

Efeito de vídeo educativo sobre segurança do paciente no conhecimento, atitudes e práticas em hemodiálise*

Effect of educational video on patient safety on hemodialysis knowledge, attitudes and practices

How to cite this article:

Silva GG, Almeida MP, Martins MG, Lima MMS, Oliveira JVAP, Silveira ACP, et al. Effect of educational video on patient safety on hemodialysis knowledge, attitudes and practices. Rev Rene. 2026;27:e96577. DOI: <https://doi.org/10.36517/2175-6783.20262796577>

 Gilmara Garcia da Silva¹
 Matheus Pinheiro Almeida¹
 Marina Guerra Martins¹
 Magda Milleyde de Sousa Lima²
 Juliana Valéria Assunção Pinheiro de Oliveira¹
 Ana Claudia Parente Silveira¹
 Joselany Áfio Caetano¹

*Extracted from the thesis entitled “Efetividade da plataforma safety4me® no conhecimento, na atitude e prática de pessoas com doença renal crônica sobre segurança do paciente”, Universidade Federal do Ceará, 2024.

¹Universidade Federal do Ceará. Fortaleza, CE, Brazil.

²Centro Universitário Inta – Uninta.
Tanguá, CE, Brazil.

Corresponding author:

Marina Guerra Martins
Rua Alexandre Baraúna, 1115 – Rodolfo Teófilo.
CEP: 60430-160. Fortaleza, CE, Brazil.
E-mail: mariinagmp@gmail.com

Conflict of interest: the authors have declared that there is no conflict of interest.

EDITOR IN CHIEF: Ana Fatima Carvalho Fernandes 

ASSOCIATE EDITOR: Luciano Marques dos Santos 

ABSTRACT

Objective: to analyze the effect of a video educational intervention on patient safety on the knowledge, attitude, and practice of hemodialysis patients. **Methods:** a quasi-experimental study, pre- and post-intervention, without a control group, carried out with 57 patients undergoing hemodialysis treatment. Data were collected using a sociodemographic characterization form and the Knowledge, Attitude, and Practice Instrument, applied at the pre-test and post-test moments. The educational intervention consisted of a face-to-face and individualized strategy, carried out during the hemodialysis session, with an average duration of 30 minutes. **Results:** there was an increase in the scores in the three domains evaluated ($p < 0.001$), with a median rising from 10 to 13 in Knowledge, from 9 to 10 in Attitude, and from 6 to 9 in Practice, with a very high, moderate, and high effect, respectively, related to safety measures. **Conclusion:** the educational intervention in video increased the knowledge, attitude, and practice scores of patients on hemodialysis related to patient safety. **Contributions to practice:** the use of educational videos is a low-cost and easy-to-implement strategy, with the potential to strengthen patient participation in the prevention of adverse events and expand the culture of safety in hemodialysis.

Descriptors: Patient Safety; Hemodialysis Units, Hospital; Nephrology Nursing; Health Education; Health Promotion.

RESUMO

Objetivo: analisar o efeito de uma intervenção educativa em vídeo sobre segurança do paciente no conhecimento, na atitude e na prática de pacientes em hemodiálise. **Métodos:** estudo quase-experimental, do tipo pré e pós-intervenção, sem grupo controle, realizado com 57 pacientes em tratamento hemodialítico. Os dados foram coletados por meio de formulário de caracterização sociodemográfica e do Instrumento de Conhecimento, Atitude e Prática, aplicados nos momentos de pré-teste e pós-teste. A intervenção educativa consistiu em uma estratégia presencial e individualizada, realizada durante a sessão de hemodiálise, com duração média de 30 minutos. **Resultados:** observou-se aumento dos escores nos três domínios avaliados ($p < 0,001$), com mediana elevando-se de 10 para 13 no Conhecimento, de 9 para 10 na Atitude e de 6 para 9 na Prática, com efeito muito elevado, moderado e alto, respectivamente, relacionado às medidas de segurança. **Conclusão:** a intervenção educativa em vídeo aumentou os escores de conhecimento, atitude e de prática dos pacientes em hemodiálise relacionados à segurança do paciente. **Contribuições para a prática:** a utilização de vídeos educativos constitui estratégia de baixo custo e fácil implementação, com potencial para fortalecer a participação do paciente na prevenção de eventos adversos e ampliar a cultura de segurança em hemodiálise.

