

Construction and validation of Comics at children with acute lymphocytic leukemia

Construção e validação de História em Quadrinhos para crianças com leucemia linfoide aguda Construcción y validación de Cómics a niños con leucemia linfocítica aguda

ABSTRACT

Giovani Basso da Silva¹ Luccas Melo de Souza¹ Simone Travi Canabarro¹

1. Universidade Federal de Ciências da Saúde de Porto Alegre. Porto Alegre, RS, Brasil. Introduction: Cancer has an impact on the lives of children and their families. Comics can be a strategy to strengthen the bond and communication between professional/patient/family. **Objective:** To develop and validate an instructional/educational material, in the format of Comics, aimed at children hospitalized with acute lymphocytic leukemia. **Methodology:** Methodological study developed in nine stages: preparation of the research project; content definition and selection; language adaptation; inclusion of illustrations; construction of a pilot material; validation of the material; layout; final printing and availability. Validation tok place with 10 specialists between March and May 2022, using the Health Education Content Validation Instrument. **Results:** 5 Comics were created, with 6 main characters, requiring 63 hours of work. They were divided by themes (gastrointestinal disorders; hemorrhagic cystitis; problems related to self-esteem and self-image; risk of infection and bone pain) that obtained a satisfactory global Content Validity Index between 0.78 and 0.87. **Conclusions and implications for practice:** Comics can be used as an attractive and reliable source of information about the disease, supporting information during hospitalization and preparation for discharge.

Keywords: Child; Health education; Nursing; Comic; Acute lymphoid leukemia.

Resumo

Introdução: O câncer tem impacto na vida das crianças e seus familiares. As Histórias em Quadrinhos podem ser uma estratégia de fortalecer o vínculo e a comunicação entre profissional/paciente/família. Objetivo: Desenvolver e validar um material instrucional/educativo, no formato de Histórias em Quadrinhos, voltada para crianças hospitalizadas com leucemia linfóide aguda. Metodologia: Estudo metodológico desenvolvido em nove etapas: elaboração do projeto de pesquisa; definição e seleção do conteúdo; adaptação da linguagem; inclusão de ilustrações; construção de um material piloto; validação do material; *layout*; impressão final e disponibilização. A validação ocorreu com 10 especialistas entre março e maio de 2022, utilizando-se o Instrumento de Validação de Conteúdo Educativo em Saúde. **Resultados:** Foram elaboradas 5 Histórias em Quadrinhos, com 6 personagens principais, sendo necessárias 63 horas de trabalho. Elas foram divididas por temáticas (distúrbios gastrointestinais; cistite hemorrágica; problemas relacionados a autoestima e autoimagem; risco de infecção e dor óssea) que obtiveram Índice de Validade de Conteúdo global satisfatório entre 0,78 e 0,87. **Conclusões e implicações para a prática:** As histórias em quadrinhos podem ser utilizadas como fonte atrativa e confiável de informações sobre a doença, servindo como apoio às informações durante a internação hospitalar e o preparo para alta.

Palavras-chave: Criança; Educação em Saúde; Enfermagem; História em Quadrinhos; Leucemia Linfoide Aguda.

RESUMEN

Introducción: El cáncer tiene un impacto en la vida de los niños y sus familias. Los cómics pueden ser una estrategia para fortalecer el vínculo y la comunicación entre profesional/paciente/familia. Objetivo: Desarrollar y validar un material didáctico/educativo, en formato de Historietas, dirigido a niños hospitalizados con leucemia linfocítica aguda. Metodología: Estudio metodológico desarrollado en nueve etapas: elaboración del proyecto de investigación; definición y selección de contenidos; adaptación lingüística; inclusión de ilustraciones; construcción de un material piloto; validación del material; disposición; impresión final y disponibilidad. La validación se realizó con 10 especialistas entre marzo y mayo de 2022, utilizando el Instrumento de Validación de Contenido de Educación en Salud. Resultados: Se crearon 5 Comics, con 6 personajes principales, requiriendo 63 horas de trabajo. Fueron divididos por temas (trastornos gastrointestinales; cistitis hemorrágica; problemas relacionados con la autoestima y la autoimagen; riesgo de infección y dolor óseo) que obtuvieron un Índice de Validez de Contenido global satisfactorio entre 0,78 y 0,87. Conclusiones e implicaciones para la práctica: Los cómics pueden ser utilizados como una fuente atractiva y confiable de información sobre la enfermedad, apoyando información durante la hospitalización y preparación para el alta.

Palabras clave: Niño; Educación para la salud; Enfermería; Cómic; Leucemia linfoide aguda.

Corresponding author: Giovani Basso da Silva. E-mail: giovanids@ufcspa.edu.br

Submitted on 01/11/2023. Accepted on 12/26/2023.

