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ORIGINAL ARTICLE

Development and Validation of a Questionnaire on Healthcare-Associated Infections for Companions of Hospitalized Patients

Desenvolvimento e validação de um questionário sobre infecções relacionadas à assistência à saúde voltado a acompanhantes de pacientes internados

Desarrollo y validación de un cuestionario sobre infecciones relacionadas con la atención de la salud dirigido a acompañantes de pacientes hospitalizados

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ABSTRACT

Background and Objectives: Healthcare-Associated Infections (HAIs) represent a major challenge in hospital settings. Hospitalized patients, healthcare professionals, and patient companions are potential disseminators of pathogens, reinforcing the need for preventive and educational strategies. This study aimed to develop and validate a data collection instrument designed to assess the perceptions of companions of hospitalized patients regarding the transmission and prevention of HAIs. **Methods:** This was a qualitative–quantitative, descriptive, observational, and cross-sectional study conducted in four phases: (1) development of the data collection instrument; (2) content validation by experts using the Content Validity Index (CVI); (3) online validation; and (4) on-site validation in a hospital in the state of Minas Gerais, Brazil. **Results:** A questionnaire consisting of 30 objective items distributed across four thematic sections was developed. Expert evaluation demonstrated high CVI values (ranging from 0.76 to 1.0) for items related to hand hygiene, use of alcohol-based hand rub, respiratory etiquette, vaccination status, and understanding of contagious diseases. The online validation involved 83 participants from different regions of the country and resulted in suggestions for instrument improvement. The on-site validation, conducted with 140 companions in a hospital setting, allowed for adjustments in language, response time, and feasibility of questionnaire application. **Conclusion:** The

instrument showed satisfactory evidence of content validity, clarity, and comprehension, indicating its suitability for subsequent phases of application and investigation of companions' perceptions regarding HAIs.

Keywords: *Health education. Hospital infection. Public health.*

RESUMO

Justificativa e Objetivos: As Infecções Relacionadas à Assistência à Saúde (IRAS) são um desafio nos hospitais. Pacientes internados, profissionais de saúde e acompanhantes são potenciais disseminadores de patógenos, o que reforça a necessidade de estratégias preventivas e educativas. Este estudo objetivou desenvolver e validar um instrumento de coleta de dados destinado à avaliação da percepção de acompanhantes de pacientes internados sobre a transmissão e prevenção das IRAS. **Métodos**: estudo quali-quantitativo, descritivo, observacional e transversal, conduzido em quatro etapas: (1) elaboração do instrumento de coleta de dados; (2) validação de conteúdo por especialistas utilizando o Índice de Validade de Conteúdo - IVC; (3) validação on-line; (4) validação in loco em um hospital de Minas Gerais. **Resultados**: Foi desenvolvido um questionário com 30 questões objetivas, distribuídas em quatro blocos temáticos. A avaliação por especialistas evidenciou IVC elevado (entre 0,76 e 1,0) para itens relacionados à higienização das mãos, uso de álcool gel, etiqueta respiratória, situação vacinal e compreensão sobre doenças contagiosas. A validação on-line contou com 83 participantes de todo o país, resultando em sugestões de aprimoramento do instrumento. A validação in loco, realizada com 140 acompanhantes em ambiente hospitalar, permitiu ajustes na linguagem, no tempo de resposta e na viabilidade de aplicação do questionário. **Conclusão**: O instrumento apresentou evidências satisfatórias de validade de conteúdo, clareza e compreensão, indicando adequação para etapas posteriores de aplicação e investigação das percepções de acompanhantes sobre as IRAS.

