CASE REPORT

Pap smear collection: Proposal of a low-cost simulator for health education

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ABSTRACT

Objective: To develop a low-fidelity and low-cost simulator for health education in Pap smears.
Methods: This is an experience report of the care practice carried out with nine nurses and twenty-five women, during Pap smears in the office of the Rural Zone Family Health Team. The SQUIRE 2.0 method was used in the following steps Context: the issue was analyzed. Intervention: searches for the existence of a simulator with the same purpose. The simulator was built manually, using low-cost materials. Measurements: an evaluation of the nurses' perception of the technology produced was performed. Afterward, it was used with women undergoing Pap smears. Analysis: evaluation was carried out by means of simple descriptive statistics.
Results: A low-cost and fidelity simulator formed by six slides, where the first slide represents a normal cervix; followed by a slide representing a cervix with cervicitis; a cervix with polyp; a cervix with a lesion in the transformation zone; a cervix with malignant neoplasm; and, by a figure equal to the first slide, however, the hole of the endocervix is perforated in order to introduce the brush of the Pap smear kit.
Conclusion and implications for practice: A strengthening of cervical cancer preventive strategies in Primary Health Care was obtained. The simulator allows visualization of the main components of the female genital organ when introducing the speculum, configuring a creative and innovative health education strategy for nursing practice.

Key Words: Cervical neoplasms, Pap smear test, Health education

1. INTRODUCTION

Cervical cancer is considered a serious public health problem worldwide. In the year 2020, about 604,000 women were diagnosed with cervical cancer and approximately 342,000 women died from it.[1] This pathology when diagnosed at an early stage, has a high cure rate. Thus, prevention is the best strategy to help women in the face of this health threat.[2,3] Some preventive measures used are educational actions, health promotion, Human Papilloma Virus (HPV) vaccination, screening, diagnosis, and treatment of cervical lesions.[4,5]

Regarding prevention strategies, the Pap smear is considered one of the most used methods in Brazil, besides being safe, accessible, and effective for the early detection of cervical lesions.[6,7] However, for an effective screening to occur using this preventive practice, it is necessary to develop effective and creative strategies to cause greater adherence of women to the exam, as well as to create a bond with the users, allow-

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ing their participation in the exercise of conscious and safe practices regarding the care of their health.[8]

In this scenario, educational technologies with the use of clinical simulation stand out, which are defined as an experience in which the characteristics of a certain real situation are imitated, using an artificial environment, aiming at a better understanding. It is considered an effective, relevant, and innovative tool to implement, teach or update procedures.[9]

Clinical simulation can be classified as high, medium, or low fidelity, the low fidelity ones being those characterized by little technology and intended for teaching and practicing simple skills. Many times, these educational technologies through simulators are not so often used by professionals, due to the fact that simulators are considered expensive and difficult to access.[9] However, there are several low-cost simulators being built to meet reality.

It is noteworthy that the Pap smear test offered in the public network of this municipality is performed by the nurse of the Family Health Team (FHT) within their office, according to the Resolution of COFEN 381/2011 that states, in the context of the Nursing team, the collection of material for cytopathological examination by the Pap smear method is exclusive to the Nurse. Before the exam, the nurse conducts orientation on how the procedure will be performed, as well as clarification of doubts. However, these orientations are performed through leaflets, inserts, and folders, which seem not to be effective for the understanding of this exam in women.[11]

Given this scenario, the aforementioned project developed in the care practice shows a problem with the need for educational materials of low fidelity to guide women to undergo the Pap smear exam in the basic health network. Thus, in order to minimize this situation and propose teaching-learning strategies, this project aims to Develop a low-cost simulator for health education related to Pap smear collection. A low-fidelity and low-cost simulator may be able to provide the user with the visualization of different types of the cervix; in addition to providing opportunities and helping the target population to understand the procedure performed for Pap smear collection and clarify doubts.

The low-cost simulators have many positive aspects that facilitate the learning process, among them, we highlight the low cost of its construction, and the possibility of having an instrument that helps in the orientation of gynecological care. The professional can evaluate the patient, understand her fears, and clarify her doubts, "breaking the taboos created regarding the Pap smear. It follows the idealization of a strategy that allows the correlation with the human anatomy through synthetic materials, with the potential to facilitate learning. As objective: to develop a low-fidelity and low-cost simulator for health education in Pap smears.