DOI:https://doi.org/10.1590/2177-9465-EAN-2022-0419en

INTRODUCTION

Cancer is characterized as a malignant neoplasm, marked by abnormal and disordered cell growth, which can occur in any part of the body.¹ In pediatric patients, it differs in its histology and frequency, generally affecting hematopoietic cells and connective tissues. Among the child and adolescent population, the most common forms are leukemias and lymphomas. The incidence of leukemia is 3 to 4 cases per 100,000 children under 15 years of age, with the highest prevalence peak between 3 and 5 years.^{2,3}Therefore, initiatives that address the treatment of this population are essential.

Acute lymphoblastic leukemia (ALL), in the context of pediatric oncology, is the leading cause of death among children and adolescents. It is characterized by a genetic error in which an immature lymphocyte fails to develop into a functional blood cell.^{2,3} Its diagnosis brings distress to both the family and the patient, as it is associated with lifestyle changes, medication use, recurring/prolonged hospitalizations, and fear of death. Frequently, pain, fear, distress, and premature maturation are observed in children with cancer.⁴⁻⁶

Maintaining a therapeutic conversation in the nurse-patientfamily triad is crucial for understanding the health-disease process.⁶ In this respect, there are different ways to ensure that the professional's integration into the child's care occurs with quality, one of which is the therapeutic toy (TT), which serves various purposes, including being a dramatic, function-enhancing, or instructional/educational toy. It is a playful way to bring the child closer to the procedures being performed, as it uses playful language, allowing for a smoother and less unpleasant process.⁶ Playfulness can then assist in understanding and accepting the health-disease process, offering a way for parents and children to adapt to the "new normal" in these families' daily lives.^{57,8}

Analyzing various ways to integrate playfulness into daily life, it's evident that Comic Books (CB) create bonds of care and openness to understanding others. They have been part of children's lives from an early age, often being the first contact with reading. As they are written and illustrated, CBs facilitate the impact and stimulation of reading and curiosity, as well as a boost in creativity and reasoning.⁹

When CBs are designed for the healthcare field, and more specifically for pediatric nursing, they can promote qualified care focused on humanity and the uniqueness of each patient.⁹ In healthcare, CBs can serve the function of a TT, more specifically of the instructional/educational type, as a strategy to enhance and strengthen the bond and communication between professional/ patient/family.⁹

Given these considerations, the importance of studying the construction and validation of an educational material in the form of CBs focused on the needs of children during prolonged oncological treatment is translated. The context of ALL was chosen for the plot and main character, as it is one of the most prevalent and incident causes in the pediatric audience, given the need to bring reality to light, through the identification of the audience and the child present in the story.^{2,3} Hospitalized children were also chosen as the context for the beginning of the treatment. Considering the above, the present investigation began with the following research question: "How to construct and validate an educational material, in the form of CB, that demonstrates and problematizes the daily life of a child with hospitalized ALL?" Thus, the study aims to develop and validate an educational material, in the form of Comic Books, for children hospitalized with ALL.

METHODOLOGY

This is a methodological study for the development and validation of an educational material. The steps proposed by Echer, and Oliveira, Lucena, and Echer,^{10,11} which divide the construction of educational materials into nine stages, were followed: development of the research project; definition and selection of content; adaptation of language; inclusion of illustrations; construction of a pilot material; validation of the material; layout of the material; final printing of the material, and dissemination of the material. Two nurses with doctoral degrees (one of whom is a specialist in child and adolescent health) and a nursing student with experience in creating comic books comprised the team for creating the comics and conducting the study.

All stages were carried out between January and September 2022, virtually, to ensure greater accessibility and availability for the researchers and participating expert judges. For the construction of the learning object, within the content definition and selection stage, an active and free search was conducted in nursing literature and databases/portals to list the main conditions found during the treatment of children with ALL.

The book "WONG Fundamentals of Pediatric Nursing"¹² was used to start the selection of themes. The following were listed according to the authors' analysis: nausea and vomiting, anemia, altered nutrition, mucosal ulceration, hemorrhagic cystitis, alopecia, risk of infection, and bone pain.

Additionally, articles were consulted to support the theoretical content of the comics in the following databases: Portal Regional da Biblioteca Virtual em Saúde®, SciVerseScopus®, Embase® e Web of Science®. For this search, truncation was performed between the terms associated with acute lymphoblastic leukemia: (náusea or vômito) and (leucemia linfóide aguda); (anemia) and (leucemia linfóide aguda); (ulceração da mucosa) and (leucemia linfóide aguda); (leucemia linfóide aguda); (cistite hemorrágica) and (leucemia linfóide aguda); (risco de infecção) and (leucemia linfóide aguda); e, (dor óssea) and (leucemia linfóide aguda).

