grouped into three conceptual categories based on their frequency: positive aspects of using visual aids, modifications to the graphic material, and difficulties in implementing them. The feasibility of use was analyzed globally.

The information collected in the surveys was compiled in a database designed for this purpose on the Red Cap (Research Electronic Data Capture, by its Spanish acronym) platform.

Ethical considerations

The study was approved by the Research Ethics Review Committee of Hospital Garrahan (October 2, 2023). HCWs expressed willingness to participate during the informational meetings, and patients and caregivers were informed of the project before the use of the VAs.

RESULTS

Seventy-two surveys were collected from caregivers and 24 from HCW.

The tool was well-received and accepted by families and the healthcare team. In 69 of the 72 caregiver surveys and 23 of the 24 HCWs surveys, some degree of improvement in understanding the procedures with the use of VAs was reported.

Caregiver surveys

The average age of children and adolescents was 62 months, ranging from 8 to 183 months; 41 were male.

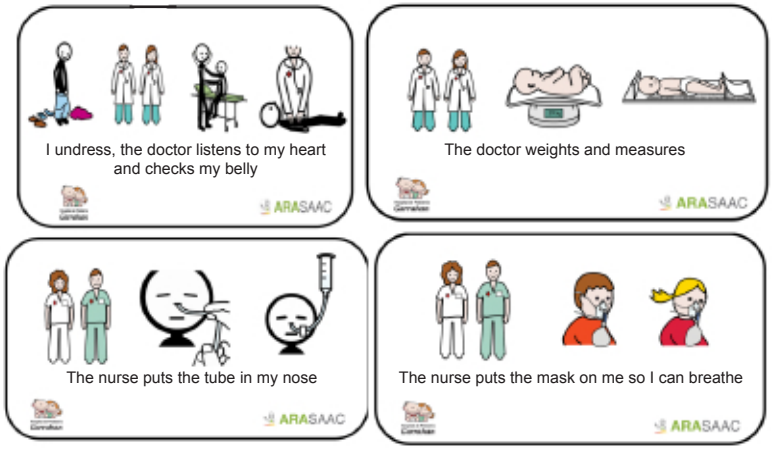
Of the 72 surveys, 55 were obtained in outpatient care sectors. The most anticipated procedure in all sectors was physical examination (N = 58), followed by oral examination (N = 21) and anthropometry (N = 16).

Figure 2 shows the results of the caregiver surveys.

Healthcare workers surveys

Of the total number of surveys, 15 were completed in the outpatient care sectors. The respondents were 18 physicians and 6 nurses; 13 held permanent positions. The results of the HCWs surveys are shown in *Figure 3.*

Figure 1. Visual aids to anticipate physical examination, anthropometry, nasogastric tube placement, and mask with reservoir



Source: adapted from Centro Aragonés para la Comunicación Aumentativa y Alternativa (Arasaac, by its Spanish acronym).

Analysis of qualitative information

Qualitative information is detailed in *Table 2*.

Supplementary Material 3 includes comments made by caregivers and HCWs.

DISCUSSION

This study explores perceptions and experiences of VAs' use in a healthcare setting. Although its use is well known in therapeutic and school settings, its incorporation into a hospital is novel.

Recently, the use of VAs in health care has begun to spread in Argentina. The National Disability Council developed a guide for anticipating COVID-19 vaccination in people with autistic spectrum disorder (ASD);[14] the Buenos Aires Ministry of Health published a guide for the use of pictograms in healthcare institutions,[15] and the Child Development Service of San Luis (Argentina) developed a booklet with VAs to facilitate understanding of the hospital environment.[16]