Descritores: Segurança do Paciente; Unidades Hospitalares de Hemodiálise; Enfermagem em Nefrologia; Educação em Saúde; Promoção da Saúde.

Introduction

Over the last decade, patient safety has been consolidated as one of the main pillars of health care quality, being recognized by the World Health Organization as a global priority for reducing avoidable harm and improving clinical outcomes⁽¹⁻²⁾. Significant advances have been achieved in recent decades, such as the institutionalization of national patient safety policies, the implementation of incident notification and learning systems, and the strengthening of the safety culture in health services⁽²⁾. However, the promotion of patient safety also requires a multifaceted approach, based on transparent governance systems, strengthening of the safety culture, adoption of evidence-based practices and strategies, understanding of human factors and continuous evaluation of care processes⁽³⁻⁴⁾.

In this context, the patient safety competence comprises the set of knowledge, skills and attitudes necessary to recognize risks, prevent harm and promote safe care practices. In nursing, the development of this competence contributes to the early identification of risks, incident notification, implementation of preventive measures and continuous improvement of the quality of care. However, recent evidence demonstrates that sustainable results in patient safety require a multifactorial approach, involving institutional leadership, positive organizational culture, efficient information systems and, increasingly, the engagement of patients as active partners in care⁽⁵⁻⁶⁾.

This engagement is particularly relevant in high-risk care contexts with a high frequency of contact with health services, such as hemodialysis. Hemodialysis units are one of the most complex and high-risk care environments within health services. Treatment involves repetitive invasive procedures, frequent manipulation of vascular accesses, administration of anticoagulants, use of high-tech equipment, and continuous monitoring during sessions usually performed three times a week. The combination of these factors increases the vulnerability of patients to the occurrence of adverse events, including identification failures,

errors related to vascular access, inadequate medication administration, intradialytic hypotension, and infections associated with care, making it essential to strengthen safety strategies in this scenario⁽⁷⁾.

Although several initiatives have been implemented to reduce adverse events in hemodialysis services, such as care protocols, checklists, quality improvement programs and team training, most of these strategies remain centered on the performance of health professionals⁽⁸⁻⁹⁾. In recent years, however, patient involvement has been recognized as an essential element for strengthening care safety. Hemodialysis patients maintain frequent and prolonged contact with health services, becoming strategic partners in the early identification of risks, in the communication of incidents and in the adoption of behaviors that favor their own safety⁽¹⁰⁾.

Among the strategies capable of strengthening this participation, educational technologies stand out, especially those based on audiovisual resources. Educational videos enable the standardization of information, favor the understanding of complex content through the integration of visual and auditory resources, stimulate patient engagement, and can promote behavioral changes related to self-care and patient safety. These characteristics make this technology particularly suitable for individuals undergoing hemodialysis, considering the long length of stay in the units and the continuous need for health education⁽¹¹⁻¹²⁾.

Despite the growing recognition of the importance of patient participation in promoting safety, there is still little evidence on the effect of educational interventions specifically aimed at patients undergoing hemodialysis treatment. In addition, few studies have investigated the impact of audiovisual educational technologies on the components of patient safety competence, including knowledge, attitude, and practice, which are fundamental for the adoption of safe behaviors during treatment. This gap hinders the implementation of educational strategies based on scientific evidence, aimed at patient empowerment and strengthening the safety culture in dialysis services⁽¹³⁾.

In this scenario, producing evidence on innovative educational interventions represents an opportunity to expand patient participation in incident prevention, qualify nursing care, and support institutional programs aimed at patient safety in hemodialysis units. Thus, this study aimed to analyze the effect of a video educational intervention on patient safety on the knowledge, attitude, and practice of hemodialysis patients.

Methods

Study design

This is a quasi-experimental study, of the pre- and post-intervention type, without a control group. This design, although it does not include random allocation of participants, constitutes an adequate methodological alternative to evaluate health interventions when randomized clinical trials are not feasible⁽¹⁴⁾.

Study site and sample

The research was carried out in the hemodialysis unit of a university hospital located in Fortaleza, Ceará, a reference in the care of people with chronic kidney disease. The service attends, on average, 70 patients in hemodialysis therapy, distributed in three daily shifts, from Monday to Saturday, with sessions lasting between three and four hours. Care is provided by a multidisciplinary team composed of nurses, nephrologists, nutritionists, social workers and nursing technicians.

