ORIGINAL ARTICLE

VIDEO CHORDEL "Ô PÉ ARRETADO" EDUCATIONAL TECHNOLOGY FOR DIABETIC FOOT PREVENTION

Maria Railisse Freitas do Nascimento[1]; Fernanda Jorge Magalhães[2]
Vanessa Silva de Castro Monte[3]; Luciana Catunda Gomes Menezes[4]
Léa Maria Moura Barroso Diógenes[5]; Adriana Celia Cardoso dos Santos[6]
Edna Maria Camelo Chaves[7]; Sherida Karanini Paz de Oliveira[8]

Highlights: (1) Technology validated as a contribution to Diabetes Mellitus health education. (2) The Video-Cordel relates foot care in a relevant, simple and clear way. (3) Raises awareness of behaviour change and prevention of diabetic foot complications.

http://dx.doi.org/10.21527/2176-7114.2025.50.15175

[1] Universidade de Fortaleza. Programa de Pós-Graduação *Stricto Sensu* em Tecnologia e Inovação em Enfermagem. Nova Russas/CE, Brasil. https://orcid.org/0000-0003-4210-7722

[2] Universidade Estadual do Ceará. Programa de Pós Graduação Stricto Sensu em Cuidados Clínicos em Enfermagem e Saúde. Fortaleza/CE, Brasil / Universidade de Fortaleza. Programa de Pós-Graduação Stricto Sensu em Tecnologia e Inovação em Enfermagem. Fortaleza/CE, Brasil. https://orcid.org/0000-0003-0104-1528

[3] Universidade de Fortaleza. Programa de Pós-Graduação *Stricto Sensu* em Tecnologia e Inovação em Enfermagem. Fortaleza/CE, Brasil. https://orcid.org/0000-0002-6527-0090

[4] Centro Universitário Fametro - UNIFAMETRO. FortalezaCE, Brasil. https://orcid.org/0000-0002-7828-9065

[5] Universidade de Fortaleza. Programa de Pós-Graduação *Stricto Sensu* em Tecnologia e Inovação em Enfermagem. Fortaleza/CE, Brasil. https://orcid.org/0000-0003-1446-7309

[6] Universidade de Fortaleza. Programa de Pós-Graduação *Stricto Sensu* em Tecnologia e Inovação em Enfermagem. Fortaleza/CE, Brasil. https://orcid.org/0000-0002-1260-7315

[7] Universidade Estadual do Ceará. Programa de Pós Graduação *Stricto Sensu* em Cuidados Clínicos em Enfermagem e Saúde. Fortaleza/CE, Brasil. https://orcid.org/0000-0001-9658-0377

[8] Universidade Estadual do Ceará. Programa de Pós Graduação *Stricto Sensu* em Cuidados Clínicos em Enfermagem e Saúde. Fortaleza/CE, Brasil. https://orcid.org/0000-0003-3902-8046

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How to cite:
do Nascimento MRF, Magalhães FJ, Monte VS de C, Menezes LCG, Diógenes LMB, dos Santos ACC. et al. Video chordel "Ô pé arretado" educational technology for diabetic foot prevention. Rev. Contexto & Saúde, 2025;25(50): e15175

ABSTRACT

Objectives: To describe the process of creating a video channel with evidence of validity as an educational technology to promote self-care and prevention of diabetic foot as a complication of living with diabetes mellitus. **Method:** Methodological study, developed through data collection in the literature and with the target audience; construction of the video script with chordel literature and video chordel; validation of the material through validation by judges (specialists in the fields of health and chordel) and udability test with the target audience (people living with diabetes in primary health care). Data were analysed descriptively. **Results:** The content and appearance of the video chordel was validated, with a content validity coefficient of 1.0; with 100% agreement between items; considered adequate for the evaluation of educational material and with the best possible usability in terms of applicability to the target audience. **Conclusion:** The Video Chordel was validated in all domains evaluated and can be used by people with diabetes to promote self-care and prevention of diabetic foot.

Keywords: Diabetes Mellitus; Diabetic foot; Health education; Educational Tecnology; Literature.