During this stage, the contents were divided and grouped according to their similarity, that is, the possibility of being discussed and addressed in the same comic book. This approach allowed the formation of five major groups of problems involving children with ALL, which are: gastrointestinal disorders (addressing the effects of nausea, vomiting, anemia, altered nutrition, and mucosal changes), hemorrhagic cystitis, issues related to self-esteem and self-image, risk of infection, and bone pain. The language adaptation and inclusion of illustrations stages occurred simultaneously. To adapt the language, technicalscientific terms were translated into language accessible to the target audience, based on the authors' experience in children's care. In addition to the use of clear and easily understandable speech, specific jargon from the children's world was utilized. These jargons were found in phrases from cartoons and through practical experience to transform the terms into language easily understood by children.

A guide was developed for constructing the comic books, with pertinent information about each character to better elucidate each story. The Pixton® platform, in its paid version, was used for the inclusion of illustrations and definition of layout. It provides advanced visual and editing features, offering greater interactivity to the setting and characters, and better immersing the reader in the story.

The material's validation stage occurred online, using the Instrumento de Validação de Conteúdo Educativo em Saúde (IVCES),¹³ edited and applied via Google Forms®. The IVCES contains 18 questions and is structured into three main topics: objectives, structure/presentation, and relevance.¹³ It includes questions with Likert scale responses, ranging from zero to two for each of the 18 items evaluated in each comic book. The IVCES considers zero as disagree, one as partially agree, and two as fully agree.

Since the instrument allows only a quantitative evaluation of the material analyzed, a space was added for the evaluator to leave opinions/questions/suggestions freely, including aspects related to the form, content, and layout of the comics.

For the material's validation, the Plataforma Lattes® was used to search for the Currículo Lattes® of expert judges. A subject search was conducted with the descriptors: "P Enfermagem pediátrica; oncologia; saúde da criança," combined with the boolean operator And. Researchers who scored 5 or more points on the Fehring Criteria adapted for the study, established in Chart 1,¹⁴ were invited to participate in the research (inclusion criterion). Expert judges who did not meet the response deadlines were excluded. During the period from March to May 2022, 52 invitations were sent out (via Plataforma Brasil) with daily monitoring of response returns. The invited experts who did not respond within the first granted deadline (forty-five days) received three additional reminders reiterating the invitation to participate, except for those who responded that they were not interested in participating in the study. The data collection was completed in 50 days, involving a total of 10 experts in child and adolescent health, who fully completed the data collection instrument.

At the end of the data collection, all the responses from the expert judges (stored in Google Forms®) were analyzed in Google Sheets® using absolute and relative frequency, mode, mean, standard deviation, median, and calculation of the Índice de Validade de Conteúdo (IVC).¹⁵

The validation occurred individually for each comic book based on the IVCES response. To obtain a satisfactory IVC, a minimum agreement of 0.78 for the three domains and for the global evaluation of the IVCES was considered, according to literature.¹⁵ Only the response of two (fully agree) was considered satisfactory for the calculation of the IVC, using the following formula: IVC = sum of the 2 responses/sum of all responses.¹⁵

The formula generated the IVC for each item, domain (objective, structure/presentation, relevance), and overall for the IVCES, which are presented in a table according to each comic book. Each expert was named with the letter "E" followed by a number according to the response date and arranged in a Google Sheets® spreadsheet (for example, "E1", "E2", ... "E10").

The final printing and dissemination of the material took place in September 2022, with categorization and request for an ISBN for the work.

The study complied with the national guidelines for ethics in research involving human beings, receiving approval from the Research Ethics Committee of the Universidade Federal de Ciências da Saúde de Porto Alegre (UFCSPA) under number 5.100.927. The Free and Informed Consent Form was used.

Chart 1. Ada	otation	of the	Fehring	Criteria.
--------------	---------	--------	---------	-----------

Adaptation of the Fehring Criteria 1987	
Criteria	Score
Have a master's and/or doctorate degree	4
Have an article published on pediatric oncology in the last 5 years	3
Have healthcare or management practice in the last 5 years in pediatric oncology or be a teaching nurse in disciplines related to pediatric oncology	2
Have training (specialization, course, postgraduate) in a clinical area related to pediatric oncology in the last 5 years	2
Be a master and/or doctor in nursing, with a dissertation in the area of pediatric oncology	1

Source: Adaptation of Fehring Criteria.14

Silva GB, Souza LM, Canabarro ST

Then I came across my biggest fear: continuing to undergo chemotherapy! They barely explained it to me and they already started with all that. I had many doubts about the treatment, especially because this time I would be hospitalized, they wouldn't let me go home.



Later, I asked the nurse for help, and I understood better what chemotherapy was. I learned that it is a type of treatment in which medications are used to fight cancer. In my case, they used a small bag hanging from my catheter.

takes too

long!!

But I was no longer afraid! I knew that what they were putting in me was a strengthening medicine, that one day it would make me as strong as a superhero.



Figure 1. Part of the CB built. Source: Research Data. 2022.

