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SOCIAL TECHNOLOGY BOOKLET: SELF-MANAGEMENT OF CHRONIC PAIN FOR OLDER PEOPLE

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ABSTRACT

Introduction: The diagnosis and management of chronic pain in older people is complex due to its multifactorial nature, social beliefs, and other health conditions that accompany aging. When the patient is actively engaged in the multiple modalities related to pain management, the chance of success is greater. Objective: To describe the development and validation of a digital booklet aimed at promoting the self-management of chronic pain in the elderly. Method: Methodological study conducted according to the following phases: preparation of the booklet (based on an integrative review and questionnaires answered by 28 elderly people); validation of appearance and content, using two instruments, with 22 judges and validation with a target audience, 21 elderly people. Results: The booklet "My pain does not go away: How can I help myself?", was prepared in the form of a comic book and has 50 pages in digital format. The overall Content Validity Index considered by the judges was 0.95 and through the Suitability Assessment of Materials it was considered "superior". Regarding the validation by the target audience, there was positive agreement. Conclusion:

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The developed technology proved to be a valid and reliable instrument to be used in promoting the self-management of chronic pain in the elderly.

Keywords: Aging, Health education, Social technology, Self-care, Comics.

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INTRODUCTION

The elderly population is the fastest growing today. It is estimated that by 2050, one in six people in the world will be over 65 years old (16%), while this number was one in eleven people (9%) in 2019(Nations). With aging, the incidence of many diseases increases, leading to various dysfunctions (Mattiuzzi & Lippi, 2020) that are related to or are accompanied by pain, such as previous traumatic injuries, physiological changes in connective tissue related to aging, degeneration of the nervous system(Ali et al., 2018), musculoskeletal disorders(Blyth & Noguchi, 2017)cancer(Guerard & Cleary, 2017) and diabetes(Baker et al., 2017).

The prevalence of chronic pain increases significantly with advancing age(Dahlhamer et al., 2018). The prevalence of pain in the elderly, especially chronic pain, is quite high, estimated at 25-85%(Abdulla et al., 2013; Kozak-Szkopek et al., 2017), compared to a younger group of adults, estimated at 7.3-68% in the 40-66 age group(Steingrímsdóttir Ó et al., 2017). Therefore, pain in the elderly is an issue that deserves attention.

The cost of pain to society is high, not only in financial terms, but also in physical and emotional suffering, which can be include impaired cognitive function, depression, sleep disturbances, decreased socialization, and impaired functional abilities(Herr, 2010).

Chronic pain is difficult to diagnose and treat accurately due to its complex and multifactorial nature(Fine, 2011). The elderly are particularly more complicated to treat clinically(Gerlach et al., 2017) due to its painful and chronic conditions, such as degeneration in bones, joints, and muscles(Molton & Terrill, 2014) and the use of polypharmacy, which may have drug interactions and side effects(Larney et al., 2015). In addition attitudes of conformation of the elderly in the face of pain, myths about pain being a natural element of aging, and fears about a potential addiction can lead to underreporting and undertreatment of pain in this population(Hadjistavropoulos et al., 2007; Herr, 2010, 2011), with functional impairments and decreased quality of life(Sayler et al., 2022).

Geriatric pain assessment should weigh the impact on the patient's ability to perform activities of daily living and how the patient's independence is affected by pain(Potru & Tang, 2021). Therefore, it is crucial for healthcare professionals to assess older adult pain effectively and employ multidisciplinary intervention strategies to help manage geriatric pain(Zhao et al., 2021). Although

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Some general principles should be followed in the treatment of all patients, pain management plans are more likely to be successful when patients are actively engaged in multiple modalities related to pain management(AGS, 2019).

A multimodal approach It is necessary to produce the best effects not only on pain, but also on function. Studies have indicated that A multidisciplinary and biopsychosocial approach is more effective than a stand-alone approach to the treatment and management of chronic pain(Kamper et al., 2014). Currently, physical exercise is considered the "gold standard" treatment for chronic pain, being beneficial for improving the quality of life of patients, with positive results in reducing pain and depression and improving sleep quality (Andrade et al., 2017). In addition, pain education with a biopsychosocial approach to deal with fears and clarify mistaken beliefs about pain and movement was also effective(Traeger et al., 2014).

It is important that patients with chronic pain understand the neurophysiology of pain and the influence of emotional symptoms (stress, anxiety, kinesiophobia, etc.), lack of sleep and physical activity on chronic pain, and are encouraged to gradually expose themselves to natural movements and physical activity for pain self-management(Junkes-Cunha et al., 2022). Social technologies aimed at educating diverse populations with chronic pain, such as children, people with chronic low back pain, and people with osteoarthritis(Foundation, 2021; PED, 2016). An educational technology aimed at the self-management of elderly patients with chronic pain, involving all the particularities of this population, however, was not found. Thus, the objective of this study was to to describe the process of elaboration and validation of a digital educational booklet aimed at elderly people living with chronic pain.