The sample consisted of 55 patients undergoing hemodialysis treatment at the institution. The participants were recruited by non-probabilistic convenience, based on the identification, together with the coordination of the hemodialysis unit, of individuals eligible to participate in the study.

Individuals aged 18 years or older who had been diagnosed with chronic kidney disease and had been undergoing hemodialysis treatment at the ins-

titution for at least three months were included, a period considered sufficient for initial adaptation to therapy and establishment of the treatment routine; literate, due to the presence of written content in the educational videos; and with preserved cognitive performance, verified through the Mini-Mental State Examination (MMSE), in order to ensure the ability to understand and respond appropriately to the assessment instrument and the content of the intervention.

Patients who had hemodynamic instability at the time of data collection, self-reported visual and/or hearing impairment that compromised the viewing and comprehension of educational videos, psychiatric disorders that could interfere with participation in the intervention, or kidney transplantation scheduled for the period of the research were excluded.

Sample losses were defined as participants who gave up participating in the study after the beginning of data collection or who required hospitalization during the intervention period, making it impossible to complete the steps provided for in the research protocol.

Data collection

Data collection took place between February and May 2025, during the hemodialysis sessions and was conducted by a single researcher, previously trained to standardize the study procedures. The pre-test was applied at the beginning of the hemodialysis session, before the educational intervention; then, the same researcher performed the bedside intervention, still during this session; and the post-test was applied, also by the same researcher, in a subsequent session, respecting a minimum interval of seven days, in patients without clinical contraindications.

To achieve the objective of the study, two pre- and post-test data collection instruments were used: a form for the sociodemographic characterization of the participants and the Knowledge, Attitude and Practice (KAP) Instrument on patient safety in chronic kidney disease, developed and validated in a previous study⁽¹⁵⁾. The sociodemographic form, prepared by the

main researcher, included information regarding the characteristics of the participants, such as age, gender, education and profession.

The KAP survey is described as a survey aimed at identifying what a population knows, thinks and does in relation to a topic of interest, usually through structured questionnaires and in defined population samples⁽¹⁶⁾. Recent study treat the three domains as related, not just parallel. In structural models, knowledge tends to influence attitudes, and attitudes tend to influence practices⁽¹⁷⁾.

The KAP Survey Application Manual indicates that this instrument can be used in different stages of the research, from the initial diagnosis to the monitoring of changes resulting from interventions, making it possible to assess the behavior of the population in relation to the investigated phenomenon. To assess the knowledge, attitude and practice of patients with chronic kidney disease regarding patient safety during hemodialysis treatment, an instrument structured in three complementary scales, Knowledge, Attitude and Practice (KAP), was used, each organized into two thematic factors: hand hygiene and safety care in hemodialysis sessions. In all scales, each item answered correctly scores 1 point and each incorrect item scores 0, considering an ideal average of correct answers of 60% for the classification of performance as adequate or inadequate⁽¹⁵⁾.

The Knowledge scale consists of 13 items with answers in three categories (Yes, No, I don't know), with a minimum score of 0 and a maximum of 13 points. Factor 1 (6 items) assesses knowledge about hand hygiene to promote safety in hemodialysis, verifying whether the patient recognizes the correct steps of hand washing (wrist, nails, fingertips, thumb, between the fingers) and whether he knows that health professionals should sanitize their hands after contact with surfaces close to the patient. Factor 2 (7 items) assesses knowledge about patient safety care in hemodialysis sessions, contemplating the need for professionals to sanitize their hands before procedures and before touching the patient, the importance of the

patient washing their hands and fistula arm before the session, the correct identification of the dialyzer/capillary and dialysis lines, and the recognition of hand hygiene and patient identification as safety goals.

The Attitude scale consists of 14 dichotomous items (Yes/No), with a score from 0 to 14 and an adequacy cut-off point of 8 points or more. Factor 1 (6 items) assesses attitudes related to hand hygiene, verifying whether the patient reports washing each stage of the hands correctly (wrist, nails, fingertips, thumb, back and palm). Factor 2 (8 items) assesses patient safety attitudes in hemodialysis sessions, including the patient's active participation in their own safety, such as questioning the professional about hand hygiene and the medication administered, informing allergies before administering medications, covering the catheter and dialysis lines, checking one's own name on the system box and on the dialyzer/capillary before the session, and avoiding walking on wet floors between sessions.

