

Educational Technology on Hypodermoclysis: A Validation Study

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ABSTRACT

Objective: To validate a pocket guide-type educational technology (ET) on hypodermoclysis.

Method: Methodological research with a quantitative approach of validation. The study was performed in 3 stages: literature review (stage 1), semantic validation (stage 2) and content validation (stage 3). The judges were among the personal contacts of one of the researchers, and they invited other judges using the snowball technique. The "expert judges" in the group that participated in content validation (stage 3) were recruited from a university hospital in the city of Rio de Janeiro. The inclusion criteria were as follows: physicians with minimum of six months experience in the prescription of hypodermoclysis; nurses and nursing technicians with at least six months experience performing hypodermoclysis and providing related nursing care.

Results: Semantic validation was achieved among all examiners, with a mean score of 24.6 points and a range from 23 to 26. For the content validation, there were 253 Completely Adequate ratings (72%), 90 Adequate ratings (26%), nine Partially Adequate ratings (2%) and no Inadequate ratings. The final content validity index of the educational technology was 0.97.

Conclusion: The pocket guide-type educational technology on hypodermoclysis was validated and this educational technology is adequate for supporting the nursing staff.

INTRODUCTION

The life expectancy of the population has grown both in Brazil and worldwide. Data from the World Bank show a life expectancy at birth of 75.51 years for Brazilians, 76.25 years for Chinese and 78.69 years for North Americans [1]. In parallel, there is an increase in chronic degenerative diseases such as cancer. For the biennium 2018/2019, approximately 600,000 new cases of cancer are estimated to occur in Brazil [2]. Moreover, according to the World Health Organization, cancer was responsible for the deaths of 9.6 million people worldwide in 2018 [1]. Given these facts, it is necessary to search for less invasive and less painful alternatives for the care required by these pathologies, and hypodermoclysis stands out among these options.

The term hypodermoclysis corresponds to the use of the subcutaneous route for the infusion of solutions in larger volumes for therapeutic purposes in nonemergency circumstances [3]. It is a treatment used for patients who often have clinical conditions such as cachexia and dehydration and require alternative routes for clinical support. Patients undergoing palliative and elderly care are frequent users of this type of infusion therapy [4].

Given the limited information about, knowledge of and studies on hypodermoclysis, this technique is not commonly taught in undergraduate courses, which sometimes causes professionals to be suspicious of its safety [3,5]. There is also resistance to its use, which is demonstrated by both its prescription by the medical team and its execution by nursing staff.

A search in databases, via Virtual Health Library (VHL), with the descriptor "hypodermoclysis", the Boolean operator and, and the years 2013 to 2017 found six publications on the subject. When the same search strategy was used in MEDLINE via PubMed and free articles that were available in full were considered, the search returned 10 publications.

As a contribution to the expansion of knowledge about the technique, the use of educational technology (ET) can be considered an effective alternative. ET consists of the results of completed processes based on daily experience and research that enables the grouping of scientific knowledge for the construction of materials. It serves to trigger interventions for a particular practical situation, contributing to the development and empowerment of the subject [6].

The idea for using ET is the pocket guide, occurred because it has been recognized by health professionals as a practical and very useful manual. Certainly, this is one of the reasons it has become a technical vehicle that is in great demand among users and has become among the most highly circulated Ministry of Health publications.

Therefore, the present study is based on the following question: is a pocket guide-type ET about hypodermoclysis adequate to support the health team, according to expert judges?

The objective of the study was to validate a pocket guide-type ET on hypodermoclysis.

MATERIAL AND METHODS

This is a methodological study of validation with a quantitative approach that was developed in three stages: a narrative review of the literature, semantic validation and content validation.

The study was conducted at a public university hospital located in the city of Rio de Janeiro, RJ, Brazil. The project was submitted for evaluation by the Research Ethics Committee and was approved. The study follows the precepts of the Declaration of Helsinki.

Due to the limited number of published articles that specifically address and describe the hypodermoclysis technique, we chose to create an ET based on a literature review (step 1). This review enabled a wide discussion on the topic based on books, articles and other publications, with the goal of addressing the topic comprehensively rather than answering a specific question [7].