RESULTS

Construction of the Comic Books

This study resulted in a total of five constructed comic books, with the following themes: 1) gastrointestinal disorders; 2) hemorrhagic cystitis; 3) problems related to self-esteem and self-image; 4) risk of infection, and 5) bone pain. All the theoretical content used to create the comic books was supported by articles published and indexed in the databases used for the search.

Each of the five themes led to a specific comic book, requiring the development of meticulous and creative steps to create a material appealing to the target audience. To ensure that no information was lost, a specific biographical instrument for each character was used as the basis. This instrument included three main topics: Personal Data, Medical History, and Family History. In the end, five children were created as main characters - one for each comic book – and one nurse. Due to the need for creativity and experience, the characters were constructed based on the professional and personal experiences of the authors, listing characteristics in common with the reality of the target audience. Figure 1 showcases a part of the constructed comic books. The comic books, in their entirety, have their own ISBN, both for the printed and digital formats.

The construction of the comics required time and a creative process. In terms of time, before the validation process, 63 hours of work were necessary for the construction of all the comics, divided among bibliographic research, translation of language, story creation, and image editing.

Before the validation process, Comic 1 consisted of 55 panels, including the main character (Arthur), his two family members (father and mother), and the nurse Giovani. Comic 2 consisted of 23 panels, featuring the main character (João), his two family members (sister and grandmother), the character from Comic 1 (Arthur), and the nurse Giovani. Comic 3 had 24 panels, with the



Figure 2. Characters from the constructed comics. Source: Research Data. 2022.

main character (Ana Paula), her two family members (father and mother), the characters from Comics 1 and 2 (Arthur and João), and the nurse Giovani. Comic 4 had 31 panels for the main character (Rafael), his family member (father), the characters from Comics 1, 2, and 3 (Arthur, João, and Ana Paula), and the nurse. Comic 5, with 23 panels, focused on the main character (Joana), her family members (father and mother), the characters from Comics 1, 2, 3, and 4 (Arthur, João, Ana Paula, and Rafael), and the nurse.

Figure 2 shows the five main characters (children) that were created and the nurse Giovani. The nurse Giovani and the character Arthur (child) drive the plot of the stories, with both characters appearing in all five comics.

Validation of the Comics

Among the ten participating experts, child and adolescent health nurses, nine are female, with an average age of 46.4 (\pm 4.5) years. Regarding the time since graduation, in complete years, the average was 20.4 (\pm 3.0) years, with half of the experts holding a doctoral degree. The characterization by institution affiliation revealed experts from three Brazilian states: Rio Grande do Sul, São Paulo, and Rio de Janeiro. The scores achieved in adapting Fehring's criteria for the participants ranged from 6 to 24 points, with an average of $11.6 (\pm 2.5)$ points.

Table 1 shows the experts' agreement regarding the 18 items that make up the Instrumento de Validação de Conteúdo Educativo em Saúde (IVCES) for the 5 comics.

Chart 2 presents the interviewees' considerations about the five comics.

Table 1. Agreement of the experts from Comic 1 to Comic 5	. Agreement of the e	operts from Comic 1 to Comic	5.
---	----------------------	------------------------------	----

IVCES Items		IVC				
		HQ 2	HQ 3	HQ 4	HQ 5	
OBJECTIVES: purposes, goals and objectives	0.753	0.7792	0.8636	0.7761	0.8333	
1. Includes proposed theme	0.823	0.6666	0.8888	0.9333	0.8888	
2. Suitable for the teaching-learning process	0.714	0.9333	0.75	0.8	0.875	
3. Clarifies doubts about the topic covered	0.714	0.6666	0.8235	0.5454	0.8235	
4. Provides reflection on the topic	0.823	0.8	0.9473	0.7692	0.8235	
5. Encourages behavior change	0.666	0.8235	0.8888	0.7692	0.75	
STRUCTURE/PRESENTATION: organization. structure. strategy. coherence and sufficiency	0.816	0.8	0.8735	0.7971	0.8025	
6. Language suited to the target audience	0.714	0.875	0.8235	0.9333	0.75	
7. Appropriate language for educational material	0.875	0.875	0.8235	0.9333	0.6666	
8. Interactive language. allowing active involvement in the educational process	0.923	0.8	0.7142	0.7142	0.8	
9. Correct information	0.933	0.8	0.8888	0.5454	0.875	
10. Objective information	0.714	0.5454	0.8888	0.6666	0.933	
11. Clarifying information	0.714	0.6666	0.8888	0.6	0.75	
12. Necessary informations	0.75	0.8235	0.9473	0.7692	0.8235	
13. Logical sequence of ideas	0.875	0.875	0.9473	0.8	0.7142	
14. Current theme	0.947	1	0.9411	1	0.8888	
15. Appropriate text size	0.6	0.7272	0.8235	0.8	0.8	
RELEVANCE: significance, impact, motivation and interest		0.8235	0.8888	0.9361	0.7659	
16. Stimulates learning	0.75	0.75	0.8235	0.9333	0.8	
17. Contributes to knowledge in the area	0.75	0.94	0.8888	0.9333	0.5714	
18. Arouses interest in the topic	0.75	0.75	0.9473	0.9411	0.8888	
GLOBAL IVC	0.786	0.8071	0.8734	0.8174	0.8055	

Source: Research data. 2022.