2. METHOD

This is a care intervention practice, of the experience report type, which seeks to present the development of a low-fidelity and low-cost simulator to perform simulations that can aid in the understanding of patients seen in the office of the Health Strategy nurse. The developed practice follows the guidelines of the SQUIRE 2.0 method.[12]

The scope of the practice is configured as an improvement in the quality of care to be developed by nurses through health education regarding the Pap smear and cervical prevention for patients assisted in nursing consultations in Primary Health Care.

This practice was developed in the nursing office of a Basic Health Unit (BHU) in the municipality of Buritis, state of Rondônia, Brazil. Nurses from the FHT of the municipality of Buritis/RO were invited to participate voluntarily. Also, all women who came to perform the Papanicolau exam in the office of the FHT Rural Zone 2 of the city of Buritis/RO were invited to participate voluntarily. As inclusion criteria, we chose women with ages ranging from 24 to 65 years old and nurses with CNES (National Register of Health Establishments) of the municipal health department of Buritis.

From the research participated, 25 women and 8 nurses from the Family Health Team. Inclusion criteria: women aged between 24 and 65 years and nurses with CNES from the municipal health department of Buritis were chosen. Exclusion criteria: participants who chose not to participate in the study.

For the elaboration of the Simulator of low cost and fidelity, we followed the steps of the SQUIRE:

Context Guideline: The referred practice was developed in the aforementioned BHU. This exam is offered in the public network of this municipality and performed by the FHT nurse, who collects the exam in their office. In this FHU, before the patient undergoes the exam, the nurse provides orientation in his or her office on how the procedure will take place, as well as clarifies any doubts. After the orientation, the exam is collected and, at the end of the nursing consultation, the user is informed that she will return in 40 days to evaluate the results of the exam.

Intervention: Stage 1 - Development of a low-fidelity and low-cost simulator: The central proposal was to present a low-fidelity and low-cost simulator capable of promoting a simulation scenario that would allow the patient to visualize the entire procedure that is performed on her during the cer-

vical exam, specifically the Pap smear. With this purpose, a low-cost and fidelity simulator was built with material that allows the patient to visualize the main components of the female genital organ and allows the nurse to manipulate and introduce the speculum inside the vaginal orifice and, when opened, the patient can visualize the cervix, as well as the main types of the cervix through the exchange of figures.

It was used for the development of this simulator cardboard box, EVA paper, crepe tape, paint, and pictures, among others that were necessary. Initially, an internet search was done to evaluate if there was already some kind of simulator, then it was built manually by the project coordinator. This construction followed two steps, the simulator's internal and external, being the internal step followed by the choice of a 17x12.5cm cardboard box, in this case, a box that stored male condoms reused, reinforcing it with instant glue and thick white cardboard, the cardboard was cut into equal sizes of the internal dimension of the box, After drying, a square 7x7 cm cut was made in the upper part of the box (cover), centered in the part below the middle of the cover, and then a meter of white LED tape was attached to the inside of the cardboard box so that it could not be seen during the simulation, but that would illuminate the box's internal field.

To limit the exposure slides of the cervix, a piece of E.V.A. was fixed on the smaller internal side of the box, 1.5 cm wide, and on the opposite side, an opening 0.5 cm wide and 11.5 cm long was made to introduce and remove the exposure slides of the cervix.

Regarding the expository slides of the cervix, the same was made as follows: first, the choice of figures representing the different types of the cervix (normal, cervicitis, polyp, low-grade lesion, and invasive cancer) was made in the round format in the dimension of a cervix commonly seen in the Pap test, After the figures were defined, they were printed on A4 white paper in a color inkjet printer, and then two units of the normal cervix and one unit of the other types of the cervix were cut out, resulting in a total of six round-shaped figures. Then, the piece that was left over from the thick, white cardboard paper that had been used before was reused to make the exhibition slides. Six units were cut out in the 20x11cm size and, after finishing the cutouts, a figure of the cervix was glued with glue stick on the bottom of the slide, on the white side, following the sequence, totaling six exhibition slides. To finish this process, one of the slides with a figure of the normal cervix was separated and a hole was made in the center of the cervix (endocervix) to pass through the figure and the cardboard so that it could be used when simulating the introduction of the Pap smear brush into the cervix, simulating the collection of cells from the endocervical canal.