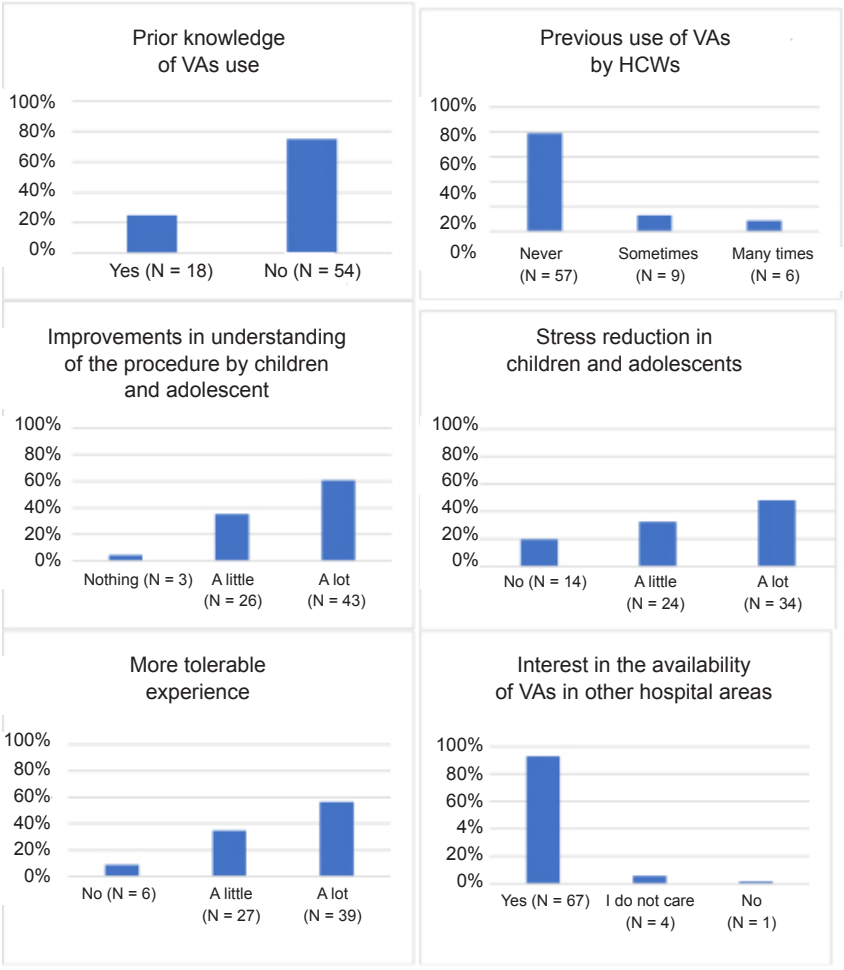
These works refer to application protocols, but there are no studies describing perceptions of their use among HCWs, patients, or their families.

Although most healthcare professionals and families lacked knowledge and experience with VAs, the tool was well-received. Healthcare teams participated in the informational talks with interest and agreed to participate in the project.

All HCWs surveyed used VAs at least once, and during regular meetings, professionals who were familiar with the tool tended to use it more.

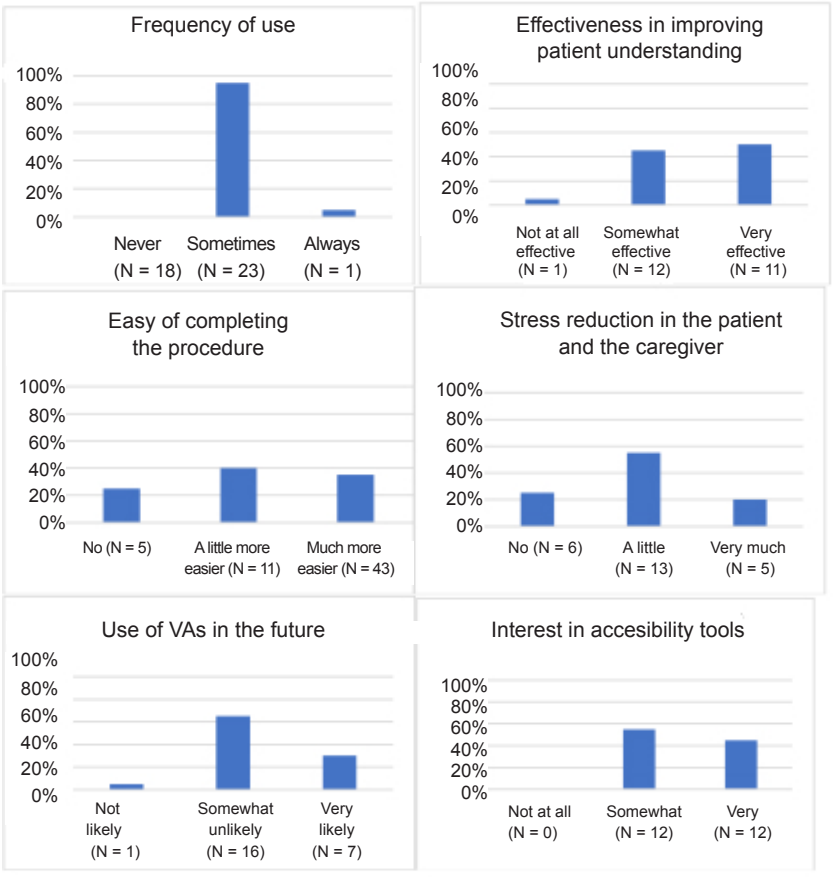
Although 23/24 healthcare professionals reported some degree of effectiveness in the children and adolescents' understanding of the

Figure 2. Results of surveys of parents and/or caregivers



VAs: visual aids; HCWs: healthcare workers.