INTRODUCTION

The term “diabetic foot” (DF) is used in national and international consensus to describe the process of ulceration, infection and/or destruction of deep tissue associated with neurological abnormalities in the lower limb of people with diabetes mellitus (DM)[1].

The data reflects that, by the end of 2019, there were around 463 million adults living with DM worldwide, with this number expected to rise to 578 million by 2030. In Brazil, the highest rates of DM are in the North and Northeast regions. As for the incidence of diabetic foot ulcers, the rate is between 19% and 34%, with an increase of 2% per year[2].

In order to minimize complications related to these ulcerations, the International Consensus[3] on DF recommends: identifying the foot at risk; examining it regularly;

educating the person, their family/caregiver and professionals; ensuring the routine use of suitable footwear and; treating risk factors.

The process of educating the individual as a person, as a family and as a community is considered challenging for health professionals, especially nurses working in Primary Health Care (PHC). As strategies for this education, educational technologies can be used to promote empowerment about the chronic condition, change behavior and improve quality of life[4], such as videos or films[5], which are considered effective alternatives for promoting self-care in the context of diabetes.

Allied to this, in order to get closer to the target audience culturally, cordel literature is presented, popularized in Brazil, especially in the Northeast, with folklore stories presented in an interactive and playful way. It is considered an important contribution to facilitating the understanding of the message, using its regionalization and culture to encourage health promotion[6].

It is therefore believed that a technology with evidence of validity and evaluated with the target audience becomes a potential contribution to diabetes education related to foot care, in a relevant, simple and clear way to change behavior and self-care.

The aim was therefore to describe the process of constructing a video chordel, with evidence of validity, as an educational technology for promoting self-care and preventing the diabetic foot as a complication for people with DM.

METHOD

The ethical and legal aspects governing research involving human beings were respected with the approval of the Research Ethics Committee, opinion number 5.175.955. Participation was voluntary and the Informed Consent Form (ICF) was signed. No conflict of interest was declared.

Methodological study, taken from the dissertation entitled “Construction and validation of the video chordel ‘Ô pé arretado’ as an educational technology for the prevention of diabetic foot”[7]. The research followed the framework of quality improvement studies-SQUIRE[8] and the guidelines of the Consolidated criteria for reporting qualitative research (COREQ)[9] of the EQUATOR network.

The video chordel was built in four stages: 1) understanding the content; 2) building the chord and script for the video chordel; 3) assessing the evidence of validity

and; 4) applicability with a usability test.

The content was understood through a scoping review[10], guided by the research question: “What are the strategies/interventions to prevent problems and promote health for self-care of the feet of people with DM?”. Twenty studies were analyzed which showed health education strategies/interventions and self-care behaviors: foot inspection in 100.0% (n=20), followed by proper foot hygiene and drying in 70.0% (n=14) and proper nail trimming in 60.0% (n=12). The majority (80.0%; n=16) highlighted the application of technologies to prevent complications from DF, with a focus on education, which is favorable to self-care.

The video, entitled “Ô pé arretado”, was constructed using a Standard Operating Procedure (SOP) for planning and constructing the script for the video-chord. After the first version of the cordel literature; developed by the researchers with the support of a cordelista, a poet with expertise in preparing cordels in the health area. The process of evaluating the evidence of validity began with a pilot test for understanding and semantic viability by an audience with varying degrees of health literacy, in order to contribute accordingly to the validation process[11] of an educational material.

To this end, a questionnaire was administered via Google Forms to five nursing students (P1, P2, ..., P5), recruited by convenience, via messaging application, from the undergraduate course of a private Higher Education Institution in the city of Fortaleza-CE-Brazil. They were over 18 years old, had already completed the Adult Health module/discipline, and had already learned about caring for people with DM and its complications. Those on sick leave or maternity leave during data collection were excluded.

Six expert judges in Adult Health, Primary Health Care and Diabetes Mellitus were selected to validate the content and appearance of the video chordel script. In order to establish parameters for selecting these judges (J1, J2,...,J6), at least two criteria were met: having clinical experience, publishing and researching on the subject, being an expert in the conceptual framework involved and having methodological knowledge about the construction of psychometric instruments[11].

