International Journal for Innovation Education and Research

ONLINE ISSN: 2411-2933 PRINT - ISSN: 2411-3123

Using simulation as cervical and anal cytology teaching-learning strategy

Janaina Coser;Janice de Fátima Pavan Zanella;Vanessa Laís Diefenthäler;Sara Gallert Sperling;Dario Ronch;Tatiana Mugnol;Juliana Lemes dos Santos

Abstract

The current descriptive study is an experience report about the use of gynecological simulators in teaching and research activities developed in the Undergraduate and Postgraduate courses in Health at Cruz Alta University in Southern Brazil. The present study aims to describe the use of gynecological simulator as cervical and anal cytological sample collection teaching-learning strategy, as well as to describe the protocol adopted in such procedure. The gynecological simulator is a useful instrument applied to the sample collection practice for cervical and anal cytological examination purposes since it is a static dummy anatomically similar to the female body. Simulating the procedure allows students to train and improve skills required to the technique; however, the theoretical contextualization must precede the practice in the simulator to stimulate students to reflect on all aspects involved in the exam. The use of a gynecological simulator is recommended as a complementary tool in cytologic examination teaching-learning scenarios.

Keyword: dummies; educational technology; professional training.

Published Date: 12/31/2017 **Page.247-259** **Vol 5 No 12 2017**

Link: http://ijier.net/ijier/article/view/897

Using simulation as cervical and anal cytology teaching-learning strategy

Janaina Coser
Curso de Biomedicina (UNICRUZ); Programa de Pós Graduação Stricto Sensu em Atenção Integral à Saúde (UNICRUZ/UNIJUÍ)
Universidade de Cruz Alta – UNICRUZ
Brazil

Janice de Fátima Pavan Zanella
Curso de Biomedicina (UNICRUZ); Programa de Pós Graduação Stricto Sensu em Atenção Integral à Saúde (UNICRUZ/UNIJUÍ)
Universidade de Cruz Alta – UNICRUZ

Vanessa Laís Diefenthäler
Programa de Pós Graduação Stricto Sensu em Atenção Integral à Saúde (UNICRUZ/UNIJUÍ)
Universidade de Cruz Alta - UNICRUZ

Sara Gallert Sperling
Programa de Pós Graduação Stricto Sensu em Atenção Integral à Saúde (UNICRUZ/UNIJUÍ)

Dario Ronch
Programa de Pós Graduação Stricto Sensu em Atenção Integral à Saúde (UNICRUZ/UNIJUÍ)
Universidade de Cruz Alta - UNICRUZ

Tatiana Mugnol
Curso de Biomedicina (UNICRUZ)
Universidade de Cruz Alta – UNICRUZ

Juliana Lemes dos Santos
Curso de Biomedicina (UNICRUZ)
Universidade de Cruz Alta - UNICRUZ

Abstract

The current descriptive study is an experience report about the use of gynecological simulators in teaching and research activities developed in the Undergraduate and Postgraduate courses in Health at Cruz Alta University in Southern Brazil. The present study aims to describe the use of gynecological simulator as cervical and anal cytological sample collection teaching-learning strategy, as well as to describe the protocol adopted in such procedure. The gynecological simulator is a useful instrument applied to the sample collection practice for cervical and anal cytological examination purposes since it is a static dummy

anatomically similar to the female body. Simulating the procedure allows students to train and improve skills required to the technique; however, the theoretical contextualization must precede the practice in the simulator to stimulate students to reflect on all aspects involved in the exam. The use of a gynecological simulator is recommended as a complementary tool in cytologic examination teaching-learning scenarios.
Keywords: dummies; educational technology; professional training.

1. Introduction

The paradigm in health professionals' education has been changing. Students and young professionals in the field need to continuously develop skills, which must be acquired outside the operating room, outpatient clinic, hospital or laboratory [1]. Thus, different strategies such as simulation may be adopted as active teaching methodologies in the health field [2].