METHODOLOGY

STUDY DESIGN AND ETHICAL ASPECTS

This methodological study was approved by the Research Ethics Committee (opinion No. 5,771,467). The study was conducted between November 2022 and October 2023 and followed the guidelines "*Revised Standards for Quality Improvement Reporting Excellence* (SQUIRE 2.0)"(Ogrinc et al., 2016). Four phases were used for the elaboration and validation of the booklet, as already used in other educational technologies applicable to health(Echer, 2005): (1) bibliographic survey; (2) survey of the need presented by the target audience, (3) preparation of the educational material and (4) qualification of the material by

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experts in the subject. The final technology, product of this work, is registered by the Brazilian Book Chamber, under ISBN nº 978-65-01-02544-5.

DATA COLLECTION

The data collection was carried out in order to support the content to be included in the booklet. This stage consisted of a bibliographic survey and a survey of the need presented by the target audience.

Bibliographic survey

To this end, an integrative review was initially carried out to answer the following question: "What are the self-management actions used for elderly people with chronic pain and their results?" The initial search was carried out in seven scientific literature databases. To search for the articles, several combinations of Booleans and keywords or descriptors were used, related to the terms "elderly people", "self-care", "coping", "self-control", "self-management" and "pain". The filtering of the articles was done in a paired manner by two independent researchers.

Survey of the need presented by the target audience

In order to understand the knowledge of this public in relation to the theme of chronic pain and its management, elderly people answered a specific questionnaire. Individuals over 60 years of age, of both sexes, with chronic pain, who accepted the Informed Consent Form were included. Those who did not correctly fill in the date of birth and duplicates were excluded. Sampling was done via the internet (Polit & Beck, 2019) and was attended by 28 elderly people, represented by each of the regions federative units of Brazil: Midwest, North, Northeast, South and Southeast. The interviews were conducted remotely by filling out a questionnaire prepared in Google Forms®.

The questions were multiple choice, with the possibility of selecting more than one answer if necessary and/or completing "others" in a blank field. The topics investigated included the knowledge of the elderly people in relation to: chronic pain pathology, reasons for pain, differences between young and old, professional approach experienced, pain management in times of worsening, general health care, limitations due to pain and effects of physical exercise. The responses of the target audience were evaluated in three stages: pre-analysis, exploration of the material and treatment of the results(Bardin 2011).

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PREPARATION OF THE BOOKLET

With the analysis of the results of the integrative review and the questionnaire answered by the target audience, the content of the booklet was elaborated, both textual and illustrative, aiming to convey a brief, direct message, with simple and understandable language to the elderly public(Doak et al., 1996). The illustration and layout of the booklet was carried out by a professional in the area of graphic design, who used the programs *FireAlpaca* and *Affinity Publisher*respectively.

VALIDATION BY EXPERT JUDGES

Professionals considered experts in the area of approach to this study were invited as judges to validate the booklet in relation to its content and appearance.

The sample size was calculated using the following formula: n=Zα2.P(1-P) /e2, where "P" is the expected proportion of experts and "e" represents the acceptable proportional difference in relation to what is expected. For the calculation, the following were considered: Zα2=1.96; P=0.85; e=0.15, estimating the participation of 22 judges(de Oliveira Lopes et al., 2012).

For the selection of health professionals to be judges in the validation of the booklet, an adaptation of Fehring's Judge classification system was used (1994), which considers the training and experience of working in the area. Thus, to be included, specialists in the area had to meet at least two of the following criteria: have skill/knowledge acquired through experience; have specialized skill/knowledge that makes the professional an authority on the subject; have special ability in the area (gerontology, geriatrics, pain, orthopedics, rheumatology, musculoskeletal physical therapy, neurological physical therapy, motor imaging, cognitive-functional therapy, collective health, public health, nursing, health education, family health and methodological studies); pass a specific test to identify judges; or have a high rating assigned by an authority(Jasper, 1994).

Initially The top 22 eligible experts among the researchers' circle of contacts at partner universities received an invitation via email or Whatsapp to participate in the study as a judge, with the help of *link* of access to the questionnaire of the *Google Forms*, containing: the Informed Consent Form; questionnaire for the characterization of the judges, the booklet and the validation protocol. Thus, the selection of the other experts was made by the snowball sampling method, so that the first respondents were asked to indicate other specialists. It is, therefore, convenience sampling (Polit & Beck, 2019).

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The booklet validation protocol consisted of filling out two instruments: one evaluating the internal content and the other the difficulty and convenience of the educational material. The first instrument was applied in the evaluation of the clarity of the language, practical relevance and theoretical relevance of the text and illustration of each of the pages of the booklet. In this one, each item was judged in five levels, according to the degree of relevance, by means of a Likert scale: very little, little, medium, a lot and a lot. When the most negative options were marked, the respondents were asked to justify the option and a space was also allocated for the judges to include their suggestions (Alves et al., 2023; Dias et al., 2021; Sabino et al., 2018).

The second instrument, SAM (*Suitability Assessment of Materials*)(Doak et al., 1996) It offers a systematic method of evaluating the adequacy of health materials objectively, in a short evaluation time. This instrument allows the evaluation through a list to check attributes pertinent to the content, language, graphic illustrations, motivation and cultural adequacy of the educational material, which are scored using a three-point Likert scale: inadequate, adequate or higher. After the judges' evaluation, the booklet was adjusted according to their suggestions, thus forming a second version of the booklet.