Once the script had been validated, the video chordel itself was constructed, thus establishing the need to validate the video as educational material. To this end, the six judges returned and three other nurses (J1, J2,...,J9), with more than two years of direct

experience with people living with diabetes in PHC, were included as technical judges, making a total of nine judges for the validation of the video chordel.

For the applicability and usability test, a sample of four people with DM, diagnosed at least six months ago, registered and monitored in the HiperDia Program (U1, U2, U3 and U4) was obtained. This was a convenience sample, and those who had glycemic instability and/or any complications during the application of the technology were excluded.

As a data collection protocol, the 15 judges were invited by convenience, via messaging app, using the SnowBall technique, with confirmation of their expertise on the Lattes Platform. However, six of them did not return the invitation within the established timeframe and three were excluded due to incomplete completion of the data collection instrument.

After agreeing to evaluate the video chordel script, the judges received instructions by email and a form created by google docs with the invitation letter, ICF, characterization of the participants and the evaluation instrument. The video chordel script was attached via a google drive link.

This instrument was based on the items in the Suitability Assessment of Materials (SAM)[12]. A likert scale was used to assess agreement (5) or disagreement (1) with the script in terms of: semantics, simplicity, clarity and relevance; as well as an analysis of the content of the cordel with space for comments and/or suggestions.

After the judges agreed on the suitability of the script, based on evidence of its validity in terms of content and appearance, it was possible to build the video with the support of a designer. After that, the validated script was carefully followed. The link to the “google drive” with the video built for validation was then emailed back to the same judges.

This was followed by the fourth stage of applicability, where the usability test was carried out with the target audience (health users and nurses) in a primary health center (PHC) in the northeastern interior of the state of Ceará, Brazil.

To this end, patients from three different teams were invited to take part in the educational strategy during their HipeDia appointment, and a folder was attached to the PHC flannelgraph describing the meeting place and time for the application of the educational strategy using the video chordel.

After accepting the invitation for this usability stage, a checklist was applied based on the "System Usability Scale" (SUS)13, which evaluates: effectiveness (are users able to complete their objectives?), efficiency (how much effort and resources are needed for this?), satisfaction (was the experience satisfactory?) and includes an open response with suggestions/comments. It consists of ten questions, each of which the user can answer on a Likert scale from 1 (Strongly Disagree) to 5 (Strongly Agree).

The video chordel was presented using a projection screen with a speaker in a PHC meeting room, with comfortable chairs in a bright, quiet environment.

The Content Validity Coefficient (CVC) for the individual (CVCi) and total (CVCt) validation stages was used, with a value of over 0.78 being desirable[14]. With regard to the analysis of the educational material with the SAM, the Likert standard was used with items from 1 to 5 which implied: No suitability (1) to Very suitable (5); and a checklist with attributes related to: content, writing style, graphic illustration, presentation, motivation and cultural suitability. In addition to domains such as visual and musical arts, cordel literature style, caption writing, appearance and motivation. A minimum of 75% agreement was considered in the positive responses for the material to be recognized as adequate[15].

The SUS analysis was based on the reference index with an average score of 68 points; if it is lower than this, the technology has usability problems. With an interpretation of: < 60 (unacceptable); 61-70 (Ok); 71-80 (Good); 81-90 (Excellent) and > 90 (Best possible usability)[13]. The results were presented in tables and figures.

RESULTS

The content of the educational cordel highlighted the importance of self-care and strategies for preventing foot injuries and ulcers in people with DM. Of the twenty pieces of evidence studied, four categories stood out: "Behavior change"[16-18] focusing on the need to examine the feet daily, care for the feet and be motivated to actively participate in their treatment; "Lifestyle and quality of life", in which one study[19] emphasizes group activity as a support for self-care literacy and improving quality of life; "Therapeutic adherence", with four studies on the topic[16,18,20,21] encouraging the correction of self-care deficits during the consultation, specialized follow-up, patient/caregiver/professional co-responsibilities and self-care interventions and; "Strategies for DM prevention", of which

four[22-25] prioritize the construction and validation of technologies to promote self-care.

After finalizing the first version of the cordel, a pilot test was carried out to evaluate the semantics of the cordel literature with eight female nursing students, aged 24.6 on average, who were between their seventh and tenth terms. They all had theoretical classes on DM, treatment, nursing care and related complications. Words such as: nail clippings; drying between the toes to avoid lesions and fungus; suitable shoes; paying attention to corns, socks and shoe seams, as well as drying to avoid fungus were found.