Descritores: *Educação em saúde. Infecção hospitalar. Saúde pública.*

RESUMEN

Justificación y Objetivos: Las Infecciones Relacionadas con la Atención de la Salud (IRAS) constituyen un desafío en los hospitales. Los pacientes hospitalizados, los profesionales de la salud y los acompañantes son potenciales diseminadores de patógenos, lo que refuerza la necesidad de estrategias preventivas y educativas. Este estudio tuvo como objetivo desarrollar y validar un instrumento de recolección de datos destinado a evaluar la percepción de los acompañantes de pacientes hospitalizados sobre la transmisión y prevención de las IRAS. **Métodos:** Estudio cualitativo-cuantitativo, descriptivo, observacional y transversal, realizado en cuatro etapas: (1) elaboración del instrumento de recolección de datos; (2) validación de contenido por especialistas mediante el Índice de Validez de Contenido (IVC); (3) validación en línea; y (4) validación in loco en un hospital del estado de Minas Gerais, Brasil. **Resultados:** Se desarrolló un cuestionario con 30 ítems objetivos, distribuidos en cuatro bloques temáticos. La evaluación por especialistas evidenció valores elevados de IVC (entre 0,76 y 1,0) para los ítems relacionados con la higiene de manos, el uso de alcohol en gel, la etiqueta respiratoria, la situación vacunal y

la comprensión sobre enfermedades contagiosas. La validación en línea contó con 83 participantes de todo el país y dio lugar a sugerencias de mejora del instrumento. La validación in loco, realizada con 140 acompañantes en un entorno hospitalario, permitió ajustes en el lenguaje, el tiempo de respuesta y la viabilidad de aplicación del cuestionario. **Conclusión:** El instrumento presentó evidencias satisfactorias de validez de contenido, claridad y comprensión, lo que indica su adecuación para etapas posteriores de aplicación e investigación de las percepciones de los acompañantes sobre las IRAS.

Palabras-Clave: *Educación para la salud. Infección hospitalaria. Salud pública.*

INTRODUCTION

According to the World Health Organization, Healthcare-Associated Infections (HAIs) are infections that occur during the care process in healthcare institutions and that were not present at the time of the patient's admission. These infections include clinical manifestations that appear after the third day of hospitalization or after medical procedures. Previously called hospital-acquired or nosocomial infections, they represent a serious public health problem, increasing morbidity, mortality, length of hospital stay, and related costs, in addition to compromising patient safety and the quality of health services.[1,2,3]

HAIs are frequently associated with critical environments, such as ICUs, and are especially serious for those with compromised immune systems or comorbidities.[4] Therefore, the need for effective prevention and control measures is even more evident. Literature suggests that by adopting appropriate practices, HAIs could be avoided, which reinforces the importance of effective control strategies and continuous awareness among all those involved in hospital care and patients.[5,6]

Analyzing risk factors and implementing control measures are essential to mitigate the impact of HAIs in the hospital environment[7]. Although prevention protocols focus primarily on healthcare professionals, there is recognition of the influence of other agents, such as caregivers of hospitalized individuals, on the dynamics of microorganism transmission. The absence of technical or educational barriers aimed at this group compromises the overall effectiveness of control strategies. Beyond reinforcing hygiene practices, it is necessary to integrate caregivers into institutional safety protocols, recognizing their active role in the healthcare environment and their shared responsibility in containing healthcare-associated infections (HAIs).[8]

Studies highlight that patient caregivers can act as vectors in the spread of pathogens.[9] Low adherence to hand hygiene among visitors is seen as a concern, as it contributes to an increased risk of HAIs.[10] Furthermore, the lack of specific guidance and adequate training for caregivers on infection prevention measures exacerbates this situation. The presence of caregivers, coupled with their mobility between different areas of the hospital and direct contact with patients, reinforces the need to include them in infection control strategies.[11]

Therefore, the objective of this study was to develop and validate a data collection instrument, as well as to evaluate its clarity, relevance, and applicability to investigate, in future contexts, the perception of caregivers of hospitalized patients regarding the transmission and prevention of HAIs.

METHODS

The study was characterized as qualitative-quantitative, descriptive, observational, and cross-sectional. This research took place between February and November 2024 and was divided into four phases: 1) Creation of a data collection instrument for caregivers; 2) Validation by experts; 3) Online validation; 4) On-site validation (Figure 1).