VALIDATION BY THE TARGET AUDIENCE

In this phase, the second version of the booklet was validated by the target audience: elderly people. 21 elderly people participated in this stage. The inclusion criteria were the same as those used in the data collection phase, sampling was also done using the snowball method and data collection took place remotely via Google *Forms questionnaire*.

For this, an adapted questionnaire was used(Alves et al., 2023), with items of characterization of the subjects and the evaluative items of the booklet about the organization, writing style, appearance and motivation domains of the educational material.

DATA ANALYSIS

For the selection of content for the booklet, the studies included in the integrative review that presented positive results from the self-management strategies were grouped in a table, according to the objectives of the self-management strategy used. As for the questionnaire with the target audience, the points in which the knowledge of the elderly

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diverged from evidence-based practices were added to the initial table, thus forming a new table with the subjects and contents to be addressed in the booklet.

The quantitative data evaluated by the judges were analyzed using Microsoft Excel ® and *the Statistical Package for the Social Sciences* (SPSS), version 20.0.

The Content Validity Index (CVI)(Yusof, 2019) was used to measure the proportion of judges in agreement regarding the representativeness of the items in relation to the content of chronic pain self-management, that is, in clarity of language, practical pertinence and theoretical relevance. Thus, the index score was calculated by means of the sums of agreement of the items scored at 4 or 5 by the experts. The global CVI (S-IVC) would be considered accepted if ≥0.80 and the individual CVI (I-IVC) if ≥0.78, serving to guide the exclusion or revision of a given item(Yusof, 2019).

Regarding the evaluation of the adequacy of the health material, by the SAM, the booklet would be considered a "superior" educational material if it reached between 70% and 100% of the scores; "adequate", between 40% and 69%; and "inadequate", between 0 and 39%.

The Intraclass Correlation Coefficient (ICC) was used for all domains: language clarity, practical relevance, theoretical relevance and adequacy of the material. Agreement between 0.40 and 0.60 was considered regular, between 0.61 and 0.75 was considered good, and above 0.75 excellent.

The essay suggestions were read, weighted and, when relevant, were inserted in the material.

For the analysis of the data with the target population, validated items that presented a level of agreement equal to or greater than 75% of positive responses were considered.

RESULTS

The results will be presented according to the phases of preparation of the booklet.

DATA COLLECTION – INTEGRATIVE REVIEW

The sum of the searches in all seven databases resulted in 1797 articles, however, after filtering, 58 articles made up the final sample, which directed the theoretical content to be addressed in the booklet.

Through the integrative review, eight main topics of pain self-management strategies used by older people were identified: (1) pain education; (2) healthy habits; (3) thought

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management; (4) faith, positivity and sharing; (5)Peers (lay); (6) physical exercise; (7) self-efficacy and (8) self-monitoring.

DATA COLLECTION – QUESTIONNAIRE WITH THE TARGET AUDIENCE

The average age of the 28 elderly people who responded to the questionnaire was 68 years, and their age range was between 61 and 88 years. Of these, most were women (78.6%), retired (64.3%) who self-declared themselves as having white skin color (75%), 17.9% brown and 7.1% black. As for the region in which they live, 32.2% are from the South, 21.4% from the Southeast, 17.9% from the North, 19.9% from the Northeast and 10.7% from the Midwest. Regarding education, 28.6% of them had not completed elementary school and another 28.6% were postgraduate, 25% had completed higher education and 18.8% had attended high school.

Through the questionnaire, in addition to the themes identified in the review, it was possible to identify the main limitations of people due to chronic pain: walking a lot, participating in fun and leisure activities, practicing a sport and sitting on the floor. Thus, a table was created with the most relevant subjects to be included in the booklet (Table 1).

Table 1. Subjects and contents to be addressed in the booklet.

Subject	Content
Limitations on activities	- What Pain Limits You
Education in pain	- musculoskeletal anatomy and biomechanics - Differences between young and old people - definition of chronic pain - Causes of pain: biopsychosocial - central awareness - types of pain - Red flags - Common diagnostic strategies - The role of diagnostic imaging - Early detection/identification of pain triggers - Common treatment strategies - the role of medication and placebo - Evaluation of new treatment possibilities
Healthy habits	- Sleep hygiene -stress, anxiety and depression - Leisure (Schedule) - Food/nutrition -Exercise
Thought management	- negative automatic thoughts - cognitive restructuring - Coping thoughts - Nice images - meditation/self-hypnosis - Other distraction techniques - relaxation/breathing - Positive reinforcement

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Faith, positivity and sharing	- accept and not complain, stay positive - search for spirituality (praying/meditating/trusting) - motivation and hope - stay active, engage in the community - what experiences to share with whom
Pairs (lay)	- Social activities - share routines - share feelings and techniques for dealing with frustration, fears, and fatigue - Experiences with exercise and nutrition - Assist in communication with family, friends and health professionals -support
Exercise	- the value of exercise and physical activity - unsupervised exercise - Self-care in posture and movement - specificity of each exercise - Exercise options and progression strategies - Know when to stop or change exercise
Self-efficacy	- goals and action plans - Decision making - Troubleshooting - ability to cope with pain - Graded exposure - stimulation and tolerance - Activity-rest rhythm - Communication skills - management during the outbreak - Monitoring for relapse maintenance/prevention - Message of thanks to yourself for the effort
Self-monitoring	- sleep diary - Daily activities - Physical exercises performed - pain diary - Thoughts and feelings journal

PREPARATION OF THE BOOKLET

The first version of the booklet was prepared in the digital version and entitled "Chronic Pain: How can I help myself? - Manual of self-management of chronic pain for older people". Its content addressed each of the subjects described in the table resulting from the data collection phases (Table 1).