Chart 2. Dissertation considerations about the five comics.

EVALUATED VARIABLES		HQ				
		HQ 2	HQ 3	HQ 4	HQ 5	
Increasing font size and reducing texts to catch the reader's attention	E1, E3, E4, E7, E8	E3	E3	-	E3	
Review of some information regarding the presentation of leukemia and gastrointestinal disorders	E2, E6, E9	-	-	-	-	
Use of alternative strategies to demonstrate the child's experience	-	-	E4, E10	-	-	
Importance of providing more information related to catheters, avoiding their devaluation	-	-	-	E1, E4, E6, E9, E10	-	
Bring more forms of pain assessment	-	-	-	-	E1, E4, E6, E9	
Compliments regarding the structure and quality of the material	E5, E10	E1, E2, E4, E5, E6, E7, E8, E9, E10	E1, E2, E5, E6, E7, E8, E9	' E2, E3, E5, ' E7, E8	E2, E5, E7, E8, E10	

Source: Research data. 2022.

The suggestions made by the experts were analyzed and almost entirely addressed, following a review of the scientific literature. Technical suggestions, such as the presentation of technical terms and revisions of information, were accommodated: changing the speech from gastrointestinal disorders to nausea, vomiting, or queasiness (Comic 1), implementation of integrative practices in the child's daily routine (Comic 3), the manner of presenting the types of Hickman® and Port-a-Cath® catheters (Comic 4), and the mode of presentation and assessment of pain was reinforced (Comic 5).

The font and text size were not altered for two reasons: due to the editing limitations of the program used, as the font size is standard and already suitable for comics; and the text size was not reduced due to the need to convey important information about the plot and the health-disease process highlighted in each comic. The comics were designed for distribution in both digital and printed formats. Regarding the availability of the material, interested parties can request it via the correspondence email.

DISCUSSION

The creation of educational instructional materials, such as comics for a pediatric audience, requires a series of specific considerations in their development, such as crafting a storyline that captures the child's attention for reading and understanding.^{16,17} Comic 1, which aimed to address the main gastrointestinal disorders, required a greater number of changes by the validators. This may have occurred because it was the first comic created, necessitating the introduction of the reader to the presented theme and subsequent stories.

Comic 2 aimed to address what hemorrhagic cystitis is and how to understand and deal with this condition that can affect a child with ALL during chemotherapy. In children, a series of precautions can be adopted to prevent early onset of hemorrhagic cystitis. These include free oral or parenteral fluid intake, spontaneous urination as soon as the patient feels the need, before going to sleep and right after waking up, and drug administration immediately after waking to stimulate urination. These are some of the preventative measures that should be taken.¹⁸

Comic 3 aimed to address the bodily changes related to the disease and treatment of a child with ALL. Nursing diagnoses related to the child's perception of their illness include decreased performance in activities and altered body image. Alopecia is one of the children's major fears, which can make treatment painful and exhausting for them.¹⁹

Comic 4 sought to address the risks of infections, as well as the importance of care with different types of catheters. The perception of altered body image worsens when the patient needs to use any type of catheter. From the patient's perspective, catheter placement can further hinder the acceptance of their own body. In the case of children, it is extremely important that the nurse guides the patient and the family about these changes in body image.¹⁸ In oncology patients using chemotherapy, catheters are commonly used. Thus, their use and handling must be correct. When dealing with a pediatric audience, these characteristics do not always occur in the best way, making the catheter a risk factor for exposing the child to an infection.²⁰

It is worth noting that the use of catheters in itself is not a sign that the child may be presenting an infection, but rather that, with incorrect handling, they can develop an infectious condition. In the use of chemotherapeutics, various types of catheters are used, chosen based on several factors, such as the reason for placing the catheter, the duration of therapy, the risks to the patient in placing the catheter, and the availability of resources to help the family maintain the catheter.^{18,20} Moreover, when choosing a catheter, it is necessary to broadly analyze the scenario in which the child is inserted. Each catheter has its specificities and singularities; however, what is common to all is that the two most common complications are occlusion and infection, which in most cases, occur due to the pathogen Staphylococcus aureus, increasing the need for hospitalization of these patients.