The Practice scale consists of 11 items, with a score from 0 to 11 and an adequacy cut-off point of 7 points or more. Factor 1 (6 items) evaluates practices related to hand hygiene and medication, through direct observation by the researcher during the demonstration of hand washing by the patient (nails, fingertips, thumb, between the fingers and back of the hand) and, by self-report, whether the patient questioned the professional about the medication administered in the last session. Factor 2 (5 items) evaluates patient safety practices in hemodialysis sessions, verifying, by self-report referring to the day of collection, whether the patient asked for help to move around after the previous session, whether he washed his hands and arm of the fistula before the day's session, and whether the identifications were checked on the hemodialysis box, on the dialysis lines and on the dialyzer/capillary before starting the treatment.

Educational intervention

Before the intervention, the participants did not

receive any educational content other than the application of the sociodemographic form and the pre-test of the KAP instrument, avoiding any effect of previous exposure on the outcomes evaluated. Each individualized educational session lasted an average of 30 minutes, including the initial explanation, the exhibition of the seven videos (9 minutes and 6 seconds) and the space for the clarification of the participants' doubts.

Thus, the intervention consisted of showing a series of educational videos on patient safety aimed at people with chronic kidney disease undergoing hemodialysis treatment, carried out during hemodialysis sessions at the treatment unit itself. The videos, produced and validated in a previous study, were presented individually to the participants using a 10.5-inch Galaxy Samsung® tablet and JBL® On-Ear Pure Bass T510BT headphones, ensuring adequate audio and image quality during the intervention⁽¹⁵⁾.

The videos were developed based on international patient safety goals and adapted to the context of hemodialysis. These resources addressed, respectively, the following topics: correct patient identification (1 minute and 50 seconds); improved communication between health professionals (1 minute and 33 seconds); safety in the prescription, use and administration of medications (1 minute and 35 seconds); care related to surgery to make the arteriovenous fistula or insertion of the venous catheter (1 minute and 33 seconds); infection prevention (1 minute and 22 seconds); general care for infection prevention (1 minute and 21 seconds) and prevention of falls during hemodialysis treatment (1 minute and 12 seconds).

Data analysis

The collected data were typed and compiled in Microsoft Excel and later analyzed in the SPSS statistical package version 20.0. The data were organized in tables and graphs with absolute frequencies, percentages, means and standard deviations. The distribution of the scores of the Knowledge, Attitude and Practice scales was evaluated using the Shapiro-Wilk

test. Considering that all variables had a non-normal distribution ($p < 0.05$), we opted for the use of non-parametric statistical tests in the inferential analyses.

To compare the scores obtained before and after the intervention, the Wilcoxon signed-rank test was used. The magnitude of the differences was estimated by means of rank-biserial correlation (rrb), adopting the following classification of the effect size: values below 0.20 were considered negligible; between 0.20 and 0.49, low; between 0.50 and 0.79, moderate; and equal to or greater than 0.80, high⁽¹⁸⁾.

Ethical aspects

The present study was approved by the Research Ethics Committee of the Federal University of Ceará under number 7.317.699/2024 and Certificate of Presentation for Ethical Review: 72677623.1.3001.5045.

Results

In the sample of this study, 30 (54.5%) female participants predominated, aged 56 to 70 years 22 (40%), retired 24 (43.6%), self-employed 17 (30.9%) and salaried workers 14 (25.5%). The participants' hemodialysis duration was, on average, 9.81 years (standard deviation [SD]=7.38). Regarding education, there was a predominance of complete high school, corresponding to 25 (45.5%).

Table 1 presents, in addition to descriptive statistics, the results of the Wilcoxon test for paired samples, used to compare the scores of the Knowledge, Attitude, and Practice domains between the pre- and post-intervention moments. All comparisons revealed statistically significant differences ($p < 0.001$), with very high effect size in the Knowledge domain, high in the Practice domain, and moderate in the Attitude domain, evidencing consistent and clinically relevant change in the three domains evaluated after the educational intervention, with greater magnitude in the cognitive and practical components of patient safety competence.