Figure 3. Results of surveys of healthcare workers



VAs: visual aids.

Table 2. Information obtained from field notes and meetings with the health team

Positive aspects of using visual aids	• HWCs reported a positive perception of patients during image use, noting better patient participation for some procedures (mainly physical examination). • Greater frequency of use was observed among HCWs who were familiar with the use of VAs beforehand, • The material distributed at the beginning of the project was the same as that used throughout the process, with no loss or breakage.
Modifications to the graphic material	• Many professionals who did not participate in the initial project showed interest. • In some areas (inpatient ward and emergency unit), the presence of posters or devices on the wall made it difficult to see the VAs, so they were provided in a smaller size. • In the inpatient ward, it was necessary to modify images depicting some HCWs, so new VAs were created using a generic pictogram.
Difficulties in using VAs	• Little use was observed on the agreed days in each sector. • Different strategies were implemented to reinforce use (modification of days, selection of permanent staff), with little adherence. • The most frequently identified factors included lack of time during the care process and lack of systematization in use due to organizational difficulties. • Difficulties were observed in the administration and collection of surveys from patients and caregivers.

HCWs: healthcare workers; VAs: visual aids.

procedure, its use was not systematic. Among the factors associated with this situation, the lack of time due to the demands of daily work was a recurring theme in regular meetings and in open-ended survey responses (*Appendix 3*). This was also pointed out by Rossich,[1] who identifies lack of time and high demand for care as significant obstacles.

Several studies have analyzed the difficulties associated with the use of AAC.[17] Moorcroft[18] mentions that there are few training opportunities in AAC use, a lack of time to implement them, and a lack of available materials.

This was observed in differences in VAs use by sector: in outpatient care (where scheduled or less complex patients are treated), VAs use was more frequent and more regular. In contrast, in sectors where more complex patients are treated (inpatient and emergency wards), HCWs frequently reported not having enough time to use them. Although strategies such as schedule adjustments and the selection of fixed references were implemented, administering VAs remained difficult. Zaylskie[17] reported that using AAC systems requires time and that, although HCWs reported that communication was important, it was not always possible to prioritize it.

HCWs expressed interest in cognitive accessibility tools and in specific training on AAC systems. The lack of training in the use of AAC systems was reported in several studies.[1,8,10,18,19] Although they are useful, accessible, and low-cost tools, their teaching is not usually included in the undergraduate or graduate training of health professionals.

For future research, it would be important to identify the main difficulties in using the device beyond the lack of training on the subject.

One aspect that emerged during the project was the interest shown by HCWs from sectors that did not participate in the project, who, upon seeing the VAs distributed in the hospital, approached to request information and showed interest in incorporating this tool. It is worth mentioning that the mere presence of the VAs enables spontaneous viewing (due to their location and size) by some children and adolescents (although this was not analyzed directly, some professionals reported in regular meetings that both patients and parents mentioned them without the staff showing them directly).

Among the project's limitations is the use of convenience sampling, which can introduce bias and limit the generalizability of results. A small number of surveys were also obtained. Some professionals commented that they often used VAs but did not ask caregivers to complete the survey. This difficulty in data collection has already been documented by Chebuhar *et al*.[10] The lack of objective indicators of implementation and results means that the findings are not generalizable and should be considered perceptions and experiences, making it impossible to infer real effects on clinical performance.

As a result of this project, two similar initiatives were developed in other hospitals, such as the Hospital Interzonal General de Agudos Dr. Abraham F. Piñeyro in Junín (Argentina)[15] and the Hospital de Rehabilitación Manuel Rocca in the Autonomous City of Buenos Aires (Argentina).

It is essential to promote AAC systems as health communication strategies. Incorporating these systems into institutional policy involves establishing clear guidelines for their systematic use, including training, provision of adapted materials, and implementation protocols. That is why this approach to the use of AAC systems in healthcare settings provides a basis for developing future projects in other areas of care, constituting a valuable starting point for designing subsequent studies focused on the implementation and adaptation of AAC systems across various institutional contexts.

CONCLUSION

This study is among the first in our field of work to describe the implementation of VAs in hospital settings, also considering the perceptions of healthcare professionals and caregivers.

The study findings suggest good acceptance of the tool and provide relevant preliminary information to guide the design and development of future research in other institutional settings, thereby contributing to the evaluation of its applicability, feasibility, and potential impact. ■

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