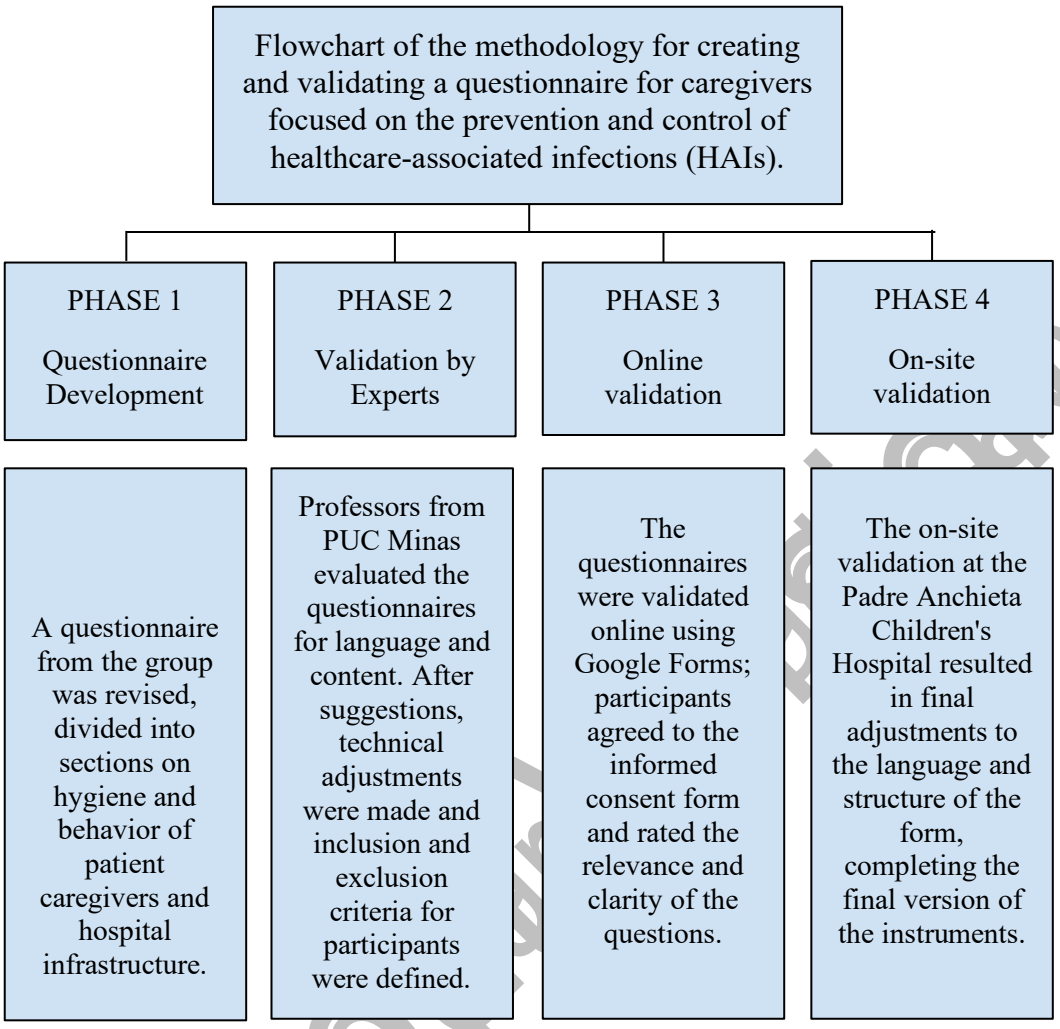

Figure 1. Schematic diagram of the questionnaire validation methodology.