Based on this review, the topics included in the pocket guide were identified. The topics were typed using Word 2016 software, in portrait mode, with a height of 17 cm and a width of 14.8 cm on A4 official paper. The illustrations were captured on the Internet and used with credits. The guide was then submitted for semantic validation and content validation. Semantic validation (Stage 2) was performed by a group of "judges from other areas" (an artistic designer, graphic designer and instructor).

The judges were among the personal contacts of one of the researchers, and they invited other judges using the snowball technique. The inclusion criteria were minimum of one year of experience in the subject of ETs based on their area of specialization, research publications or course work related to the subject.

The "expert judges" in the group that participated in content validation (Stage 3) were recruited from a university hospital in the city of Rio de Janeiro using the snowball technique. The inclusion criteria were as follows: physicians with a minimum of six months experience in the prescription of hypodermoclysis; nurses and nursing technicians with at least six months experience performing hypodermoclysis and providing related nursing care.

The participants received an invitation letter, a copy of the evaluation instrument with instructions for completion and a copy of the first version of the ET via email. The "judges from other areas" performed the semantic validation by assessing the writing style, appearance, appeal and adequateness of the ET. The data collection instrument was developed based on a US tool for assessing the difficulty and convenience of educational materials called the Suitability Assessment of Materials (SAM) [8].

The SAM score is calculated by summing the points obtained for each item and dividing the result by the total number of items on the instrument for each judge. For the educational material to be considered adequate, it should have a SAM score equal to or greater than 10 points in relation to the total score of the instrument. Scores were based on a Likert scale and were determined according to three degrees of assessment: Adequate (A: 2 points), Partially Adequate (PA: 1 point) and Inadequate (I: 0 points) [8].

Adaptations suggested by the "judges from other areas" were used to create the second version of the pocket guide, which was sent by e-mail to the "expert judges" for content validation. The content validation was based on an instrument adapted from a validation study aimed at health professionals working in primary care. The instrument has 22 items related to the objectives (block 1), structure/presentation (block 2) and relevance (block 3) of the ET to be validated [9].

For a tool to be considered valid, its content validity index (CVI) should be greater than or equal to 0.8. Scores were determined using a Likert scale with four degrees of assessment: Completely Adequate (CA: 1), Adequate (A: 2), Partially Adequate (PA: 3) and Inadequate (I: 4). The index was calculated as the sum all items marked "1" and "2" and divided by the total number of responses [9]. Finally, the suggestions made by the expert judges in the health area were followed to produce the final version of the pocket guide.

RESULTS

The first version of the ET contained 36 pages and was entitled "Pocket guide on hypodermoclysis: what is necessary to know to provide better care". Its content was organized as follows:

1. Concept of hypodermoclysis
2. Anatomy of the skin
3. Pharmacokinetics
4. Indications
5. Contraindications
6. Advantages
7. Disadvantages
8. Who prescribes hypodermoclysis?
9. Who performs the technique?
10. Commonly used subcutaneous drugs
11. Solutions and electrolytes
12. Compatibility of medications
13. Drug compatibility table
14. Materials
15. Puncture site selection
16. Execution of the technique
17. Step-by-step technique
18. Adverse effects
19. Nursing care

Semantic validation was performed by five "judges from other areas": one artistic designer, one graphic designer and three educational instructors. The average score obtained was 24.6 points, ranging from 23 to 26 points. This group of evaluators recommended reorganizing the summary to provide the user with a better understanding of the proposed content. The summary was then reorganized as follows:

- Part 1 - Concepts about hypodermoclysis;
- Part 2 - When/why to use hypodermoclysis;
- Part 3 - Hypodermoclysis and the role of health professionals;
- Part 4 - Medications;
- Part 5 - Materials and technique;
- Part 6 - Adverse effects and care.

Next, the ET was transferred to the "expert judges" for content validation. Six physicians, nine nurses and one nursing technician comprised 16 participants. Of these, 11 participants had between two and 10 years of training, and five had more than 11 years. Regarding training, 14 were specialists, one had a master's degree, and one had technical training. The participants worked in various settings at the hospital: the chemotherapy outpatient clinic, hematology, cardiology, nephrology, the radiotherapy outpatient clinic and the medical clinic.