Simulation is an educational process that reproduces health-work scenarios in several aspects through an interactive environment close to the reality faced by healthcare services [3, 4]. This environment may be represented through different strategies and technologies, for example: patient simulator (dummy), simulated patients (people playing the role of patients, role-play), simulator in virtual environments, videos, audios, educational games, mobile telephone applications, hypertexts and mixed methods (use of more than one simulator type) [5,6].

All these resources allow training the necessary skills to apply the actual procedures to patients. Simulations enable a safe training, since the self-recognition of possible errors during the procedures, along with the theoretical contextualization of knowledge, helps to assure patient safety [5].

Patient safety is paramount and must be emphasized since academic training. Thus, simulations gained prominence in professional training [7], since procedures performed in simulators help improving students' performance. Such improvement process reflects trainees' desire and devotion since it requires hours and hours of practice [1]. Although simulation does not replace real clinical scenarios, it allows improving students' clinical skills and helps to reduce the anxiety of professionals when they perform procedures [8]. Varga and collaborators (2009) emphasize that students have the opportunity to learn and make mistakes in the protected environment provided by simulations, as well as that students' reasoning about their mistakes works as cognitive learning stimulus [9]. This characteristic is also the purpose of active methodologies, i.e., integrating theoretical-practical knowledge and enabling a critical-reflexive professional training [10].

Although technical skills may be developed in the operating room, in the hospitalization unit or directly with the patient, the difficulty in standardizing procedures, the restricted procedure time and the need for excellence in the clinical care given to patients, make the learning process difficult. Thus, using simulators gives students the opportunity to practice and maximize their performance [1, 11, 12].

Therefore, the aim of the current study was to describe the use of gynecological simulators as a teaching-learning strategy for the collection of cervical and anal cytological samples, as well as to describe the protocol adopted in this procedure, based on the literature, on guidelines and on the experience acquired in our academic and professional practices.

2. Methods

The current descriptive study is an experience report about the use of gynecological simulators in teaching-learning scenarios developed in the Undergraduate and Postgraduate courses in Health at Cruz Alta University, Cruz Alta County, the Rio Grande do Sul State. The simulator is stored in the Cytology Laboratory of the institution and, since 2013, has been used for the following purposes: I) complementary strategy to teach contents encompassing fields such as Cytology, Laboratory Methods, Oncology and Women's Health; II) *permanent health education* directed to professionals working in Health Services; and, III) *health education* within the community, in order to demonstrate and demystify the examination process.
The study emerged from the initiative of describing a theoretical-practical approach to the use of simulations in the health field, with emphasis to the cytological examination, since there are no national guidelines for anal collection, whereas health services use protocol adaptations for cervical collections. Thus, the description of a teaching-learning experience based on theoretical and practical knowledge, on the activities mentioned above and on requirements set in the literature, was considered relevant.
The current experience report was developed by a biomedical scientist and a pharmacist, who are clinical cytology specialists with teaching experience; by a biomedical scientist and a nurse, who are post-graduate students; and by an obstetrician-gynecologist and two biomedicine undergraduate students, who are scientific initiation fellows.

3. Experience report and discussion

3.1 Cytological examination used as screening *strategy* for the early diagnosis of neoplasias

Screening is defined as the application of a test or examination to an asymptomatic and apparently healthy population to identify cancer-precursor or suggestive lesions, thus enabling them to be referred to further investigation and treatment. On the other hand, early detection strategy is defined as the one that allows approaching individuals are presenting disease signs and symptoms [13].
Cytological examinations are used to screen several neoplasias since the first Papanicolaou and Babes studies have emerged. Their basic principle lies in the identification of cellular morphology changes by observing the cytoplasm and the nucleus of stained cells. Cytoplasmic features indicate the cell differentiation level, whereas nuclear features indicate whether the cell is normal or undergoes inflammatory, pre-neoplastic and even neoplastic changes [14].
National and international guidelines recommend cytology examinations as public cervical cancer (CC) screening strategy because they are effective, safe, cost-effective and present 86% to 100% specificity; besides being recommended by the Brazilian Ministry of Health (MS - Ministério da Saúde) for sexually active women in the age group of 25 to 64 years. The examination should be repeated every three years, after two consecutive negative annual examinations [15].
Assuring 80% to 85% minimum coverage of vulnerable populations, as well as the quality of the cytological examination, and the timely treatment and follow-up of patients is necessary to help to influence the epidemiological profile of CC [16,17]. Accordingly, from 2010 on, the Brazilian Ministry of Health prepared propositions aimed at improving the effectiveness of cytological examinations through the