In phase 1, carried out in February 2024, the data collection instrument was created based on a previous questionnaire model used with caregivers of patients hospitalized in a teaching hospital in the South of the country.[12] The reformulation considered recent scientific publications and the post-Covid-19 pandemic context, with necessary language adjustments and content insertion.[13,14,15]

The second phase, also held in February, involved the content validation of the questionnaire using the Content Validity Index (CVI) by 25 health experts from across the country, with at least a specialization, invited directly by email. The experts were selected for having training and/or experience in the areas of microbiology, infection control, public health or related fields. The professionals judged each item of the questionnaire regarding

relevance, clarity and applicability, using a five-point Likert scale, ranging from 1 (“not relevant”) to 5 (“very relevant”). For the calculation of the CVI, responses with a score equal to or greater than 4 were considered valid, with the index obtained by the ratio between the number of responses 4 and 5 and the total number of respondents. In addition, at the end of each thematic section, participants evaluated the set of items through dichotomous questions ("yes"/"no"); for these, the CVI was calculated by assigning a value of 1 to positive responses and 0 to negative ones.

The online validation, the third phase of the research, took place between March and May 2024, where people with a profile similar to that of the target audience of the final questionnaire gave their opinions on the relevance of the topics covered and the language of the data collection instrument. Data collection was carried out using the simple random sampling technique, through the dissemination of an electronic form on the researchers' social networks.

Participants accessed the electronic address of the Google Forms Platform containing the Free and Informed Consent Form – TCLE, socioeconomic questions and the questionnaire to be evaluated. Participants rated the questions in each section as Relevant (R), Not Very Relevant (NVR), or Indifferent (I), evaluating the items as components of the instrument, as well as assessing the language and clarity of the questions. At the end of the online questionnaire, participants could suggest, add, or remove any question or topic. There was no time limit for answering the questionnaire; however, the "completion time" and "questionnaire size" were considered for the participants' evaluation.

The inclusion criteria for selecting participants in phase 3 were: being 18 years old or older, not working/having worked in the health field, or not pursuing/having pursued undergraduate or graduate studies in the health field, and signing the Informed Consent Form. Professionals and students in the health field were excluded from the study because they possessed prior knowledge that could interfere with the lay evaluation of the instrument, as well as those who did not agree with the Informed Consent Form or who did not complete the questionnaire in full.

The fourth phase of the research consisted of on-site validation of the instrument, conducted in person at the Padre Anchieta Children's Hospital (HIPA), located in Belo Horizonte - MG, between May and November 2024, with the objective of testing the clarity, comprehension, application time, and operational feasibility of the questionnaire. After explaining the research, obtaining agreement and signing the Informed Consent Form by companions of hospitalized patients, the questionnaires were applied in the form of an interview, focusing on evaluating the comprehension of the items and the dynamics of application, with the responses being recorded by the researchers. This phase aimed to evaluate the clarity, comprehension, and applicability of the instrument in a real-world context of use.

Descriptive statistical analysis was conducted systematically, with the data being tabulated and organized using Microsoft Office Excel and Graphpad Prism. For statistical purposes, in Tables 2, 3, and 4, the responses were quantified as follows: Relevant (R) received the value 2, Slightly Relevant (PR) the value 1, and Irrelevant (I) the value 0. This categorization allowed for the calculation of the mean and standard deviation, facilitating the visualization and interpretation of the results.

The research was approved under Opinion No. 6,497,920 and Certificate of Presentation for Ethical Appraisal (CAAE) No.: 73990023.00000.5137 issued on February 2, 2024. The conduct of the research fully complied with the ethical standards established by Resolutions No. 466/2012, No. 510/2016, and No. 580/2018 of the National Health Council/Ministry of Health, which regulate research involving human beings in Brazil.

RESULTS

As a result of phase 1 of the study, a questionnaire composed of 30 objective questions was developed, organized into four thematic sections: sociodemographic information, hygiene, practices and conduct, and hospital infrastructure.