These are reflected in P1's words, with an emphasis on cutting nails and choosing shoes: “Patients are instructed to cut their toenails so that they are square to reduce the chance of nail bites, to avoid removing cuticles. They are advised to choose shoes (...) that are comfortable and don't hurt”.

P3 and P6 mention the need for hygiene, the use of creams to moisturize the skin, avoiding walking barefoot and removing calluses. “Check the temperature of the water, dry the feet well and between the toes so that there is no risk of fungus or bacteria” (P3); ‘Use emollients to lubricate dry skin, but don't use them between the toes, avoid walking barefoot (...) wear seamless socks, don't remove calluses’ (P6).

After the students agreed on the clarity, simplicity and semantic relevance of the educational material, an overall CVC of 1.0 and 100% agreement were obtained for the first evaluation of the cordel. It is clear and easy to understand for the different levels of literary comprehension of health professionals, especially for those who are still in training, minimizing language bias.

This was followed by the preparation of the script for the video chordel, which described in detail: the objective of the technology; the target audience (people living with DM and their caregivers/family members); self-care in the prevention of PD as the main message; the cordel as content; the feelings (humor, hope, gratitude and empathy) and emotions (fun, visual appreciation, interest, satisfaction and joy) to be perceived; a running time of one minute and 30 seconds; use of images such as woodcuts and cangaço in aged aspects in black, white and grey; instrumental music (accordion and triangle); subtitles in Portuguese with letters of an appropriate size for the video designer; credits (names of the researcher, supervisor, video editing team and cordelista); acknowledgements and; registration by Creative Commons.

Content and appearance validation was carried out with six judges, all female,

average age 41.8 years, all nurses, one of whom had experience in writing health cordels. They had a minimum of two years' training and a maximum of 20 years; three had a master's degree, two were specialists and one had a doctorate. Four of them worked in PHC, where they monitored people with diabetes, with an average of 12.3 years' experience.

There was a CVCt of 1.0, i.e. they all agreed with the items regarding the simplicity, clarity and relevance of the script. As well as the appearance/design of the video (use of black and white woodcuts, with regional music and the use of the avatar for interactivity and linking the feelings and emotions of the target audience).

Only one expert reported the possibility of revising the word “fissure” in the cordel, but as it was only a “possibility”, we decided to keep it and re-evaluate it in the technology's applicability stage with users.

The SAM showed that 100% of the judges agreed that the educational material is suitable for use with the target audience and that the script has the potential to improve the professional-patient communication process, making it an effective method of guidance (Table 1).

Table 1: Classification of the suitability factor of the “Ô Pé Arretado” educational material using the SAM, by the panel of technical judges. Fortaleza-CE, 2022.

Judges	SAM Total (S)	N/A x 2 (4x2 =8)	SAM Total adjusted [T = S - (N/A x 2)]; (T=S-8)	Percentage (S/T)	Interpretation
1	38	8	30	1.3	Adequate
2	23	8	15	1.5	Adequate
3	25	8	17	1.5	Adequate
4	26	8	18	1.4	Adequate
5	37	8	29	1.3	Adequate
6	42	8	34	1.2	Adequate

Source: Authors (2022).

Caption: S-Soma; N/A- Não aplicável; T-Total.

The categories classified as excellent were: cultural appropriateness, language,

followed by content and learning stimulation/motivation. Those considered adequate were: layout presentation and illustrations. Only one judge rated the illustrations item as not suitable, perhaps because the material being assessed at this stage was a video script and not the video itself. Another judge rated the literacy requirement as not adequate but made no comments or suggestions.

At the end of the interpretation, it was noted that the educational material had an average score of 1.4, which shows that the material is suitable for communication and guidance for people living with diabetes and their carers on self-care to prevent diabetic foot problems.

After validating the content and appearance, it was possible to build the video chordelstrictly following the validated script. The programme used to make the video was Affter Effects and Premiere, both from Adobe®. The sound was captured on a free platform with the cordel read in the voice of the cordelist. For the images, the designer used his talent as a draughtsman. This resulted in 21 illustrative and animated slides synchronised with the reading of the cordel, subtitles, the first being the cover, 19 educational slides and the final two thanks and credits (Figure 1).