Comic 5 dealt with the pain that a child with ALL might present, as well as ways to reduce it. Pain can be a present sign in children with cancer and may appear from the onset of other symptoms or manifest more aggressively later. Initially, the child may present diffuse pains throughout the body with inexplicable origin. Given this, the professional must carefully evaluate the patient's pain history, taking into account factors such as onset, characteristics, intensity, location, and mitigating factors.^{16,21} When bone pain affects the long bones, the patient's physical mobility becomes compromised. In lactating patients, the pain can be so intense as to interfere with their motor development, preventing them from crawling or taking their first steps. In this population, delayed motor development can be an early sign of ALL.¹⁸

Comics are a specific type of literature that mixes written language with visual language, making communication more effective and closer through the construction of playful language. They are typically used during the literacy process as learning objects for the child audience. However, for this use, it is necessary to understand and comprehend the child as a social subject and cater to their peculiarities.¹⁶

For the use of this material with children, the comic must allow the reader to concentrate, making it an enjoyable moment. For this, the use of a proper grammar, with short texts, dynamic language, and the use of symbols and images, is necessary.¹⁶ This characteristic collaborates with the constructed material, which allowed the dissemination of specific care for children with ALL, translating technical-scientific language into one easily accessible to the target audience. Additionally, it provided, with the adequate amount of text, the construction of five interconnected stories.

It is understood that for the health area, the comic plays the role of an instructional and empowering tool for physiological functions, having the role of instructing the child about their health-disease process and guiding them about possible procedures they may undergo, giving meaning to the moderate use of technical terms that the child will hear during their hospitalization and treatment.¹⁷ It is estimated that the comic, as an instructional tool, can improve the child's behavior and attitude towards hospitalization,¹⁶ but there is a lack of studies with other designs for more evidence.

Moreover, during hospitalization, the child may develop episodes of sadness, pain, and fear. This mix of feelings often causes them to go through a process of premature maturation, changing their childhood.⁵ The storytelling process is an inherent part of the teaching and learning process of a non-hospitalized child. In school, they experience various forms of reading, including comics. By coming into contact with this type of literature, they are allowed to find the three levels of reading:22,23 tactile, in touching the book or eBook full of animations and illustrations; emotional, as it allows the child to fantasize and place themselves within the story; and rational, which helps in the maturation of the child's intellect. For the child who needs hospitalization, besides being a way to bring the child closer to reading, the comic is a therapeutic toy.^{16,23} Due to the potential use of comics as a therapeutic toy, it is understood that the learning object constructed can be a practical guide used during the hospitalization of the child with ALL. Thus, contact with comics as a form of reading can provide the child with a new way of reading a creative, expressive, and also artistic material.

Comics are often used as educational tools within health, like the "Practice Health" campaign, created to awaken interest in the theme in the population.^{22,24} It is hoped that the sequence of comics created "Great Friends: How It All Began!" has the potential to encourage and stimulate the child during hospitalization to take ownership of their health-disease process and make it more bearable, knowing they are not alone in the process.

This potential can be achieved due to the process established for the creation of this object, as it follows the guidelines of various studies, with careful and meticulous elaboration, valuing submission to the evaluation and/or validation process by experts.²⁵⁻²⁷

Other studies that also used the same method for validating digital educational resources for health and safety at work in primary health care and developing an educational activity in the form of an extension course obtained a higher overall IVC, ranging between 0.88 and 0.96 and 0.84 to 1.00.^{26,27} However, it is important to note that this variation may have occurred due to the different themes addressed in these researches.

Regarding the difference in Global IVC values achieved between the comics, it is justified by the fact that they are stories constructed with different themes from each other. A variation in IVC was expected because the information, even presented in the same way, reaches the reader differently.

It is also added that the use of IVCES as a means to validate educational resources in health is recent (2018).¹³ However, the items contained in the domains are important for the validation process and delivery of a product to the target audience.¹³ Additionally, the open space for criticism/suggestions/praise helped in the process of adaptation and improvement of the quality of the developed learning object. The use of the material has the potential for building knowledge in children with ALL. Studies with other designs will be able to confirm this hypothesis.

CONCLUSIONS AND IMPLICATIONS FOR PRACTICE

The five comics were validated by experts, with a global IVC ranging from 0.78 to 0.87. Even though Comic 1 presented a global IVC of 0.02 points below the ideal, due to the proximity of scoring and the changes made from the requests of expert judges, the set of stories was considered valid. Therefore, they can be used as a therapeutic toy for children with Acute Lymphoblastic Leukemia undergoing hospital admission. However, the comics can also be used for health education of children with other types of cancer, especially leukemias and lymphomas, as they refer to common conditions (nausea, vomiting, hemorrhagic cystitis, alopecia, risk of infection, and bone pain) among children undergoing oncological treatment. Similarly, they can be used in a home context.

With the increasing number of hospitalizations of children with ALL, coupled with the need to observe them comprehensively, it becomes necessary to involve these patients in their health-disease process and assist in promoting a more amenable admission. Thus, the creation and validation of quality learning objects are essential.