The plot was developed in comic book format with some sequential comic strips. Two elderly people with chronic pain are the main characters: a woman feeling very well, because she already knows what to do for self-management of pain, and a very sad man, in pain and not knowing what to do. The second learns from the first. In addition, information boards with the character of a health professional were included to emphasize certain more theoretical descriptions. At the end of the story, a "true or false" test on the content was included, as a form of formative assessment.

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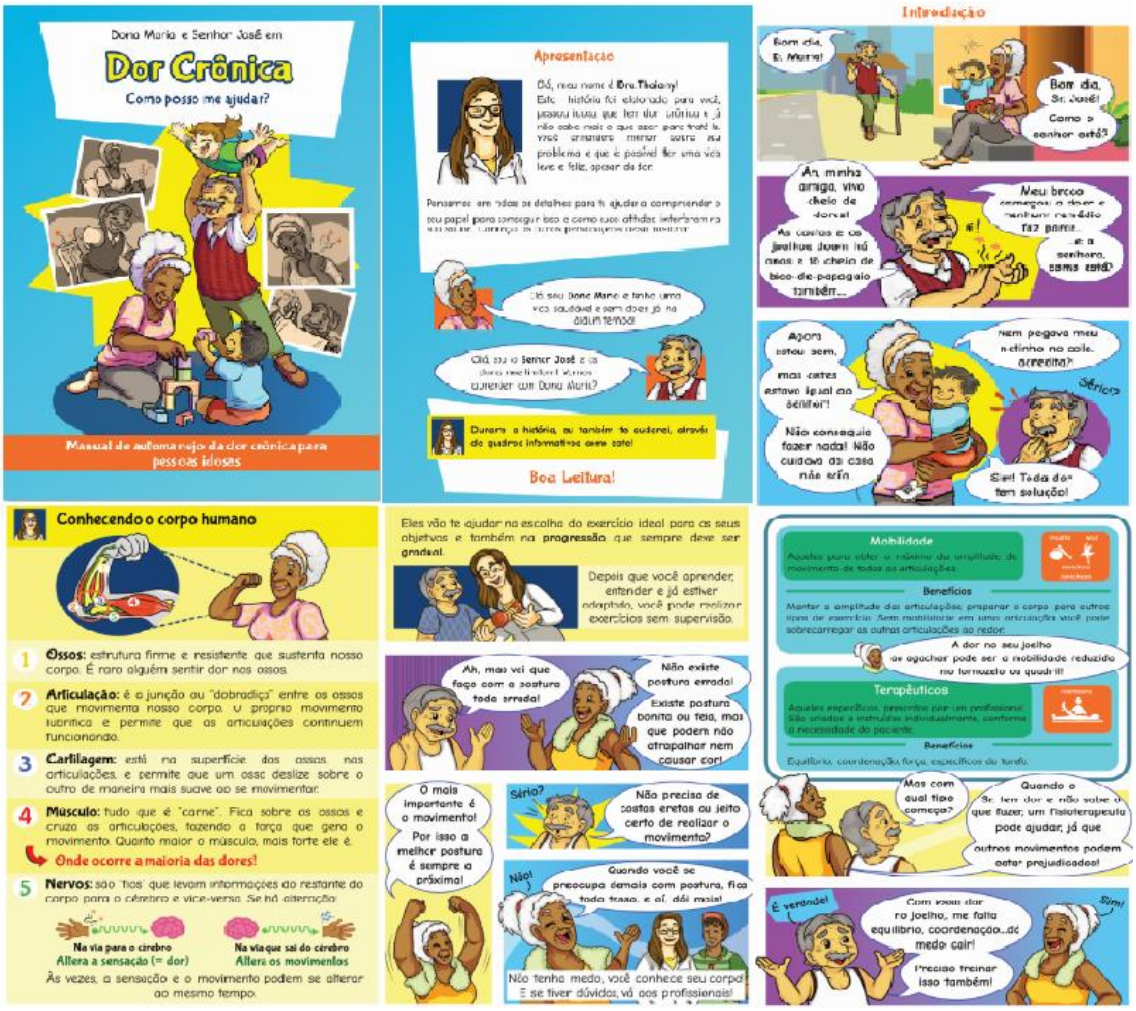
As a technical description, this version of the booklet contained 49 pages in size 23cm high by 16cm wide. On the cover, the title is in Bubblegum Sans font, size 50, in yellow and blue colors and the subtitle, in Comic Neue font, size 20, white color, with an orange background. The rest of the text is in Comic Neue font, with the conversation between the characters and informative, size 13, black; chapter titles, size 20, orange; and the chapter subtitles, size 16, blue color. As a bibliographic reference, in addition to references to scientific articles, Youtube videos, podcasts and textbooks were included. Figure 1 presents some pages from the first version of the booklet.