Therefore, the materials for making the simulator external part were separated, setting the external stage of the simulator, first the search for an image that represented the female genital organ was performed. In this period of the simulation, research was done on the internet and applications that provided free images, after choosing the image, the image of the external female genital organ was sent to the printer to be printed on adhesive paper.

Then, the cardboard box was covered with a piece of pink E.V.A. and instant glue, after drying and fixing the material, the box was adhered, centering the printed vaginal canal of the adhesive sheet with the square cutout of the cardboard box lid (7cm x 7cm). After fixing the adhesive, a cut was made in the shape of a cross that crossed the adhesive and the E.V.A. in the printed region of the vaginal canal (to introduce and open the speculum).

After making the simulator, a pocket of E.V.A in PINK color was added to it, in its back and front, to store the Pap smear kit, control of the LED tape and cables for power connection. Making it practical and organized.

To use the simulator, the health professional must connect the power supply cable, and next to the user, he or she will use the Pap test collection kit (speculum, wooden spatula, brush).

Step 2 Nurses' evaluation of the low-fidelity and low-cost simulator: Before being applied in care practice, the simulator underwent an evaluation of the instrument that was performed by FHT nurses. For this purpose, a video was sent to each nurse's private WhatsApp number demonstrating the use of the simulator, which provided a view similar to that of the user when it was used in care practice. A text was also sent to them where they had the opportunity to evaluate and suggest ideas for improvement for the final construction of the simulator. In this text the following affirmations were inserted: 1-Considering the content presented, the simulator helps in the understanding of the Pap smear; 2-Considering the visual aspects of the simulator, it is didactic for the understanding of the patient. The answers were through a Likert scale between 1 and 5. Where 1 Totally Disagree, 2 Disagree, 3 Undecided, 4 Agree and 5 Totally Agree. After that, the nurse participants were asked to give their opinion about the low-cost simulator, pointing out possible necessary points of adjustments and contributions to improve this material.

Measures: Regarding the application of the intervention - use of the simulator: The use of a low-fidelity and low-cost simulator was used, after the changes suggested by the professional participants, with the women who perform the

Pap smear in order to promote health education. This simulator was presented before starting the Pap smear, so that they could visualize the step-by-step procedure. In addition, the intention is that they understand which findings can be identified by nurses during the exam.

This intervention was developed with all patients with exams scheduled at the unit during the period from June to July 2022. At the end of the intervention and after the exam was completed, the patients had the opportunity to voluntarily evaluate the simulator intervention using a Likert scale between 1 to 5. Where 1 was Strongly Disagree, 2 Disagree, 3 Undecided, 4 Agree, and 5 Strongly Agree. To score the Likert scale, the user had at her disposal a box at the exit of the service with three openings for the answers and also several small plasticized numbers between 1 and 5.

The first opening of the box contained the following statement: Consider that before the explanation with the simulator, you had little knowledge about how the Pap smear was performed (place inside the box the number between 1 and 5); the second opening contained the following statement: Regarding the content presented, you consider that the simulator helped you to understand clearly and objectively how the Pap smear is performed (place inside the box the number between 1 and 5). The third question: Do you think that the simulator should be used for women's orientation before the Pap smear (place the number between 1 and 5 in the box).

Analysis: The evaluation of the answers was performed by means of simple descriptive statistics describing the information obtained by means of the scores.

Ethical dimensions: Because this was a project to be developed in practice, there was no approval from the Ethics and Research Committee. However, the author followed all the recommendations and legal precepts of Resolution 466/12, respecting the patients' confidentiality and anonymity.