Phase 2, validation by experts, showed high CVI (between 0.76 and 1.0) for items related to hand hygiene, use of alcohol gel, respiratory etiquette, vaccination status, and understanding of contagious diseases, indicating high clarity and relevance. In contrast, items that addressed non-compliance with hygiene practices, patient care during intestinal

infection, the use of accessories in the hospital environment, and institutional guidance to the caregiver presented lower CVIs (0.36 to 0.56), possibly because they involved socially undesirable behaviors or reflected institutional variations. In general, the instrument demonstrated adequate content validity, with lower CVIs concentrated in potentially sensitive items, without compromising the representativeness of the construct evaluated.

Phase 3 involved 83 participants from all over Brazil who judged the relevance of the 30 questions in the instrument created in the previous phases. The majority of participants were between 18 and 28 years old (41%), female (67.5%), with incomplete undergraduate or postgraduate studies (44.6%), living in the Southeast region (83.1%). Approximately 80% of participants stated that they had previously accompanied an inpatient, with an average follow-up period of 1 to 3 days (56.5%) (Table 1).

Table 1. Sociodemographic Characteristics and Hospital Experience of Participants for the Online and On-site Phases.

Variable	Categories	N (%) 83 online
Age range (years)	18-27	34 (41.0)
	28-37	15 (18.1)
	>38	34 (41)
Gender	Female	56 (67.5)
	Male	27 (32.5)
Education	Incomplete undergraduate/postgraduate studies	21 (25.3)
	Complete High School	17 (20.5)
	Others	45 (54.2)
Region of residence	Southeast	72 (86.8)
	Others	11 (13.2)
Prior monitoring	Yes	66 (79.5)
	No	17 (20.5)
Duration of monitoring	1-3 days	39 (56.5)
	> 4 days	44 (43.5)

Legend: NA: Not applicable.

The results of phase 3 were analyzed according to the sections containing questions designed to assess the clarity, pertinence, and relevance of the questionnaire items, aimed at understanding the participants' perception of: the importance of hygiene in

the hospital context; practices and conduct of caregivers; hospital infrastructure; and the exchange of information between professionals and caregivers (tables 2, 3, and 4, respectively).

The data regarding the relevance attributed by the participants to the questionnaire items that address hygiene practices show good indicators for handwashing, but contradictory rates for other hygiene practices. This fact is proven in the category "washing hands before and after entering the room or hospital," in which they obtained 92.7% and 96.3% responses in the "Relevant" category, respectively. The use of hand sanitizer before and after leaving the room/hospital was classified as “Relevant” by 90.3% and 89.1% of participants, respectively, while access to 70% alcohol whenever necessary received 74.6% responses as “Relevant”. Practices such as touching bodily fluids (57.8%) and caring for patients without washing hands (28.9%) showed a number below the average of responses considered “Relevant”, indicating less agreement regarding the adequacy of these items as questions in the instrument. Regarding behavior after returning home, 79.5% of participants indicated that the statement of washing clothes separately is “Relevant”. Other practices such as lending hygiene products (34.9%), removing shoes upon arriving home (42.1%), and sanitizing belongings (40.9%) showed a greater standard deviation from the mean, suggesting divergence in the assessment of the relevance of these items (Table 2).

Table 2. Results of the online validation on the relevance of items related to hand hygiene and biosecurity.

Statements	R (%)	NVR (%)	I (%)	ME	SD
I wash my hands before entering the room and/or hospital.	77 (92)	6 (7)	0 (0)	1.93	0.26
I wash my hands after leaving the room and/or hospital.	80 (96)	3 (4)	0 (0)	1.96	0.19
I use hand sanitizer before arriving at the room and/or hospital.	78 (94)	1 (1)	4 (5)	1.89	0.44
I use hand sanitizer after leaving the room and/or hospital.	75 (90)	4 (5)	4 (5)	1.61	0.71
I have access to 70% alcohol whenever I need it.	62 (75)	18 (22)	3 (4)	1.76	0.46
I have touched bodily fluids or contaminated objects.	40 (48)	30 (36)	13 (16)	1.33	0.73
I have had to care for more than one patient without washing my hands or using gloves.	29 (35)	50 (60)	4 (5)	0.87	0.76
I have helped care for other patients without washing my hands.	32 (38)	47 (57)	4 (5)	1.34	0.57