It is pointed out that to enhance the comics and their use, dissemination and adherence by multiprofessional teams that can provide an opportunity to read this material in daily practices are necessary. Feelings, willpower, and new thoughts can be found and will serve as support in the dialogic action of caring for the child with childhood cancer. With this new perspective, it can be inferred that willpower and effort will be appreciated in the application of using the comics and that children will likely find thoughts, feelings, and the desire to continue in the treatment of ALL, with greater knowledge on the subject.

Regarding the limitations of the study, the lack of specialists from some regions of Brazil (mainly the North and Northeast) is considered the main one. This may limit the use of the comics in these regions, given that Brazil is culturally diverse, including in locoregional language. Another limitation refers to the non-presentation and/or discussion of the material with the target audience.

All the constructed comics have their own ISBN and are available in digital and print format. Those interested in the final work can request the digital format provided in open access from the corresponding author.

AUTHOR'S CONTRIBUTIONS

Study design. Giovani Basso da Silva. Luccas Melo de Souza. Simone Travi Canabarro.

Data collect. Luccas Melo de Souza. Simone Travi Canabarro. Data analysis. Giovani Basso da Silva. Luccas Melo de Souza. Simone Travi Canabarro.

Interpretation of results. Giovani Basso da Silva.

Writing and critical review of the manuscript. Giovani Basso da Silva. Luccas Melo de Souza. Simone Travi Canabarro.

Approval of the final version of the article. Giovani Basso da Silva. Luccas Melo de Souza. Simone Travi Canabarro.

Responsibility for all aspects of the content and integrity of the published article. Giovani Basso da Silva. Luccas Melo de Souza. Simone Travi Canabarro. Silva GB, Souza LM, Canabarro ST

ASSOCIATED EDITOR

Candida Primo Caniçali 💿

SCIENTIFIC EDITOR

Ivone Evangelista Cabral 💿

REFERENCES

- Instituto Nacional de Câncer. Leucemia: as topografias referentes às leucemias são C90-95 [Internet]. Brasília: INCA; 2022 [cited 2022 sep 13]. Available in: https://www.inca.gov.br/tipos-de-cancer/ leucemia
- Instituto Nacional de Câncer. Quimioterapia [Internet]. Brasília: INCA; 2023 [cited 2024 jan 19]. Available in: https://www.gov.br/inca/pt-br/ assuntos/cancer/tratamento/quimioterapia
- Guedes AKC, Pedrosa APA, Osório MO, Pedrosa TF. Cuidados paliativos em oncologia pediátrica: perspectivas de profissionais de saúde. Rev SBPH [Internet]. 2019 [cited 2023 oct 28];22(2):128-48. Available in: http://pepsic.bvsalud.org/scielo.php?script=sci_arttext&pid=S1516-08582019000300008&Ing=pt
- Emidio SCD. The viewpoint of hospitalized children with regards to oncological treatment. Rev Pesqui. 2018;10(4):1141-9. http://dx.doi. org/10.9789/2175-5361.2018.v10i4.1141-1149.
- Enskär K, Darcy L, Björk M, Knutsson S, Huus K. Experiences of young children with cancer and their parents with Nurses' Caring practices during the cancer trajectory. J Pediatr Oncol Nurs. 2020;37(1):21-34. http://dx.doi.org/10.1177/1043454219874007. PMid:31526068.
- Liu Q, Petrini MA, Luo D, Yang BX, Yang J, Haase JE. Parents' experiences of having a young child with acute lymphoblastic leukemia in China. J Pediatr Oncol Nurs. 2021;38(2):94-104. http://dx.doi. org/10.1177/1043454220975463.
- Guimarães TM, Silva LF, Santo FHE, de Moraes JRMM. Palliative care in pediatric oncology in nursing students' perception. Esc Anna Nery. 2016;20(2):261-7. http://dx.doi.org/10.5935/1414-8145.20160035.
- Canêz JB, Gabatz RIB, Hense TD, Vaz VG, Marques RS, Milbrath VM. O brinquedo terapêutico no cuidado à criança hospitalizada. Rev Enferm Atual In Derme. 2019;88(26):1-9. https://doi.org/10.31011/ reaid-2019-v.88-n.26-art.129.
- Rolim K, Pinheiro C, Magalhães F, Frota M, Mendonça F, Fernandes H. Comic books: technology in health for the humanization of care delivery to hospitalized children. Rev Enferm Ref. 2017;4(14):69-78. http://dx.doi.org/10.12707/RIV17028.
- Echer IC. Elaboração de manuais de orientação para o cuidado em saúde. Rev Lat Am Enfermagem. 2005;13(5):754-7. http://dx.doi. org/10.1590/S0104-11692005000500022. PMid:16308635.
- Coelho HP, Souza GSD, Freitas VHS, Santos IRA, Ribeiro CA, Sales JKD et al. Percepção da criança hospitalizada acerca do brinquedo terapêutico instrucional na terapia intravenosa. Esc Anna Nery. 2021;25(3):e20200353. http://dx.doi.org/10.1590/2177-9465ean-2020-0353.
- 12. Hockenberry MJ, Wilson D, Winkelstein ML. Wong fundamentos da enfermagem pediátrica. São Paulo: Elsevier; 2011. 1280 p.