3. RESULTS

It is observed as a result that the simulator reached the proposed objective, which provided the professional nurse with resources with technological educational materials to explain the whole process of the Pap smear's exam collection, as well as the anatomy of the female genital organ, since the low-fidelity and low-cost simulator developed in this practice allows the visualization of the main components of the female genital organ when the speculum is introduced, and the visualization of the types of cervix, configuring a strategy of creative and innovative health education to the nursing practice. The low cost and fidelity Simulator was formed by six slides, where the first slide represents a normal cervix, the second slide represents a cervix with cervicitis, the third slide represents a cervix with polyps, the fourth slide represents a cervix with a lesion in the transformation zone, the fifth slide represents a cervix with malignant neoplasia, and the sixth slide is composed by a figure equal to the first slide, however, the endocervix hole is perforated in order to introduce the Pap smear brush. Regarding the structure of the simulator, the vaginal introitus orifice made with E.V.A, waterproof adhesive sheet and cut in the shape of a cross, aids in the introduction of the speculum and its opening, making the simulation more real. The led light for the simulator's internal lighting was also another point that required adaptation, and the white light was chosen for its better visualization of the cervix. In this case, the short energy cable was a complicating factor, since the energy source needs to be turned on to better visualize the cervix in the simulator. The support behind the simulator to store the power source and the Pap smear kit helped in the storage and organization of the materials used for the user's orientation. In total, eight FHU nurses expressed their opinion about the simulator and twenty-five women voluntarily expressed their opinions about the practice used with the simulator for health education, depositing their answers in the designated box at the exit of the doctor's office with statements and numbers that represented their level of agreement according to the Likert scale. In the nurses' initial analysis, the simulator presented was configured in affirmative opinions such as: an excellent idea, very interesting, very explanatory and creative, such an instrument contributes to helping patients understand how the exam is performed and its importance due to the visualization of each stage of pathology, and that it serves as a tool for the professional nurse to explain the anatomical structures and the way the exam will be performed. It was suggested that the brush should be introduced a little further into the endocervix, and from this suggestion, slide 6 was created. When analyzing the agreement answers according to the Likert scale, the following results were obtained: regarding the nurses' answers, the total CVI reached 100% agreement, and regarding the users' total CVI, 89% agreement was obtained (see Tables 1 and 2).

It is also configured as a result that the simulator low cost and low fidelity for Pap smear is a viable alternative to meet the needs of professional nursing practice, in addition to contributing to the nurse, because within this context of cervical cancer screening, such a professional has occupied its space, and this technological innovation, comes to contribute to new possibilities of activities, in addition to social visibility, because his care is characterized as a humanized and educational gynecological consultation. It encourages women to seek health care services to prevent cervical cancer.

Table 1. Answers sent voluntarily by the nurses regarding the simulator of low cost and fidelity, measurement through Likert Scale: 1 to 05 (n.8)

Statement 1: Considering the content presented, the simulator helps in the understanding of the Pap smear		
Score	**n**	**%**
1 - I strongly disagree	0	0
2 - I disagree	0	0
3 - I am undecided	0	0
4 - I agree	2	25
5 - I strongly agree	6	75
Total	8	100
Statement 2: Considering the visual aspects of the simulator, it is didactic for the understanding of the patient		
Score	**n**	**%**
1 - I strongly disagree	0	0
2 - I disagree	0	0
3 - I am undecided	0	0
4 - I agree	2	25
5 - I strongly agree	6	75
Total	8	100

Source: elaborated by the authors, 2022.

Table 2. Responses deposited in the box of statements regarding the Low Cost, Low Fidelity Simulator, Likert Scale measurement: 1 to 05 (n. 25)

Statement 1: Do you think that before the explanation with the simulator, you had little knowledge about how the Pap smear was performed?		
Score	**n**	**%**
1 - I strongly disagree	1	4
2 - I disagree	0	0
3 - I am undecided	2	8
4 - I agree	3	12
5 - I strongly agree	19	76
Total	25	100
Statement 2: Considering the content presented, do you think that the simulator helped you understand in a clear and objective way how the Pap smear is performed?		
Score	**n**	**%**
1 - I strongly disagree	0	0
2 - I disagree	0	0
3 - I am undecided	3	12.5
4 - I agree	3	12.5
5 - I strongly agree	18	75
Total	25	100
Statement 3: Do you think that the simulator should be used to guide women before the Pap smear		
Score	**n**	**%**
1 - I strongly disagree	1	4
2 - I disagree	1	4
3 - I am undecided	0	0
4 - I agree	1	4
5 - I strongly agree	23	88
Total	26	100

Source: elaborated by the authors, 2022.