Figure 1: Representation of the final version of the video-chord 'Ô Pé Arretado' for validation with the panel of expert judges. Fortaleza-CE, 2022.

Slide 1

Slide 2

Slide 3

Slide 4

Slide 5

Slide 6

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Slide 7

Slide 8

Slide9

Slide 10

Slide 11

Slide 12

Slide 13

Slide 14

Slide15

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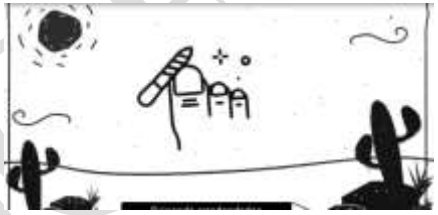
Slide 16

Slide 17

Slide 18



Slide 19

Slide 20

Slide 21

Source: Authors (2022).

Once the video had been constructed, the video itself was validated. To do this, the six judges who took part in validating the script were returned and three other judges who work in clinical care practice at the PHC were included, and the SAM was applied. An average score of 1.5 was obtained, with 100% agreeing that this is educational material suitable for health education and that it favours raising awareness of self-care for the feet of people with DM.

The video-chordel was presented and applied to users at a PHC. There were three female participants, on average 50 years old, only two had type 2 DM and only one claimed to have a lesion, three had been diagnosed for between 5 and 11 years.

They were asked about their knowledge of how to take care to prevent complications from DM, especially DF, and mentioned: observation and comfort of footwear, foot hygiene and that care should be daily, according to U1, U2 and U3. Only one participant reported that they had no knowledge of the subject. ‘You should avoid hurting your feet, avoid tight shoes and make sure there's nothing inside’ (U1). ‘You should wash your feet well, use alcohol to disinfect them and cream’ (U2). ‘Don't wear tight shoes, don't walk barefoot and be careful when washing’ (U3).

The video chordel was shown to be a technology with excellent usability, i.e. users can easily understand the proposed objectives, and users reported excellent satisfaction. Therefore, three users considered it the best possible usability (SUS = 100) and one considered it excellent usability (SUS = 87.5) (Table 2).

Table 2: Score, calculation and interpretation of the Usability Test of the video chord. Fortaleza-CE, 2022.

QUESTIONS	U1	U2	U3	U4
I think I'd like to use this video often (X- 1)	5 (5-1 = 4)	5 (5-1 = 4)	5 (5-1 = 4)	5 (5-1 = 4)
I found the video chordel unnecessarily complex (5-Y)	1 (5-1 = 4)	1 (5-1 = 4)	1 (5-1 = 4)	1 (5-1 = 4)
I found the video chordel easy to understand (X- 1)	5 (5-1 = 4)	5 (5-1 = 4)	5 (5-1 = 4)	5 (5-1 = 4)
I think I would need help from a person with technical knowledge to understand the video chordel	1 (5-1 = 4)	1 (5-1 = 4)	1 (5-1 = 4)	2 (5-2 = 3)
(5-Y)	5 (5-1 = 4)	5 (5-1 = 4)	5 (5-1 = 4)	2 (5-2 = 3)
I think that the various functions of the video are very well interconnected (X-1)	1 (5-1 = 4)	1 (5-1 = 4)	1 (5-1 = 4)	2 (5-2 = 3)
I think the video chordel is very inconsistent (5-Y)	5 (5-1 = 4)	5 (5-1 = 4)	5 (5-1 = 4)	5 (5-1 = 4)
I imagine that people will understand the video chordelquickly (X- 1)	1 (5-1 = 4)	1 (5-1 = 4)	1 (5-1 = 4)	2 (5-2 = 3)
I found the video difficult to understand (5-Y)	5 (5-1 = 4)	5 (5-1 = 4)	5 (5-1 = 4)	5 (5-1 = 4)
I felt confident watching the video (X- 1)	1 (5-1 = 4)	1 (5-1 = 4)	1 (5-1 = 4)	2 (5-2 = 3)
I needed to understand several other things before I could understand the video (5-Y)	(4 x 10) x 2,5 = 100	(4 x 10) x 2,5 = 100	(4 x 10) x 2,5 = 100	(4 x 5) + (3 x 5) = 35 x 2,5 = 87,5
Value of each participant x 2.5	100 Best possible usability	100 Best possible usability	100 Best possible usability	87,5 Excellent usability

Source: Authors (2022).