Table 1 – Descriptive statistics and comparison of pre- and post-intervention scores in the Knowledge, Attitude, and Practice domains. Fortaleza, CE, Brazil, 2025

Domain	Moment	Median	Q1*	Q3*	Minimum	Maximum	W†	z‡	p-value§	rrb
Knowledge	Pre	10	10	12	10	13	0	5.65	< 0.001	1
	Post	13	13	13	12	13				
Attitude	Pre	9	7	10	3	13	220	3.05	< 0.001	0.53
	Post	10	9	11	6	13				
Practice	Pre	6	6	8	3	11	70.5	5.22	< 0.001	0.88
	Post	9	8	10	6	11				

*Quartiles; †Wilcoxon test; ‡z-test; §Significance level; ||Rank-biserial correlation

When disaggregating the domains into their constituent factors, a ceiling pattern was observed in Knowledge, with 96.4% and 100% of the participants reaching the maximum score in the factors Hand Hygiene and Safety Care, respectively. On the other hand, the items that are part of the “safety during the hemodialysis session” factor, such as: identification verification, communication about medications and aller-

gies, performed considerably lower both in Attitude (mean of 4.18 out of 8 points; no participant reached the maximum score) and in Practice (mean of 3.45 out of 5 points; 5.5% in the maximum score), indicating that the overall gain reported in these domains was concentrated in behaviors related to the hand hygiene factor, while active safety verification practices remain a priority target for educational reinforcement.

Table 2 – Breakdown of the Knowledge, Attitude, and Practice domains by factor, post-test. Fortaleza, CE, Brazil, 2025

Domain	Factor	Items	Mean (Standard deviation)	Medium	%*
Knowledge	F1-Hand hygiene	6	5.96 (0.19)	6	96.4
Knowledge	F2-Safety cautions	7	7.00 (0.00)	7	100
Attitude	F1-Hand hygiene	6	5.62 (0.76)	6	76.4
Attitude	F2-Security in session	8	4.18 (1.16)	4	0.0
Practice	F1-Hand hygiene and medication	6	5.36 (0.87)	6	56.4
Practice	F2-Security in session	5	3.45 (0.92)	4	5.5

*Percentage of items that reached the maximum score

Discussion

The main finding of the study was the significant improvement in the three domains evaluated knowledge, attitude and practice, with different magnitudes of effect between them. These results corroborate those of a randomized clinical trial that used educational interventions mediated by audiovisual resources and also demonstrated an increase in knowledge, greater adherence to self-care and an improvement in the participation of patients in dialysis therapies, reinforcing the effectiveness of this technology as a health education tool⁽¹⁹⁾.

Analyzing the domains in their constituent factors, a ceiling effect on Knowledge was observed, in which participants reached the maximum score in the factor Hand hygiene and safety care in the post-test, showing that the intervention was particularly effective in consolidating information already partially incorporated by the patients throughout the treatment. A recent study reinforces this dynamic by demonstrating that educational interventions in health often produce more immediate effects on knowledge, while attitudinal and behavioral changes tend to present greater variability and dependence on the care context⁽²⁰⁾.

A different pattern was observed in the fac-

tors related to active identification verification and communication about medications and allergies during the hemodialysis session, in these items, which are included in factor two of the attitude and practice domains, performance remained considerably lower. This contrast is consistent with the distinction proposed in a recent study between self-protective safety behaviors, which are more easily incorporated by the patient, such as hand hygiene, and active behaviors aimed at reporting and correcting (voicing and correcting behaviors), in which the patient needs to position himself in front of the team to, for example, confirm his identification or warn about an allergy before administering a medication; according to the authors, these active behaviors depend less on the knowledge acquired than on the patient's perception that it is legitimate and safe to intervene with the health team⁽²¹⁾.

This finding is also consistent with studies that use the KAP survey and demonstrate that the three domains, although related, respond heterogeneously to the same intervention, especially when behavioral factors depend on greater autonomy, assertiveness and confidence of the patient to manifest themselves before the health team^(17,22). Similarly, a review on patient engagement in care safety highlights that the behaviors of active verification and risk communication require, in addition to technical knowledge, the overcoming of relational and hierarchical barriers between patient and team⁽¹⁰⁾.