training and qualification of health professionals working in organized screening programs at primary healthcare level [18].

Similar to cervical cancer screening, the anal cancer screening based on cytology is also an efficient method that can be made available in health services by using the same infrastructure [19]. This strategy allows identifying neoplastic changes at early stages and enables early treatments. Current recommendations indicate anal screening for at-risk groups, including individuals who practice receptive anal sex, people living with HIV/AIDS, and those with a history of anogenital malignancies caused by human papillomavirus (HPV) [20,21].

The use of cytological examinations as anal cancer screening method remains under discussion. Although anal cancer is rare in the general population, in comparison to other cancer types, the number of cases has increased in recent years, mainly in women [22]. Therefore, prevention and screening strategies based on anal cytology can be adopted to help early detecting this neoplasm, as well as reducing its development risk [23].

3.2 The use of gynecological simulators as teaching-learning strategy

Simulation is a teaching strategy that complements the traditional training of health professionals and students to avoid potential risks to patients. Laboratories - from the most modest to the most sophisticated ones - offer adequate teaching conditions within the healthcare context based on the introduction of the simulation-fidelity concept [11].

Professionals in charge of collecting cytological cervical and anal specimens should be trained and qualified to do so to assure that the procedure will be performed efficiently, with quality, and without intercurrences. Gynecological simulators, which are characterized as patient simulators or low-fidelity static dummies, are among the instruments used for this purpose.

This simulator type allows making coarse movements in the main joints, does not present any interaction or response to the interventions, besides presenting robustness, simple maintenance and low cost [24]. It is mainly indicated for the training of technical procedures [25].

It is known that skills acquired during simulation exercises are successfully transferred to the clinical practice by promoting greater patient care [1,11]. Therefore, a partial body gynecological simulator representing the lower part of the adult female body is used in our teaching-training practice, which is focused on the collection of samples for cytological examination purposes (Figure 1A). In addition to providing familiarity with the materials used in collection procedures (Figure 1B), the contact with the dummy and the different uterine cervix aspects (Figure 1C) allows future professionals to develop greater intimacy with the examination scenario, to practice the visual inspection of the uterine cervix and to handle collection instruments.

An important benefit from this type of training lies on the increased self-assurance and competence of the trainee, since the practice with simulators reduces anxiety and stress, besides reducing the margin of error. Also, repeating the movements triggers a muscle memory that leads to technical skill [1, 12].