Figure 1 - Pages of the first version of the booklet entitled "Chronic Pain: How can I help myself?". Vitória, ES, Brazil, 2023.



VALIDATION BY EXPERT JUDGES

A total of 22 expert judges in the health area participated, most of them women (86.4%). Regarding the area of activity, 82% worked at the time of the research in one or more of the following areas: geriatrics and/or gerontology (36.4%), clinical and/or pain

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research, orthopedics and/or musculoskeletal physiotherapy, health education (31.8% each), health promotion (27.3%) and methodological studies/validation studies (22.7%). The other areas of activity of the judges were: psychosomatic psychology, cognitive-behavioral therapy, family health, nursing, rheumatology, public health and collective health. The age range of the participants was 25-62 years with a mean of 38 years. The mean length of experience in years was 11.5 with a standard deviation of 7.1. Most of the judges had experience in: carrying out individual and/or collective educational activities in their area of professional activity (90.9%), developing scientific research in the area (63.6%) and authoring scientific articles in the area (54.5%). In addition, half of the judges have already participated as speakers in scientific events and some of them have supervised and/or participated in undergraduate, master's and doctoral academic work boards.

Regarding the evaluation of the content of the booklet, it was observed that, for clarity of language and practical relevance, the I-IVC were higher than 0.82, and for theoretical relevance, the I-IVC were higher than 0.91, indicating the agreement between the majority of the judges for each of the items regarding these aspects.

As for the S-IVC, for clarity of language it was 0.93, demonstrating that, overall, the judges agree that the pages of the booklet have very or very clear language. For practical relevance and theoretical relevance, the S-IVC was 0.96, acknowledging, overall, the judges' agreement that the items in the booklet are very or very relevant to the practice of the theme addressed and that the theoretical information presented in the booklet is very or very relevant. The overall average CVI of the three aspects evaluated was 0.95. Table 2 presents both the evaluation of the content by the expert judges for each of the 49 items addressed in the booklet individually (I-IVC), as well as the global CVI (S-IVC).

Table 2. Amount of I-IVC values judged for the 49 items.

I-IVC	**Clarity of language**		**Practical relevance**		**Theoretical relevance**	
	n	**%**	**n**	**%**	**n**	**%**
0,82	5	10,2	1	2,1	0	0
0,86	5	10,2	0	0	0	0
0,91	14	28,6	6	12,2	8	16,3
0,95	16	32,6	27	55,1	26	53,1
1,00	9	18,4	15	30,6	15	30,6
Total	49	100	49	100	49	100
S-IVC	0,93		0,96		0,96	

I-IVC= Content validity index of an individual item; n = number of items that presented a certain I-IVC value. S-IVC= global content validity index.

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Regarding the evaluation of the adequacy of health materials, the score among the judges was 93%. Thus, the booklet was considered a "superior" educational material (Table 2).

Table 2 - Assessment of the adequacy of health matters.

SAM Items	Suitable (1)		Superior (2)	
	N	%	N	%
The objective is evident, facilitating the ready understanding of the material.	2	9,1	20	90,9
The content addresses information related to sustainable practices that favor health-promoting actions.	1	4,5	21	95,5
The proposal of the material is limited to the objectives, so that the viewer can reasonably understand in the time allowed.	1	4,5	21	95,5
The reading level is adequate for the understanding of the elderly public.	3	13,63	19	86,4
The conversational style makes it easier to understand the text.	0	0	22	100
The vocabulary uses common words.	3	13,63	19	86,4
The cover attracts attention and portrays the purpose of the material.	1	4,5	21	95,5
The illustrations present key visual messages so that the reader can grasp the main points on their own, without distractions.	1	4,5	21	95,5
There is interaction of the text and/or figures with the reader. Leading them to solve problems, make choices and/or demonstrate skills.	2	9,1	20	90,9
The desired patterns of behavior are modeled or well demonstrated.	2	9,1	20	90,9
There is a motivation to develop sustainable practices, that is, people are motivated to learn because they believe that tasks and behaviors are feasible.	0	0	22	100
The material is culturally appropriate to the logic, language, and experience of the target audience.	2	9,1	20	90,9
It presents culturally appropriate images and examples.	2	9,1	20	90,9
Total/Average	**1,5**	**7,0**	**20,5**	**93,0**

SAM= *Suitability Assessment of Materials.*

Regarding the ICC, for language clarity it was 0.973 (p<0.001), for practical relevance it was 0.986 (p<0.001), for theoretical relevance it was 0.979 (p<0.001), these items being considered excellent and, for adequacy of health materials it was 0.732 (<0.001), being considered of good adequacy for the elderly public.

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The judges' suggestions were mainly related to clarity of language and appearance. These were considered and accepted for the most part.