In the validation of block 1, which refers to the purposes and goals of the pocket guide - there were 65 (81.25%) CA ratings and 15 (18.75%) A ratings, and the CVI was 1.0 (**Table 1**).

Table 1. The expert judges' evaluation of block 1–Objectives.

Items	N=16				Content validation index per item
					CA+A/CA+A+PA+I
Block 1: Objectives	CA	A	PA	I	
1.1 The information/content is consistent with the daily needs of the target audience of the educational technology.	13	3	0	0	1.0
1.2 The educational technology is important for the quality the target audience's work.	14	2	0	0	1.0
1.3 It invites and/or instigates changes in behaviour and attitude.	13	3	0	0	1.0
1.4 It can be circulated in the professional environment of the related topic.	14	2	0	0	1.0
1.5 It meets the objectives of institutions in which the target audience of the educational technology works.	11	5	0	0	1.0
Block Score		65	15	0	0
% Block		81.25%	18.75%	0%	0% = 100%
Block CVI 1 = 1.0, CA = Completely Adequate; A = Adequate; PA = Partially Adequate; I = Inadequate					

In turn, block 2, which refers to how the guidelines are presented, including their general organization, structure, presentation strategy, coherence and formatting, obtained a total CVI of 0.95. There were 126 (65.62%) CA ratings, 57 (29.68%) A ratings and nine (4.70%) PA ratings (**Table 2**).

Table 2. The Expert Judges' Evaluation of Block 2 - Structure and Presentation.

Items	N=16				Content validation index per item
					CA+A/CA+A+PA+I
Block 2: Structure and Presentation	CA	A	PA	I	
2.1 The educational technology is adequate to guide the work of the target audience.	13	3	0	0	1.0

2.2 The messages are presented in a clear and objective manner.	9	7	0	0	1.0
2.3 The information presented is scientifically correct.	10	5	1	0	0.94
2.4 The material is adequate to the sociocultural level of the target audience.	11	5	0	0	1.0
2.5 The proposed content has a logical sequence.	13	3	0	0	1.0
2.6 The information is well structured in terms of concordance and spelling.	7	4	5	0	0.69
2.7 The writing style corresponds to the target audience's level of knowledge.	10	6	0	0	1.0
2.8 The information on the cover, back cover, summary, acknowledgments and/or in the presentation is consistent.	12	3	1	0	0.94
2.9 The sizes of the title and topics are adequate.	13	3	0	0	1.0
2.10 The illustrations are expressive and sufficient.	9	5	2	0	0.87
2.11 The material (printing paper) is adequate.	10	6	0	0	1.0
2.12 The number of pages is adequate.	9	7	0	0	0
Score Of The Block		126	57	9	0% = 100%
% Block		65.62%	29.68%	4.70%	0% = 100%
CVI of Block 2 = 0.95, CA = Completely Adequate; A = Adequate; PA = Partially Adequate; I = Inadequate					

Finally, block 3, which evaluates the relevance of the educational material presented, had a CVI of 1.0. In the analysis of the responses for this block, there were 62 (77.50%) CA ratings and 18 (22.50%) A ratings (**Table 3**).

Table 3. The expert judges' evaluation of Block 3–Relevance.

Items	N=16				Content validation index per item
	CA	A	PA	I	CA+A/CA+A+PA+I
Block 3: Relevance					
3.1 The topics present key aspects that should be reinforced.	13	3	0	0	1.0
3.2 The educational technology allows the transfer and generalization of learning to different contexts.	12	4	0	0	1.0
3.3 The educational technology promotes the construction of knowledge.	12	4	0	0	1.0
3.4 The educational technology addresses the subjects necessary for target audience's skill development.	12	4	0	0	1.0
3.5 The educational technology is suitable for use by its target audience.	13	3	0	0	1.0
Block Score		62	18	0	0
% Block		77.50%	22.50%	0%	0% = 100%
Block CVI 3 = 1.0, CA = Completely Adequate; A = Adequate; PA = Partially Adequate; I = Inadequate					

In the content validation, there were 253 Completely Adequate (CA) ratings (72%), 90 Adequate (A) ratings (26%), nine Partially Adequate (PA) ratings (2%) and no Inadequate (I) ratings, which confirms the experts' propensity to rate the items as CA and A. The final CVI of the ET was 0.97.