I arrive home after returning from the hospital and wash my clothes along with other clothes.	66 (79)	5 (6)	13 (16)	1.90	0.34
I borrow hygiene products from other patients or their respective companions.	29 (35)	54 (65)	0 (0)	1.35	0.48
When I arrive home, I leave my shoes outside.	35 (42)	17 (20)	31 (37)	1.29	0.86
I sanitize my belongings, taken to the hospital, when I arrive home.	34 (41)	31 (37)	18 (22)	1.19	0.77

Legend: R: Relevant; NVR: Not Very Relevant; I: Indifferent; ME: Mean and SD: Standard Deviation.

Section 3 of the questionnaire refers to the assessment of the relevance of items regarding the practices and conduct of patient caregivers. Among the responses to this section, 55.4% of participants considered the question about accompanying someone to the hospital while they have the flu to be “Relevant,” and 30.1% reported the same in cases of intestinal infection. Regarding vaccination, 91.5% indicated that keeping vaccination records up-to-date was relevant, and 90.3% reported knowing what a contagious disease is. The use of jewelry was considered “Relevant” by 37.3% of participants, while 44.5% indicated the use of patients' bedsheets as “Relevant.” The items regarding the use of electronic devices and covering the mouth or nose when coughing or sneezing were indicated as “Relevant” by 53.0% and 86.7% of people, respectively (Table 3).

Table 3. Results of online validation regarding the relevance of items related to practices and conduct.

Statements	R (%)	NVR (%)	I (%)	ME	SD
I have accompanied someone to the hospital when I had the flu.	46 (55)	32 (38)	5 (7)	1.4	0.61
I have cared for patients while I had an intestinal infection.	25 (30)	52 (62)	6 (7)	1.23	0.57
My vaccination record is up to date.	76 (91)	7 (8)	0	1.92	0.28
I know what it means for a disease to be contagious.	75 (90)	7 (8)	1 (1)	1.89	0.35
I wear earrings and accessories while in the hospital environment.	31 (37)	30 (36)	22 (26)	1.11	0.79
I use the patient's sheets to cover myself in the hospital.	37 (44)	43 (52)	31 (37)	1.41	0.56
I use electronic devices, writing and reading materials during the visit.	44 (53)	20 (24)	19 (23)	1.30	0.82
I usually cover my mouth and nose when coughing or sneezing while accompanying a patient in the hospital.	72 (87)	6 (7)	5 (7)	1.81	0.53

Legend: R: Relevant; NVR: Not Very Relevant; I: Indifferent; ME: Mean and SD: Standard Deviation.

Section 4 of the data collection instrument addresses the analysis of the relevance of items related to hospital infrastructure. Among the participants, 73.4% rated seeing posters teaching how to wash hands at sinks and in bathrooms as "Relevant". Regarding

access to masks and gloves, 59.0% indicated it as "Relevant", 38.5% as "Somewhat Relevant", and 2.4% as "Indifferent". The statement about access to soap and water at handwashing sinks was considered "Relevant" by 77.1% of people, and receiving information about the correct way to contact patients was considered "Relevant" by 60.2% of people, while 32.5% rated it as "Somewhat Relevant" and 7.2% as "Indifferent". Regarding the information provided by the medical team about the patient's illness being contagious, 72.2% considered it "Relevant," 14.4% "Not very relevant," and 13.2% "Indifferent" (Table 4).

Table 4. Results of online validation regarding the relevance of items related to hospital infrastructure.