VALIDATION BY THE TARGET AUDIENCE

21 elderly people aged 60 to 75 years and an average age of 66 years participated in this phase. Among these, the majority were female (62%), self-declared white (76%), followed by brown and black (38%), and indigenous (5%). When it came to schooling, most of them had completed higher education (57%).

The level of agreement of the elderly for each of the four evaluative aspects (regarding organization, clarity in the text, adequate illustrations and motivation to act or think about self-management practices for chronic pain) was 93%, demonstrating that this booklet was considered superior for this target audience, as shown in Table 4.

Table 4 - Evaluation of the target audience regarding the organization, writing style, appearance and motivation of the booklet.

	Positive responses		Negative responses		Unbiased responses	
	N	%	N	%	N	%
Organization						
Did the cover catch your eye?	20	95,24	0	0	1	4,76
Is the sequence of content adequate?	21	100	0	0	0	0
Is the structure of the electronic booklet organized?	21	100	0	0	0	0
Writing style						
As for the understanding of the sentences, they are:	20	95,24	0	0	1	4,76
Written content is:	20	95,24	0	0	1	4,76
The text is:	21	100	0	0	0	0
Appearance						
The illustrations are:	20	95,24	0	0	1	4,76
Do the illustrations serve to complement the text?	21	100	0	0	0	0
Do the pages or sections look organized?	21	100	0	0	0	0
Motivation						
In your opinion, will anyone who reads this booklet understand what it is about?	20	95,24	0	0	1	4,76
Did you feel motivated to read the booklet until the end?	19	90,48	2	9,52	0	0
Does the educational material address the issues necessary to develop self-care with chronic pain?	20	95,24	0	0	1	4,76
Did the digital comic book suggest you to act or think about self-care practices in chronic pain?	19	90,48	1	4,76	1	4,76

It should be added that some suggestions were made by the target audience, which were accepted or not, as the researchers considered pertinent (Table 5).

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Table 5.

Suggestions by the target audience	Researchers' decision
Removing age limitations	Although information is important for everyone, the intention of this material is to attract the elderly public that often associates pain with age. Therefore, the content was kept focused on this age.
Space out information more on some pages	Suggestion accepted.
Increase the size of the letters	Considering that the material is digital, it is possible to increase the font seen on each device, so the font size has not changed.
Change the word protagonist, because someone may not know it.	The word was kept, as only 1 of the participants questioned it and the same, as well as the others, understood its meaning.

At the end of the questionnaire, the general opinion of the elderly people about the material was asked and, in general, the answers were positive, emphasizing the creativity, importance of the content, clarity and adequacy to the public, as demonstrated in the examples taken from the answers to the questionnaire: "Very informative and didactic". "Very good needed for everyone in pain... clear educational and motivating messages". "Creative, very didactic, and easy to understand".

ADJUSTMENTS TO THE FINAL VERSION OF THE BOOKLET

Despite the excellent evaluation of the expert judges, as well as the target audience, and also the CVI being within the acceptable value, some items referring to language clarity received lower evaluations. Thus, in order to improve the content and appearance of the booklet and improve the quality of this educational social technology, it was decided to consider and accept most of the suggestions of both the expert judges and the target audience.

The main changes made were related to the clarity of language and appearance, directing them to the target audience in a more appropriate way. They were: change in the title and in some chapter titles, font of the letter, background colors of some frames, use of synonyms for some words and spacing of information on some pages.

Thus, the final version of the booklet was created, entitled: "My pain does not go away: How can I help myself? Learn about self-care in chronic pain – for 60+".

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As a technical description, this version was composed of 50 pages in size 23cm high by 16cm wide. On the cover, the Bubblegum Sans font, size 30pt, in yellow and blue colors were used for the title. For the chapter titles and subtitles, the Helsinki font was used, with size 18 pt, orange color for the titles and size 16, blue color, for the subtitles. For the general text, the Pragati Narrow font, size 14, black color was used. Figure 2 shows some pages of the final version of the booklet.

Figure 2 - Pages of the final version of the booklet entitled "My pain does not go away: How can I help myself? Learn about self-care in chronic pain – for 60+". Vitória, ES, Brazil, 2023.

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DISCUSSION

This study developed and validated a social technology that can help the educational practice of health professionals to promote the role of elderly people with chronic pain in the management of this condition, increasing the quality of life of this population. The final product was a digital booklet, in comic book format and its elaboration was composed of a few stages. The results of each of these steps will be discussed below.

INTEGRATIVE REVIEW

Many studies have been found focusing on the management of chronic pain in the elderly, including systematic reviews. However, this seems to have been the first literature review focusing on chronic pain in general, as previous studies have always been limited to one or a few specific regions of the body with pain (e.g., low back pain, neck pain, knee pain) (Junkes-Cunha et al., 2022; Walsh et al., 2020)or to an underlying condition that has pain as one of the symptoms (e.g. osteoarthritis, fibromyalgia)(Ceballos-Laita et al., 2021; Dahlberg et al., 2020).