Twenty-five women between the ages of 25 and 64 were screened; all 25 women voluntarily left their evaluations in the box provided for this purpose. At the end of the consultations it was observed that they were satisfied with the care provided.

4. Discussion

It is observed in the literature a scarcity on the theme of simulator type technologies for women's health education, in most of the results found that involved health education with women patients as the target audience, the result found is the development of educational booklets for the promotion of self-care and prevention of diseases to women's health in the reproductive, gestational and puerperal stages.[13–18] However, among the few experiences found on this type of technology, they used a low-cost, handmade, realistic simulator for breastfeeding counseling and as a result, the instrument helped to clarify doubts and contributed to the knowledge of puerperae about the best management of breastfeeding. They refer that the use of simulators as educational technology has a positive impact on the population, helping in the difficulties encountered in practice.[19] Corroborating this, the authors used educational technology as a cervical cancer preventive activity, developing actions related to prevention and early diagnosis of cervical and breast cancer through slides, questions and answers (to clarify doubts of the participants about the topic) and distribution of male and female condoms, guiding them about the correct use.[20]

It is noteworthy that simulators used for gynecological health guidance, promotes health promotion, because the population receives information that clarify their doubts, encouraging healthier practices in Pap smears. This teaching process should be part of the health team's daily work, in order to impact on behavioral changes and reduction of illness and death.[21]

Regarding the use of technological educational practices for professionals related to cervical cancer, the authors describe an experience report with a light-hard educational technology using a rotating disk with diagnosis and treatment of cervical lesion to instruct professionals on cervical cancer screening. This information is in line with the data obtained in this experience report, in which both nurses and patients understand that this tool brings important contributions to the adherence of women in performing the Pap test, since they begin to understand the procedure that is performed at the same time that they become aware of the results that may arise in this examination.[22]

The literature points to the need to combine light and light-hard technologies in care to the various procedures that nurses can perform according to the legal support.[23] To this end, it is necessary to introduce educational technologies in care practice, because they are dynamic tools for the teaching-learning process that offer information in a more detailed and creative way.[24–26]

Thus, it is understood that the low-fidelity simulator created in this description as an experience report is an important technological tool, capable of supporting and assisting nurses in health promotion, sensitizing women to adhere to this exam, as well as clarifying in detail the step-by-step of this exam and the possible results. This has a direct impact on adherence, tracking of new cases, and better health practices. Considering that nursing care through health education activities promotes actions related to screening and early detection of these types of cancer, as well as the identification of risk factors and awareness of the population about the importance of these actions.[27,28]

Still, it is noteworthy that the patient has the opportunity to observe the structures that make up the female genital organ and the changes visualized in the gynecological physical exam, providing opportunities for promotion, clarification of doubts, and health education regarding the exam that helps in the tracking and prevention of cervical cancer.

5. Conclusion and implications for practice

The simulator will assist in professional nursing care about cervical cancer screening and consequently enable greater adherence of women to the Pap test, since from practice, they are guided as the risks of neoplastic lesions and cervical cancer. It is worth mentioning that this simulator helps the professional to develop visual and concrete information to the woman, which was not possible before, because it is an exam that makes an internal assessment of the genital region.

It provides women with a moment to clarify doubts and strengthen self-knowledge and self-care. Consequently, it helps to reduce the epidemiological rates for this pathology that has become a serious public health problem, in addition to providing health education and best practices.

It is noteworthy that this proposed practice with a low-cost simulator for health education related to cervical cancer was a unique experience for the participants involved, since it allowed them an exchange of knowledge between nurses and patients, through the process of health education based on the use of soft-hard technology, thus allowing, The dissemination of necessary knowledge and the empowerment of women regarding their health, reaching the purpose of em-

powering women about the Pap smear and what procedures are performed in their bodies when this exam is performed, so that they feel safer when performing the exam and that health professionals offer a humanized and qualified service. It is recommended that it can be used in other BHUs for women's health education.

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CONFLICTS OF INTEREST DISCLOSURE

The authors declares that there is no conflict of interest.

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