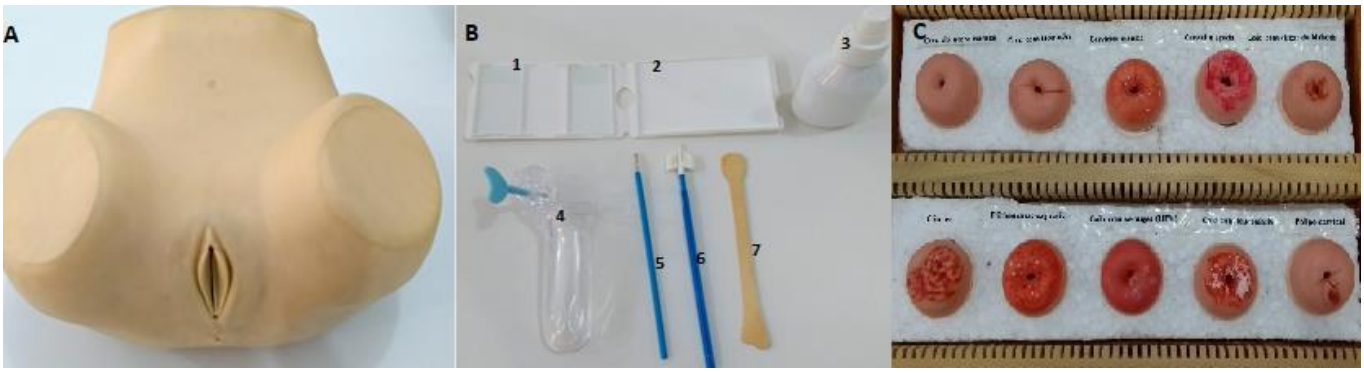

Figure 1. Materials used to simulate the collection of samples for cervical and anal cytology examination purposes. (A) Gynecological simulator; (B) Materials needed for the cytological collection procedure: 1- glass slide with frosted edge; 2- slide holder; 3-cytological fixative agent; 4- vaginal speculum; 5- endocervical brush - conventional cytology; 6- endo- and ectocervical brush - cytology in liquid medium; 7- wooden spatula. Source: Authors' files; (C) Uterine cervix models presenting distinct aspects.

3.3 Cervical cytology

Women should be instructed before the examination, since there are many avoidable factors, such as sexual intercourse 48 hours before the examination, remnants of medications in the vaginal canal, and the presence of sperm or blood in the smear, which may interfere in the cytological collection result [26].

Patients shall be placed in gynecological position (as comfortable as possible) during the collection procedure. A speculum presenting adequate size for the patient to be examined shall be gently inserted in an upright position (Figure 2A). Once the introduction has begun, the speculum shall be rotated into transverse position to allow the opening of the instrument to be placed in horizontal position. Once the instrument is fully inserted into the vagina, it shall be slowly and gently opened (Figure 2B) to allow observing the vaginal walls, their contents and the uterine cervix (Figure 2C) [27, 28].

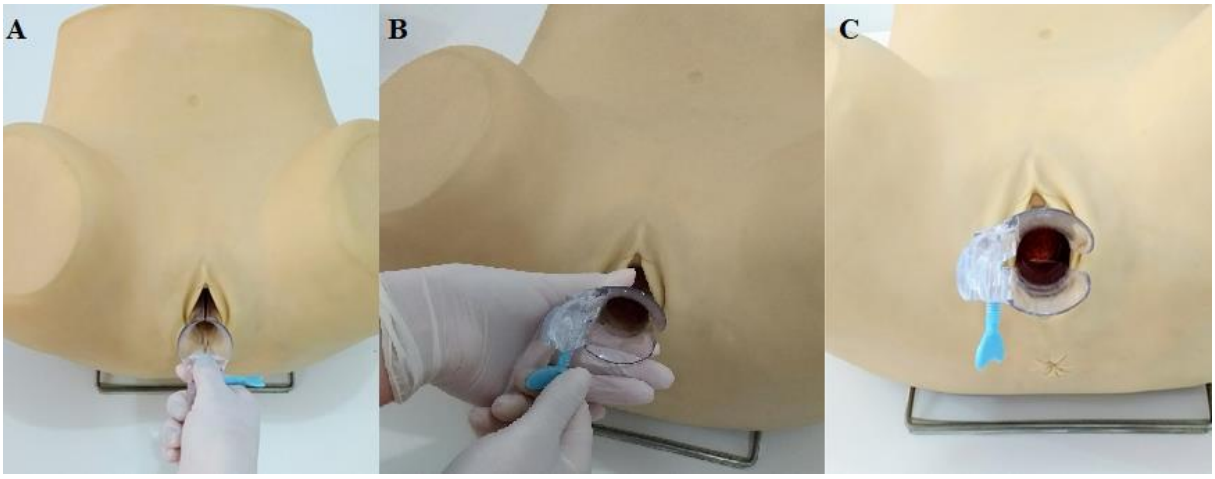

Figure 2. Simulation showing vaginal speculum insertion. (A) Initial vaginal speculum insertion position; (B) Opening; (C) Final position with uterine cervix visualization. Source: Authors' files.