The average calculation was 96.8, which refers to the excellent usability of the technology and adequate educational material for encouraging self-care in the prevention of complications related to DF.

DISCUSSION

Adherence to self-care for people with DM is still a challenge, as there are emotional, cognitive and behavioural aspects that are considered obstacles to self-care, such as denial of the condition and fear of complications, especially those resulting from

ulcerations and/or other foot injuries[26].

The video-chord ‘Ôh pé arretado’ was considered valid, suitable as educational material and with excellent usability for the target audience. In view of this, it corroborates with scholars[5,27,28] who emphasise the importance of a rigorous method for the construction and validation of educational technology, with an innovative contribution, guaranteeing a product with relevant information in simple and accessible language, as well as clear, objective and attractive figures and animations for the target audience.

The results therefore confirm the findings of other scholars[6,29,30] who emphasise the development of technology as educational material aimed at the needs, including the cultural needs, of the target audience. With simple content, clear semantics, as well as an attractive and interactive appearance, it can be recognised as valid and suitable for enhancing educational and health promotion activities for people living with chronic conditions.

Limitations of the study

It was difficult to find a larger number of cordel judges working in the health area, as well as up-to-date studies that have used cordel in the teaching-learning process in the areas of science and health. To alleviate this limitation, it is recommended that the video undergo other validation studies in clinical practice in different Brazilian municipalities, which value the cultural folklore of cordel.

Contributions to practice

This video chordelcould be used to strengthen diabetes education with a view to promoting self-care for the feet of people with DM. It is considered feasible in PHC and outpatient settings. It has the potential to raise awareness and encourage changes in behaviour and lifestyle in order to prevent complications and problems resulting from DM, especially DF.

It is innovative in that it shows a cultural approach to cordel literature. It is registered under the Creative Commons Licence: ‘Video chordelel - Ô Pé Arretado© 2022, licensed under CC BY-NC-ND 4.0’. It is available for free on YouTube® via the following link: https://youtu.be/q9_WYFA4Pyg

CONCLUSION

In conclusion, the development of the video-chord was valid in terms of its content and appearance, considered appropriate and perceived by the target audience as a technology of excellent usability for the diabetes education process, especially in the prevention of DF.

It is hoped that this video-chord 'Ô pé arretado' will become a technology incorporated into the care spaces of people living with DM, in order to favour self-care of the feet and, consequently, the prevention of diabetic foot problems.

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Submitted: September 18, 2023

Accepted: September 16, 2024

Published: March 17, 2025

Corresponding author:

Maria Railisse Freitas do Nascimento: Conceptualization, Data curation; Formal analysis; Investigation, Writing – original draft.

Fernanda Jorge Magalhães: Conceptualization, Data curation; Formal analysis; Investigation, Methodology, Validation, Project administration, Supervision, Writing – original draft.

Vanessa Silva de Castro Monte: Formal analysis, Validation, Writing – original draft.

Luciana Catunda Gomes Menezes: Validation, Writing – original draft.

Léa Maria Moura Barroso Diógenes: Funding acquisition; Validation, Writing – original draft.

Adriana Celia Cardoso dos Santos: Validation, Writing – original draft

Edna Maria Camelo Chaves: Validation, Writing – original draft

Sherida Karanini Paz de Oliveira: Validation, Writing – original draft

All authors approved the final version of the text.

Conflict of interest: There is no conflict of interest.

Funding: Universidade de Fortaleza – UNIFOR

Corresponding author:
Fernanda Jorge Magalhães
Universidade Estadual do Ceará
Av. Dr. Silas Munguba, 1700 - Campus do Itaperi - Fortaleza/CE, Brazil
fernandaj.magalhaes@uece.br

Editor-in-chief: Adriane Cristina Bernat Kolankiewicz. PhD