Despite the agreement among the experts shown by the high CVI, this group proposed the following modifications that were considered relevant and were accepted: to present the numbering of the needled devices as 21, 23 and 25" and that of the nonneedled devices as 20, 22 and 24", to improve the sharpness of the image showing the hypodermoclysis technique and to cite the stability of the drugs after dilution.

DISCUSSION

The "Pocket guide on hypodermoclysis: what is necessary to know to provide better care" was considered valid by a total of 21 experts from the standpoints of both semantic and content validity.

The average rating of the "judges from other areas" was 24.6 points, more than double that necessary to support the convenience of the educational material. The writing and appearance of the ET were considered semantically validated. In Iran, a study using the same methodological resource determined the adequacy of the writing in educational instructional pamphlets for patients^[10]. This validation tends to ensure that the educational material will communicate effectively with its target audience once it is integrated into practice^[11].

For block 1 of the instrument, the CVI was 1.0. This block addresses the comprehensibility of information and the ability of the technology to add value to professional practice. ETs are based on substantial research and the experience of their creators; thus, skill-related elements are presented in and learned from the material^[12]. According to the validators of this ET, it is capable of encouraging and instigating changes in behaviors and attitudes that could be beneficial for the use of the hypodermoclysis technique.

An international projection estimates a 60% increase in the population of adults over 65 years of age by 2050 and points to the specific risk among this age group for hospitalization associated with dehydration. As an alternative treatment, subcutaneous hydration is an essential aspect of care, and it needs to overcome the underutilization barrier^[4].

The CVI of block 2 was 0.95. Although this index was the smallest among the blocks, it can still be considered excellent. This block addresses the structure, scientific pertinence and organization of the pocket guide. The item related to agreement and spelling obtained a lower CVI, reflecting the need to revise its spelling. In addition, the validators' suggestions to add to the content were followed because they were charged with proposing and/or modifying items. A similar study that prepared a welcome booklet for "kangaroo family" members also obtained recommendations for adjustments in spelling and content in block 2. It is at this stage that multiple views allow the technology to be fine-tuned^[11].

The third block addresses the relevance of the pocket guide; that is, it assesses the ET's ability to construct knowledge and the transfer and generalization of learning to different contexts. The CVI of 1.0 reflects the merit of this pocket guide in regard to the analyzed question. Subcutaneous hydration, or hypodermoclysis, is a safe technique and an effective alternative for the administration of fluids and drugs that can be used in various care settings, such as hospitals, long-term care facilities for the elderly or even in-home treatment^[13].

Because ET is a little-discussed topic in the literature, its elaboration was based on a narrative and nonintegrative literature review, which ensured the methodological rigor of the information collection process. In terms of specialists, although a satisfactory number of sample components was used, the duration of the experiment could be considered borderline. It is noteworthy that although this study had a positive result for the use of the pocket guide, it is essential to perform application research that involves the target audience.

The pocket guide-type ET on hypodermoclysis has been validated and thus may help the health team. The final version of the ET proved to be attractive and easy to understand, which may help with the permanent education of the team regarding this drug administration route.

The incorporation of ETs into patient care favors the construction and continuous updating of knowledge. It is hoped that professionals can access and apply this tool whenever necessary. The growing population of elderly and/or cancer patients may benefit from an alternative route of administration capable of ensuring adequate hydration.

CONCLUSION

The producer of pocket guide-type ET on hypodermoclysis brings with it a body of knowledge that supports the practice, empowering professionals to act correctly. Scientifically based nursing care facilitates the development of new knowledge, as well as the improvement of the hypodermoclysis technique.

This technique of drug administration needs to be discussed and its use encouraged among professionals, given the growing number of cancer patients and the increase in life expectancy.

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