The U-shaped side of the Ayre spatula shall be used in collection procedures performed in the ectocervix. The longest tip of the spatula shall touch the external *orifice* of the uterine cervix and smear it through 360° rotation around the orifice (Figure 3A) to enable the entire uterine cervix surface to be smeared and represented on the slide. A firm, although delicate, pressure shall be applied without harming the uterine cervix in order avoid affecting the quality of the sample. The endocervical brush shall be used in collections performed in the endocervix; its bristles shall be fully inserted into the vagina, and a 360° rotating movement shall be made to cover the entire contour of the uterine cervix orifice (Figure 3B). [27,28].

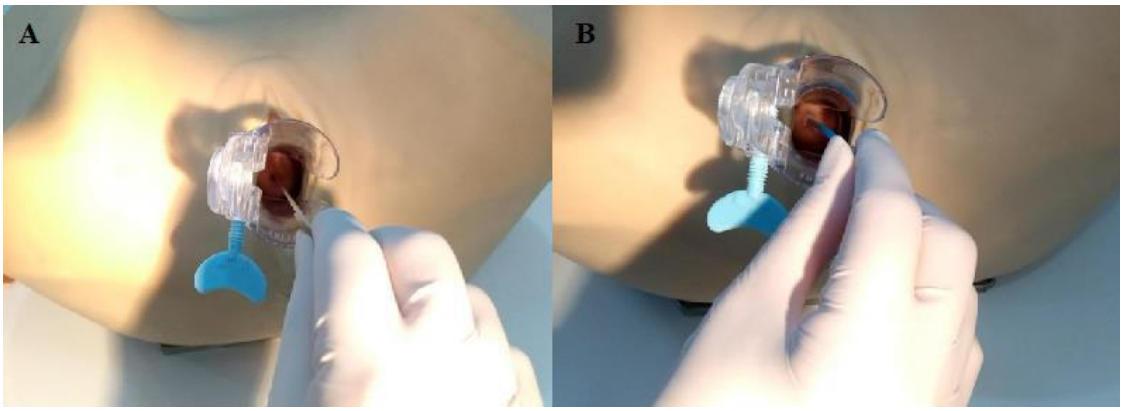

Figure 3. Simulation showing cervical sample collection. (A) Ectocervix collection using the Ayre spatula; (B) Endocervix collection using the endocervical brush. Source: Authors' files.

The Ayre spatula shall be used to collect samples from the fundus of the vaginal sac in hysterectomized women. Concerning pregnant women, the collection shall be preferably performed by using the Ayre spatula due to the physiological eversion of the squamocolumnar junction that takes place during pregnancy; most of the time, this procedure allows obtaining satisfactory smears without taking the risk of causing bleeding events [27,28].

The following procedures shall be adopted to prepare the smear: the ectocervical sample shall be transversely placed in the upper half of the slide close to the frosted region, and previously identified with the patient's initials and registration number (Figure 4A). The material removed from the endocervix shall be longitudinally placed on the lower half of the slide (Figure 4B). The smear shall be immediately fixed to prevent the collected material from drying (Figure 4C). The properly-packed slides shall be sent to the laboratory (Figure 4D) along with their respective requisition forms. The forms shall be properly filled, and their identification shall meet that of the vial or slide holder box and the initials on the slide [27,28,29].