Statements	R (%)	NVR (%)	I (%)	ME	SD
I see posters teaching how to wash hands at the sinks and bathrooms.	61 (73)	11 (13)	11 (13)	1.60	0.71
I have access to masks and gloves whenever I need them.	49 (59)	32 (38)	2 (2)	1.57	0.54
I have access to soap and water at the handwashing sinks.	64 (77)	11 (13)	8 (10)	1.67	0.64
The hospital instructed me on the correct way to interact with the patient when I am a caregiver.	50 (60)	27 (32)	6 (7)	1.53	0.63
I received information from the medical team that the illness of the patient I am caring for is contagious.	60 (72)	12 (14)	11 (13)	1.59	0.71

Legend: R: Relevant; NVR: Not Very Relevant; I: Indifferent; ME: Mean and SD: Standard Deviation

Regarding satisfaction with the data collection instrument, 97% of participants stated that the questions were relevant and 88% stated that the language was clear and easy to understand, reinforcing the suitability of the instrument as a data collection tool. Suggestions were incorporated to change the language of some questions and to add new questions in sections 1 and 2.

Thus, after reformulation, the questionnaire had 35 questions with the answer options "yes", "no", "I don't know". It was used in phase 4, the on-site validation, carried out with 140 caregivers of patients hospitalized at HIPA. The results revealed that most participants were female (94.2%), aged between 28 and 37 years (42.8%), had completed high school (47.1%) and had a family income between 1 and 3 minimum wages (35%). In addition, 62.1% of caregivers accompanied children with respiratory diseases, mainly in the first days of hospitalization (66%). During on-site validation, it was observed that some questions needed reformulation because they had been misinterpreted, similar questions

were causing bias in the answers, and terms were identified as "confusing" or "difficult to understand." The questionnaire response time was also evaluated and, in practice, exceeded expectations. Participant resistance was observed when interviews exceeded seven minutes. To address this issue, interviewers were trained for interactions of up to five minutes in duration.

Regarding sociodemographic information, new variables were added, including the caregiver's relationship with the patient, reason for hospitalization, and length of hospital stay. The reformulations aimed not only to improve the questionnaire's applicability but also to facilitate the statistical analysis of the data and ensure internal consistency between the thematic sections, providing a more intuitive response experience for participants.

DISCUSSION

The adequacy, clarity, and relevance of the instrument's items are discussed in light of the literature, as well as the judgment standards assigned by participants during the validation phases. It is observed that even with prior contact with the hospital environment, the judgment of low relevance attributed to certain items highlights important informational gaps, reinforcing the need for educational strategies and interventions in the hospital context.[5]

Regarding the data from the online validation phase, it is observed that in the section dedicated to hand hygiene and biosafety practices, most questions were considered "Relevant," indicating agreement regarding the clarity and relevance of the items, especially with regard to hand washing and the use of alcohol in the hospital environment. However, items recognized as priorities by the Ministry of Health were classified as “Not Very Relevant” or “Indifferent,” suggesting challenges in understanding these practices by the evaluated population.[16]

For example, more than half of the participants considered the statements “I sanitize my belongings, taken to the hospital, when I get home” and “I have had to care for more than one patient without washing my hands or using gloves” to be irrelevant. In the context of validating the instrument, these findings justify maintaining these items, since they address critical practices for the prevention of HAIs, which can contribute to cross-

contamination, that is, the transmission and dissemination of microorganisms between the hospital and home environments and between beds, spreading infections.[6]

In the section on practices and conduct, the low relevance attributed by participants to the item related to the use of jewellery in the hospital environment stands out, despite its importance according to the Ministry of Health.[16] It is worth emphasizing that these jewellery can act as vehicles for the transmission of microorganisms, contributing to the spread of infections in the outpatient environment.[17] Similarly, the reduced judgment of relevance attributed to staying in the hospital while ill indicates weaknesses in the understanding of this risk, considering that clinically ill visitors should avoid frequenting health units because they are potential transmitters of HAIs.[18]

The results of the section on hospital infrastructure indicate that the community perceives the importance of the existence of informative posters about hand washing and the availability of resources for this practice. From a validation perspective, these findings confirm the clarity and relevance of the infrastructure-related items, since handwashing is a fundamental practice in controlling the spread of pathogens and depends on the adequate supply of water, soap, and hand sanitizer.[19,20] Studies have demonstrated that educational campaigns aimed at caregivers and family members increase awareness and improve adherence to hand hygiene practices, supporting the inclusion of these items in the questionnaire.[21,22]

The on-site validation phase was fundamental for understanding and practical functionality of the instrument in the hospital context. During this process, the adjustments made allowed for better management of response time and reinforced the methodological character of the study, centered on the validation of the instrument, with the elaboration of clearer and more accessible guidelines for the lay population.