The knowledge-related results are also compatible with evidence from experimental trials and quasi-experimental studies that evaluated video-based educational interventions for hemodialysis patients. In general, these studies demonstrated that video-based interventions promote a significant increase in knowledge about treatment-related aspects, favoring the understanding of information and the retention of the content presented. Although there are methodological differences between the studies regarding the number of educational sessions, the follow-up time and the contents addressed, consistency is observed in the direction of the results, suggesting that the com-

bination of visual and auditory resources favors learning and reduces difficulties related to health literacy, making dialysis patients more apt to actively participate in their own care⁽²³⁻²⁵⁾.

Although the attitude also improved, its magnitude of effect was lower than that observed for knowledge and practice, a finding consistent with the pattern identified in the factor analysis of the domains. This finding can be explained by the fact that attitudes represent more complex constructions, influenced by beliefs, previous experiences, risk perception, trust in the health team and self-efficacy, aspects that generally require more time to be modified. In hemodialysis patients, evidence indicates that attitude acts as an important mediator between knowledge and practice, favoring the transformation of acquired information into safe behaviors. In addition, educational interventions that stimulate dialogue and active involvement of patients can strengthen the sense of responsibility for treatment and expand their participation in decision-making related to care safety^(22,26).

In addition to statistical significance, the evaluation of the magnitude of the effects allowed a more comprehensive interpretation of the clinical relevance of the results. Although statistically significant changes may occur in studies with different sample sizes, the analysis of the effect sizes demonstrated that the observed gains had a consistent practical impact. The high effect for knowledge and practice indicates that the intervention produced substantial changes in these domains, while the moderate effect observed for attitude suggests that this component, especially the items related to active identification verification and communication about medications and allergies, may require continuous educational strategies, reinforcement sessions and longer follow-up time so that cognitive changes are fully incorporated into daily behavior⁽²⁷⁾.

Thus, the use of educational videos represents an easy-to-implement, low-cost, and highly reproducibility strategy, with the potential to strengthen patient participation in the prevention of adverse events during hemodialysis and to expand the safety culture

in nephrology services, as the educational intervention is capable of positively modifying the knowledge, attitude, and practice domains related to patient safety⁽²⁸⁾. The findings suggest, however, that this isolated strategy tends to produce more homogeneous gains on knowledge than on active safety verification behaviors, reinforcing the hypothesis that educational intervention positively modifies the knowledge, attitude, and practice domains related to patient safety, although in different magnitudes among the factors that compose them.

Study limitations

The quasi-experimental design, without a control group, limits the causal inference of the observed effects. The non-probabilistic and convenience sample, from a single hemodialysis service, restricts the representativeness and generalization of the findings. In addition, the short interval between the intervention and the application of the post-test may have favored the evaluation of immediate effects, without allowing the inference of long-term maintenance of changes. Finally, it was not possible to control the participants' prior or concomitant exposure to texts, videos, or other content related to the intervention themes, which may have influenced the results. Future studies with experimental designs, multicenter samples, and prolonged follow-up may confirm the sustainability of the observed effects and identify the need for periodic educational interventions to maintain the gains obtained.

Contributions to practice

This article highlights the potential of using educational video technologies as a health education strategy aimed at patient safety in hemodialysis services. The use of educational videos represents an easy-to-implement, low-cost, and highly reproducibility strategy, with the potential to strengthen patient

participation in the prevention of adverse events during hemodialysis and to expand the safety culture in nephrology services.

Conclusion

It was evidenced that the educational intervention in video produced significant effects on the knowledge, attitude, and practice related to patient safety on hemodialysis. A consistent increase in the scores in all domains evaluated was observed in the post-intervention period compared to the pre-intervention moment, indicating an improvement in the participants' performance regarding safety measures in dialysis care.

Authors' contributions

Conception and design or analysis and interpretation of data: **Silva GG, Almeida MP**. Writing of the manuscript and relevant critical review of the intellectual content: **Martins MG, Lima MMS**. Final approval of the version to be published: **Oliveira JVAP, Silveira ACP, Caetano JA**. Agreement to be responsible for all aspects of the manuscript, ensuring that any issues are investigated and resolved appropriately: **Caetano JA**.

Data availability

The authors declare that the dataset that supports the results of this study will be made available by the authors, upon reasonable request to the corresponding author, respecting the ethical aspects approved by the Research Ethics Committee.