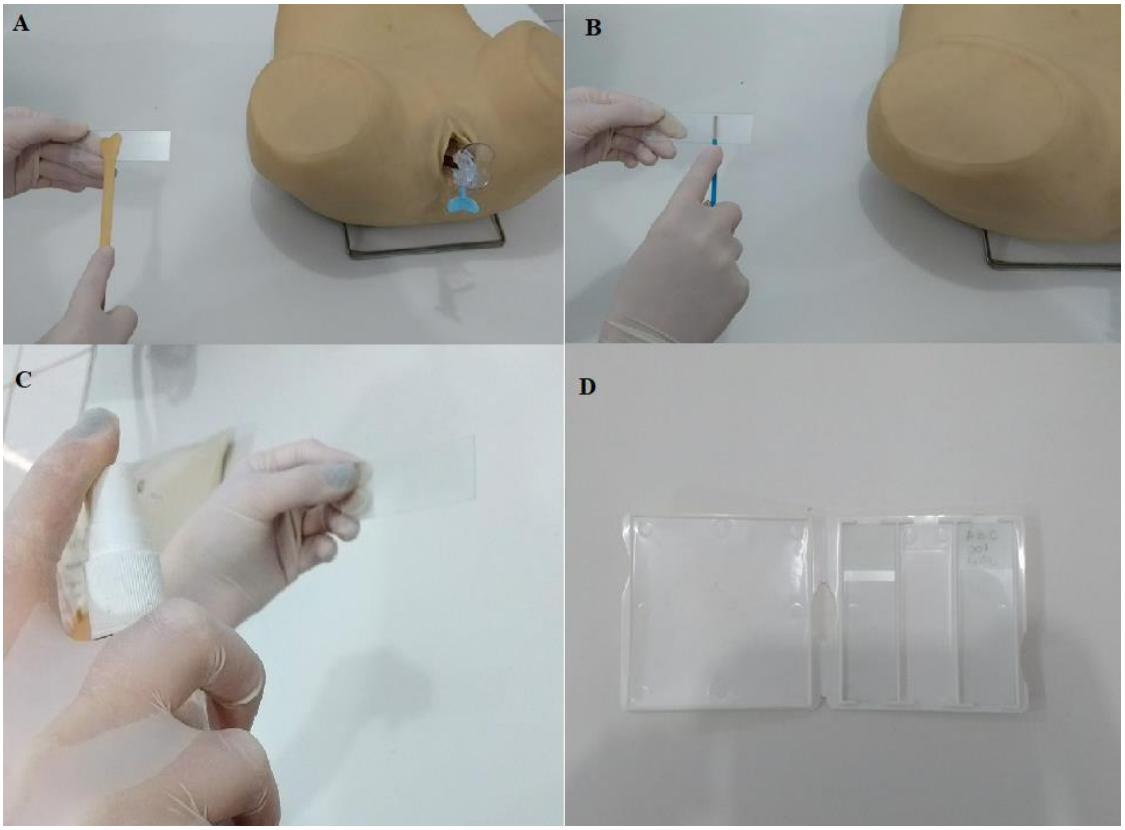

Figure 4. Simulation is showing the preparation and fixation of the uterine cervix cytologic smear and the slide packaging process. (A) Smear preparation process using the material collected from the ectocervix; (B) Smear preparation process using the material collected from the endocervix; (C) Smear fixation; (D) Slide packaging. Source: Authors' files.

3.4 Anal cytology

Unlike the cervical cancer screening, the cytologic examination for anal cancer screening purposes remains little adopted in the clinical practice. Although anal sample collections have been cited or described in some studies [20, 30-31], there are no guidelines focused on sampling procedures for anal cancer screening purposes.

Therefore, the collection technique presented in the current study was based on literature descriptions and the practices adopted in teaching and research activities developed in the Cytology Laboratory at Cruz Alta University. Thus, we herein understand the use of simulators in knowledge acquisition and training processes focused on sample collection for anal cytology examination purposes as a differentiating factor in professional training. Simulators enable the correct identification of anatomical structures, allow performing the collection procedure in the correct sequence, as well as identifying and reasoning about possible mistakes or intercurrences before applying the technique to real patients. The theoretical contextualization of the anal canal histology and anatomy, as well as of the step-by-step collection procedure, precedes the practice with the aid of simulators in our teaching practice.