The need for linguistic adjustments corroborates the literature, which highlights the importance of considering sociocultural variations when constructing texts and data collection instruments.[23] The use of technical terms without language adaptation can compromise the understanding and reliability of the responses, impacting the quality of the data obtained.[24] This difficulty is important in themes related to the prevention of HAIs, in which translating technical concepts into accessible language, without losing scientific

rigor, becomes fundamental to ensure the understanding and effective participation of caregivers in infection control strategies.[12]

Another factor adjusted in the face-to-face application was the response time of the questionnaire by caregivers. In a hospital setting, the time available to caregivers is limited and impacted by the dynamics of care for hospitalized patients and by emotional factors.[14] Reformulating questions and standardizing response options reduced application time, increasing the instrument's viability in real-world scenarios and facilitating subsequent analyses.

Countries that have adopted rigorous health education protocols for caregivers have shown a reduction in cases of HAIs, reinforcing the effectiveness of these measures in containing the transmission of pathogens and improving hospital safety. This evidence reinforces the relevance of instruments that support structured educational actions. By recognizing the caregiver as a fundamental link in the care network, a more humanized, preventive care model aligned with the guidelines of a safety culture is created.[1,8,20] The developed instrument offers a consistent methodological basis for future investigations, in which the training of this individual can be explored as an essential component of infection prevention policies and the promotion of quality of health care.

The validation phases were fundamental to improving the instrument in terms of content, clarity, and language appropriateness, reinforcing the importance of systematic validation processes before its analytical application. However, limitations were identified, such as low adherence in the online validation, possibly associated with the initial length of the questionnaire, and the restriction of face-to-face validation to a single hospital context. To mitigate these limitations, the instrument was revised and optimized, with a reduction in redundancies and simplification of sentences, aiming to increase its acceptability.

The results of this study contribute to strengthening continuing health education actions and the prevention of HAIs in the hospital environment. The results of this study contribute to strengthening continuing health education actions and the prevention of HAIs. The instrument is validated in terms of content, clarity, and relevance, offering a structured basis for future investigations with caregivers of hospitalized patients and enabling its

adaptation to different hospital settings, favoring the understanding of the role of caregivers in strategies for preventing healthcare-associated infections.

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Arielle Teixeira Silva has contributed to project management, bibliographic research, abstract writing, introduction, methodology, discussion, interpretation and description of results, table creation, conclusions, review, and statistics. **Rafaela Bergamini Resende Silveira** has contributed to project management, abstract writing, introduction, methodology, discussion, interpretation and description of results, conclusions, review, and statistics. **Fabrício Gomes Michel** has contributed to abstract writing, methodology, interpretation of results, conclusions, review, and statistics. **Evelyn Lívia Miranda da Silva** has worked remotely, contributing to the creation of the abstract, analysis and interpretation of online data, final text review, and support in the methodological organization of the study. **Tânia Elisabete Dias de Castro** has contributed to project management and data collection, as well as facilitating access to the research field and institutional information. **Thaimara Ribeiro Leite de Castro** has contributed to project management and data collection, as well as facilitating access to the research field and

institutional information. **Sabrynna Brito Oliveira** was responsible for guiding the project, contributing to the methodological design, supervision of activities, critical review of the content, and final validation of the work.

All authors approved the final version to be published and are responsible for all aspects of the work, including ensuring its accuracy and integrity.