Through the integrative review, eight topics were identified with the main pain self-management strategies used by older people: (1) pain education; (2) healthy habits; (3) thought management; (4) faith, positivity and sharing; (5) Lay pairs; (6) physical exercise; (7) self-efficacy and (8) self-monitoring (Antunes et al., 2024).

Many studies have combined more than one strategy, so it is not possible to say that a given result is exclusive to one of the strategies adopted. For example, most of the studies included in the review investigated pain self-management courses and programs, as well as the use of primers. These programs focused on pain education and lifestyle changes, presenting positive results in the three areas of biopsychosocial aspects.

Although the management of chronic pain requires a multidisciplinary and multimodal intervention, frequent physical exercise is the "gold standard" intervention, recommended by all guidelines related to painful and chronic conditions(Excellence, 2021; Swain et al., 2020). Physical exercise, both general and specific to a given health condition, was the second most reported strategy, showing benefits in all areas of biopsychosocial aspects, regardless of the type of exercise practiced. In addition, some studies have emphasized the learning of the elderly regarding the practice of unsupervised exercises in a safe way(Rios et al., 2020; Rios, 2015; Sorbi et al., 2017). However, the elderly person who is starting to self-manage pain needs to know that each type of exercise has a different bodily effect,

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knowing exercise options, some progression strategies and recognizing the moment to stop or change exercises(Marconcin et al., 2018; Ussing et al., 2020). These issues were also addressed in the integrative review. Although many authors have given postural advice, there is no consensus in the literature on the causal relationship between the physical posture adopted and the incidence of pain(Swain et al., 2020).

Education and Cognitive-Behavioral Therapy (CBT) were both in third place in the strategies used. CBT is a biopsychosocial approach that can be used to encourage patients to start pain management(Baker et al., 2017). In this review, strategies such as meditation/self-hypnosis, diet, pace of activities, guided physical activity, thought management, and self-created coping strategies were addressed by the CTB, showing positive results in different aspects involving chronic pain(Bennell et al., 2017; Damush et al., 2016; Davis et al., 2015; Heapy et al., 2017; Ikemoto et al., 2020; Kimura, 2021; McCurry et al., 2021; Nicholas et al., 2013, 2017; Vitiello et al., 2013).

Only three of the studies in this review dared to publish exclusively neutral or negative results (Hoon, 2017; Mehlsen et al., 2017; Murphy, 2016). This was probably due to a publication bias(Nair, 2019). The remaining studies that reported neutral or negative results also reported positive results for other outcomes.

Most outcomes addressed biological aspects of pain, followed by psychological aspects. However, as most studies combined more than one pain management strategy, their results also addressed a mix of biopsychosocial approaches (Antunes et al., 2024).

QUESTIONNAIRE WITH THE TARGET AUDIENCE

Through the questionnaire, it was also possible to identify doubts and distorted knowledge about most of the elements pointed out by the integrative review. In addition to these, the respondents pointed out their main limitations, resulting from pain, which are: walking a lot, participating in fun and leisure activities, playing sports and sitting on the floor. A review on the impacts of chronic pain highlighted the severe limitations that people with this condition can present, impacting their social and family environment, in addition to the financial impact on the health system(Dueñas et al., 2016).

PREPARATION OF THE BOOKLET

A social technology is created by transformative methodologies developed and applied by a professional with specialized knowledge, together with the community,

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appropriate according to the needs of each part of the population so that there is social inclusion and/or improvements in living conditions. Such technology aims to promote awareness and empowerment of the community to act proactively in prevention actions in various areas, including their own health. The booklet for the self-management of chronic pain for the elderly was developed with the collaboration of its target audience both in its initial phase, of construction, and in the final phase, for validation of the material(Lencina et al., 2023).

The idea of the comic book format with short stories was that the reader could stop reading whenever he wanted, to resume it at any time without getting lost in its content. The colorful images, scenarios and characters were created so that the elderly audience can identify themselves, holding the reader's attention and facilitating their understanding(Echer, 2005). It was also decided to include, as bibliographic references, materials with simpler language and in different formats so that they can serve as complementary content to the reader's learning on the subject. Thus, Youtube videos, websites, podcasts and textbooks were also referenced, in addition to scientific articles.

As for the colors used, we sought to use the colors yellow, to refer to joy and optimism, blue, to refer tranquility, serenity and peace, and the color purple was used in the scenes that represent concern(HELLER, 2016).

Educational materials for older people focusing on other themes were found in the physical form. One of the advantages of being a digital booklet is the prevalence of elderly people with low visual acuity is high and this format allows you to increase the size of the letters, making it easier to read. In addition, digital technologies provide access to health education in a fun way and with universal access(Antunes et al., 2022), promoting significant learning regarding the adoption of changes in healthy habits. These results can also be emphasized with the technology in comic book format.

EVALUATION OF EXPERT JUDGES

In the evaluation of the content, measured by the CVI, the answers of the expert judges were considered acceptable, as the majority agreed on the clarity of language, practical relevance and theoretical relevance of the items addressed in the booklet. Based on the answers, the educational booklet "Chronic Pain: How can I help myself" presented content validity with an overall CVI of 0.95, suggesting that the booklet is representative of the content to be addressed about the self-management of chronic pain by elderly people.