References

1. Macleod H, Greenfield D. Navigating the complex terrain of patient safety: challenges, strategies, and the importance of ongoing evaluation and knowledge sharing. *Int J Qual Health Care*. 2024;36(3):mzae074. doi: <https://dx.doi.org/10.1093/intqhc/mzae074>

2. World Health Organization. Global Patient Safety Action Plan 2021–2030: towards eliminating avoidable harm in health care [Internet]. 2021 [cited Apr 13, 2026]. Available from: <https://iris.who.int/handle/10665/343477>
3. Jose-Saras DS, Valencia-Martín JL, Vicente-Guijarro J, Moreno-Nunez P, Pardo-Hernández A, Aranz-Andres JM. Adverse events: an expensive and avoidable hospital problem. *Ann Med*. 2022; 54(1):3157-68. doi: <https://doi.org/10.1080/07853890.2022.2140450>
4. Anders RL. Global perspectives on patient safety: the central role of nursing management. *Healthcare*. 2025;13(24):3240. doi: <https://doi.org/10.3390/healthcare13243240>
5. Ibrahim MM, Abdul-Rahaman F, Sayibu MS, Alhassan DN, Awudu RT, Sisala IM, et al. Assessing the impact of nurses' patient safety competencies on key performance indicators (KPIs) for patient safety outcomes at Tamale Teaching Hospital: the mediating role of leadership and barriers to competency development. *BMC Health Serv Res*. 2025;25(1):1176. doi: <https://doi.org/10.1186/s12913-025-13384-3>
6. Sutton E, Martin G, Eborall H, Tarrant C. Undertaking risk and relational work to manage vulnerability: acute medical patients' involvement in patient safety in the NHS. *Soc Sci Med*. 2023;320:115729. doi: <http://doi.org/10.1016/j.socscimed.2023.115729>
7. Aguiar LL, Martins MG, Silva RA, Moreira TMM, Almeida PC, Caetano JA. Chronic kidney disease patient safety in hemodialysis: evidence of scale validity and reliability. *Rev Bras Enferm*. 2025;78(3):e20240327. doi: <https://doi.org/10.1590/0034-7167-2024-0327>
8. Leite A, Kislaya I, Machado A, Aguiar P, Nunes B, Dias CM. Use of quasi-experimental studies to evaluate causal effects of public health interventions in Portugal: a scoping review. *BMC Med Res Methodol*. 2025;25(1):263. doi: <https://doi.org/10.1186/s12874-025-02701-3>
9. Faiad C, Baptista MN, Primi R. Tutoriais em análise de dados aplicados à psicometria. Petrópolis: Vozes; 2022.
10. Kendir C, Fujisawa R, Fernandes OB, Bienassis k, Klazinga N. Patient engagement for patient safety: the why, what, and how of patient engagement for improving patient safety OECD Health Work Pap. 2023;159:74. doi: <https://doi.org/10.1787/5fa8df20-en>
11. Corrêa BSO, Góes FGB, Silva ACSS, Silva MA, Goulart MCL, Campos BL, et al. Effectiveness of educational technology in video format on home bathing of term newborns. *Texto Contexto Enferm*. 2024;33:e20230161. doi: <https://dx.doi.org/10.1590/1980-265X-TCE-2023-0161en>
12. Furukawa E, Okuhara T, Okada H, Fujitomo Y, Osa M, Hashiba T, et al. Evaluating the understandability and actionability of online educational videos on pre-dialysis chronic kidney disease. *Nephrology*. 2023;28(11):620-8. doi: <https://doi.org/10.1111/nep.14226>
13. Fernandes LD, Castelo EN, Gondim LC, Costa AEA, Corrêa GD, Rodrigues AM. Evaluation of the clinical-sociodemographic profile of hemodialysis patients in an oncology hospital in the northern region of Brazil. *Rev Eletr Acervo Saúde*. 2024;24(10):e17400. doi: <https://dx.doi.org/10.25248/reas.e17400.2024>
14. Fabrigar LR, Vaughan-Johnston TI, Wegener DT. Quasi-experimental designs. In: Reis HT, West T, Judd CM, Handbook of research methods in social and personality psychology. Cambridge: Cambridge University Press. 2024. p.160-92. doi: <https://doi.org/10.1017/9781009170123.009>
15. Lima MMS. Efeito de vídeos educativos da plataforma safety4me® no conhecimento, na atitude e prática de pessoas com doença renal crônica sobre segurança do paciente [tese]. Fortaleza: Universidade Federal do Ceará; 2024.
16. Andrade C, Menon V, Ameen S, Praharaj SK. Designing and conducting knowledge, attitude, and practice surveys in psychiatry: practical guidance. *Indian J Psychol Med*. 2020;42(5):478-81. doi: <https://doi.org/10.1177/0253717620946111>
17. Shadibek A, Kamalbekova G, Musina A, Latypova, N. Assessment of knowledge, attitudes, and practices regarding community-acquired pneumonia among adults: a cross-sectional study. *J Health Dev*. 2026;61(1):e2663. doi: <https://doi.org/10.32921/2663-1776-2026-61-1-jhd053>