- Leite SS, Áfio ACE, Carvalho LV, Silva JM, Almeida PC, Pagliuca LMF. Construction and validation of an Educational Content Validation Instrument in Health. Rev Bras Enferm. 2018;71(suppl 4):1635-41. http://dx.doi.org/10.1590/0034-7167-2017-0648. PMid:30088634.
- 14. Fehring R. Methods to validate nursing diagnoses. USA: Elsevier; 1987.
- Alexandre NMC, Coluci MZO. Validade de conteúdo nos processos de construção e adaptação de instrumentos de medidas. Cien Saude Colet. 2011;16(7):3061-8. http://dx.doi.org/10.1590/S1413-81232011000800006. PMid:21808894.
- Pedrinho LR, Shibukawa BMC, Rissi GP, Uema RTB, Merino MFGL, Higarashi IH. Brinquedo terapêutico para crianças com Diabetes Mellitus tipo I: intervenções no domicílio. Esc Anna Nery. 2021;25(3):e20200278. http://dx.doi.org/10.1590/2177-9465-ean-2020-0278.
- 17. Gaio G, Chiavon SD, Brum CN, Zuge SS, Santos E. Brinquedo terapêutico como tecnologia de cuidado para crianças que vivenciam doenças respiratórias em unidade de internação hospitalar: Scoping Review / Therapeutic toy as a care technology for children experiencing respiratory diseases in a hospital care. Brazilian J Heal Rev. 2022;5(2):7753-67. http://dx.doi.org/10.34119/bjhrv5n2-328.
- Silveira OG. Manifestações dermatológicas em pacientes cirróticos ambulatoriais [tese]. Porto Alegre: Programa de Pós-graduação em Hepatologia, Universidade Federal de Ciências da Saúde de Porto Alegre; 2010 [cited 2023 apr 17]. Available in: https://www.yumpu. com/pt/document/view/15710432/manifestacoes-dermatologicas-empacientes-cirroticos-ufcspa
- Galvan DC, Kaufmann G, Brustolin AM, Ascari RA. Percepção dos pacientes acometidos pela leucemia frente à internação hospitalar. Rev Enferm UFSM. 2014;3:647-57. http://dx.doi.org/10.5902/2179769211079.
- Matos ACB, Ferreira DC, Ferreira J, Faria RF, Tavares TS. Características do cateter venoso central em uma unidade de terapia intensiva pediátrica. EJHR. 2022;3(3):364-78. http://dx.doi.org/10.54747/ejhrv3n3-005.
- Ikeuti PS, Borim LNB, Luporini RL. Dor óssea e sua relação na apresentação inicial da leucemia linfóide aguda. Rev Bras Hematol Hemoter. 2006;28(1):45-8. http://dx.doi.org/10.1590/S1516-84842006000100011.
- Almeida FA, Miranda CB, Maia EBS. Implementation of the Therapeutic Play in pediatric hospital units from the perspective of health professionals who are members of BrinquEinstein. NTQR. 2022:e710. https://doi. org/10.36367/ntqr.13.2022.e710.
- 23. Faria MA. Como usar a literatura infantil na sala de aula. São Paulo: Contexto; 2004.
- Arquimedes P, Santos RE, Cavignato D. O uso das histórias em quadrinhos de Mauricio de Sousa na prevenção de doenças e promoção da saúde. Comunicação & Sociedade [Internet]. 2012 [cited 2023 oct 28];34:225-48. Available in: https://oasisbr.ibict.br/vufind/Record/USCS-1_12f204 6d3d50f3757ea8c91b23a51ab6.
- Lima ACMACC, Bezerra KC, Sousa DMN, Rocha JF, Oriá MOB. Construção e Validação de cartilha para prevenção da transmissão vertical do HIV. Acta Paul Enferm. 2017;30(2):181-9. http://dx.doi. org/10.1590/1982-0194201700028.
- Silva NF, Silva NCM, Ribeiro VDS, Iunes DH, Carvalho EC. Construção e validação de um vídeo educativo sobre a reflexologia podal. Rev Eletrônica Enferm. 2017;19:a48. http://dx.doi.org/10.5216/ree.v19.44324.
- Fabrizzio GC, Ferreira JM, Perin DC, Klock P, Erdmann AL, Santos JLG. Tecnologia da informação e comunicação na gestão de grupos de pesquisa em enfermagem. Esc Anna Nery. 2021;25(3):e20200299. http://dx.doi.org/10.1590/2177-9465-ean-2020-0299.