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Other studies have also validated their materials with indices Superior. The booklet for older people on sleep hygiene(Carvalho et al., 2019) also obtained a CVI of 0.95 in the experts' assessment, while the primer with specific physical exercises to prevent falls in community-dwelling older adults obtained 0.89 in this evaluation(Lima, 2020).

Regarding the SAM, the booklet was classified as superior, indicating that the booklet is an excellent health instrument. A similar classification has been presented in other studies that have developed and validated social technologies such as this(Alves et al., 2023; Sabino et al., 2018).

Regarding the agreement between the experts, the clarity of language, The practical relevance and theoretical relevance of the booklet were considered excellent and its adequacy as a health material was considered good for the elderly public. As in similar studies(Alves et al., 2023; Sabino et al., 2018), the judges' suggestions contributed to the reformulation of the text and illustrations, increasing the quality and reliability of the information contained in this social technology in its final version.

EVALUATION BY THE TARGET AUDIENCE

The validation of the material prepared with the elderly people indicated that its content was developed according to their reality, observing a positive evaluation of the material. Emphasis was given to the importance of the evaluation process by the target audience as a way to identify if the material portrays the reality of the people for whom it is intended, as well as to sensitize them to the adoption of new behaviors(Alves et al., 2023). Echer (2005) points out the importance of involving the target audience in the process of developing the technology in the identification of content, reflecting on its demands to arouse the interest of the target audience in the subject.

Listening to the elderly highlighted the need for technology to address topics that would facilitate knowledge of the human body, what chronic pain is, how its diagnosis and treatment options are made, as well as the importance of practices involving health in a global way, with the inclusion of healthy habits, thought management, including deconstructing beliefs, faith, sharing with peers, strategies to enable continuity, and self-monitoring. This set allows older people to reflect on the biopsychosocial dimensions that involve chronic pain as a disease, considering the complexity that involves this condition, which is not just a symptom(Treede et al., 2019).

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The level of agreement of the elderly people regarding the organization, clarity in the text, adequate illustrations and motivation to act or think about practices of self-management of chronic pain demonstrated that this booklet was considered superior for the elderly. Few changes were suggested by this target audience for this version of the booklet. Among the suggestions that were not accepted were *"remove the age limitation", "increase the size of the letters" and "change the word protagonist".* Although information is important to everyone, the characters in this story, plot and language were designed to attract the elderly audience that sometimes associates pain with age. Therefore, the age indication was kept on its cover, but its reading can benefit people of all ages. As for the font size, this was also maintained, because as it is a digital material, it is possible for the reader to increase the font size, according to his needs during reading. As for the word "protagonist", we did not find another word that could better describe the term and, consulting part of the target audience, the researchers chose to keep it this way.

At the end of the questionnaire, the opinion of the elderly people about the material was asked and, in general, the answers were positive, emphasizing the creativity, importance of the content, clarity and adequacy to the public, as demonstrated in the examples taken from the answers to the questionnaire: "Very informative and didactic". "Very good needed for everyone in pain... clear educational and motivating messages". "Creative, very didactic, and easy to understand".

STUDY LIMITATIONS

As a limitation, it is possible to mention that, in the data collection phase through the questionnaire with the target audience, the sampling rate representing each region of the country was not balanced because, despite exhausting all attempts to contact elderly people in the Midwest region of Brazil, these answers were not obtained in a timely manner to continue the research.

Also, in the phase of evaluation of the second version of the booklet by the target audience for its validation and completion of the final version, the education level of most of the elderly respondents was high, with complete higher education, followed by high school. Perhaps, this justifies the majority having been interested in reading, finding it fluid.

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CONTRIBUTION OF THIS STUDY IN PRACTICE

Construction and validation of social technologies for elderly people with chronic pain were not found in the literature. Thus, the dissemination of the results of the study could reduce this gap. The booklet elaborated is a tool that can help the production of knowledge and discussions about chronic pain in the elderly, allowing the approximation and appropriation of this population with the theme and their active participation in the decision-making of their health-disease process.

The elderly person with chronic pain will deepen the knowledge about their own condition, facilitating engagement in their health care. She will have accurate and undistorted information about this condition (chronic pain), promoting a decrease in the feeling of threat, represented by the rain of useless information she is used to receiving. Thus, they will be guided on how to deal with the levels of stress, anguish and anxiety, reducing levels of vigilance and will be discouraged from excessive focus on pain, modifying beliefs and not reinforcing catastrophic behaviors, to promote acceptance and resilience through lifestyle changes, with behaviors that consist of well-being, rather than reinforcing suffering.

CONCLUSION

The results of an integrative review focusing on the strategies used for the self-management of chronic pain in the elderly and a questionnaire to deepen the knowledge of this population on the subject were used to create the textual and visual content of a digital educational booklet. The social technology developed proved to be a valid and reliable instrument in terms of appearance and content to be used in the promotion of the health of elderly people regarding the self-management of chronic pain, through the evaluation of specialists in the field and the target audience. It is believed that the use of this booklet will awaken the protagonism of the elderly person with chronic pain in the management of their health condition.

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