18. Katakam A. Handbook for designing and conducting clinical and translational research. In: Eltorai AEM, Liu T, Mehta DI, Horvat K. Continuous variable analyses: T-test, Mann-Whitney test, and Wilcoxon signed-rank test. Philadelphia: American Psychiatric Publishing; 2025. p.135-6.
19. Pessoa NRC, Sales JKD, Sousa CN, Lopes MVO, Frazão CMFQ, Ramos VP. Educational video for self-care with arteriovenous fistula in renal patients: randomized clinical trial. *Rev Latino-Am Enfermagem*. 2024;32:e4185. doi: <https://dx.doi.org/10.1590/1518-8345.6949.4185>
20. Kang J, Zhu X, Kan Y, Zhuang S. Application of the Knowledge, Attitude, and Practice model combined with motivational interviewing for health education in female patients with systemic lupus erythematosus. *Medicine (Baltimore)*. 2023;24;102(12):e33338. doi: <http://doi.org/10.1097/MD.0000000000003338>
21. Reader TW, Gillespie A. The active patient: voicing and correcting behaviors by patients and families to ensure safety in healthcare organizations. *Safety Sci*. 2026;193:107026. doi: <https://dx.doi.org/10.1016/j.ssci.2025.107026>
22. Chen Z, Xu N, Chen XX, Zhang X, Yin S, Xiao G, et al. Dietary knowledge-attitude-practice status in hemodialysis patients: a latent profile analysis. *BMC Public Health*. 2024;24(1):836. doi: <https://doi.org/10.1186/s12889-024-18066-z>
23. Fashafsheh N, Chui PL, Danaee M, Ayed A, Lai LL. Enhancing knowledge in adolescents undergoing hemodialysis in palestine: the impact of a video-assisted educational program. *Hemodial Int*. 2025;30(1):215-23. doi: <http://doi.org/10.1111/hdi.70015>
24. Peng M, Cai X, Wang Q, Li Z, Cao R, Guan B-Z, et al. Effects of visualized health education based on health belief model on self-management of patients undergoing maintenance hemodialysis. *West J Nurs Res*. 2024;47(2):89-99. doi: <https://doi.org/10.1177/01939459241306705>
25. Dsouza B, Prabhu R, Unnikrishnan B, Ballal S, Mundkur SC, Sekaran VC, et al. Effect of educational intervention on knowledge and level of adherence among hemodialysis patients: a randomized controlled trial. *Glob Health Epidemiol Genom*. 2023;2023:4295613. doi: <https://dx.doi.org/10.1155/2023/4295613>
26. Montalvo RC, Ftouni D, Shell P, Subhash S, Pearce K, Shukla AM. Understanding how patient education affects the process of treatment decision-making: Cultural model change in kidney disease therapy. *Patient Educ Couns*. 2025;139:109254. doi: <https://doi.org/10.1016/j.pec.2025.109254>
27. Rendón-Macias ME, Zarco-Villavicencio IS, Villasis-keever MÁ. Statistical methods for effect size analysis. *Rev Alerg Mex*. 2021;68(2):128-36. doi: <https://doi.org/10.29262/ram.v65i2.949>
28. Du Y, Cai X, Hong X, Chen YQ, Chen C, Gong J, et al. Knowledge, attitude, and practice of coronary heart disease patients towards antithrombotic therapy. *BMC Public Health*. 2025;25(1):549. doi: <https://doi.org/10.1186/s12889-025-21678-8>



This is an Open Access article distributed under the terms of the Creative Commons