The anal canal, or anus, (Figure 5) is known as the terminal portion of the rectum; it passes through the posterior perineum and ends in the anoperineal line [32, 33]. It is approximately 4 cm long and shorter in women [34]. In histological terms, it comprises the columnar epithelium (located in the upper part of the anal canal) and the transitional epithelium; it is formed by the squamous epithelium and the non-keratinized

epithelium (located in the lower part of the anal canal, approximately 4 to 5 mm from the anoperineal line). The squamocolumnar junction (SCJ) is located in the dashed line. Like the uterine cervix, the anal canal has an epithelium Transformation Zone (TZ); HPV infections may also happen in this area or just in the squamous epithelium [32].

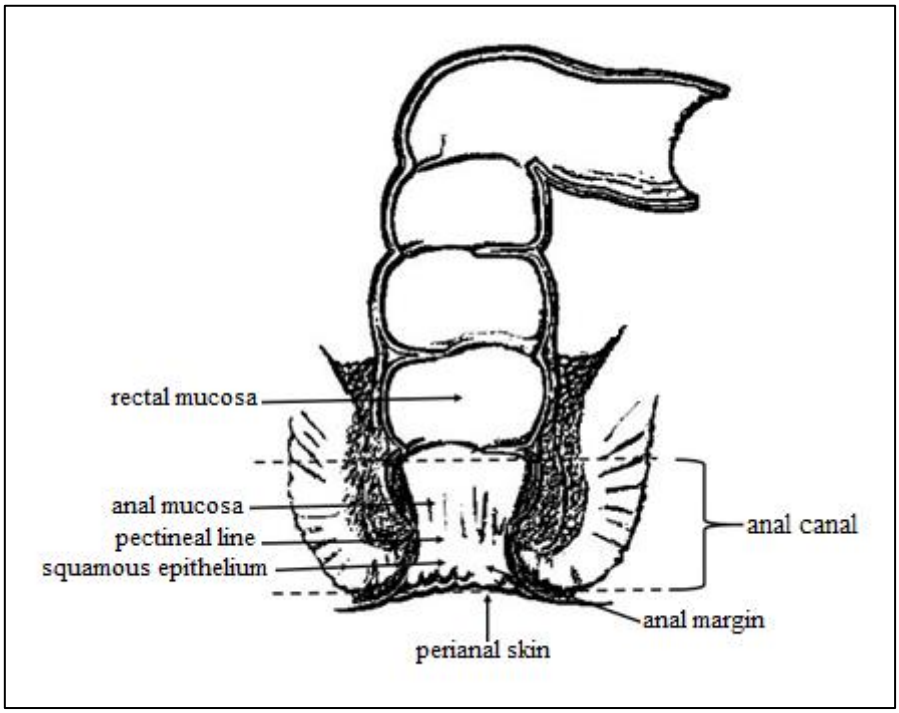

Figure 5. Anal canal anatomy. Source: Own authorship

Patients shall be lying in Sims' position, i.e., in left lateral decubitus, with their right lower limb flexed and their left lower limb slightly flexed at the time to collect the sample. This position makes the collection process easier because it relaxes the anal sphincters and the perineum, as well as provides greater comfort to patients [35,36]. The left lateral decubitus is the position of choice adopted in research projects developed by our Research Group since it shows good acceptance by patients.

Similar to what happens in cervical cytology, patients shall be instructed before the examination because there are important recommendations to be followed to allow collecting optimal samples. Enemas and receptive anal intercourse shall be avoided 24 hours before the procedure, and the rectum shall be emptied before the sample collection [35].

Samples shall be collected in the anal canal and its margin, with the aid of a brush used for endocervical collection to assure better quality and preservation of cellular samples [35, 37]. The brush shall be moistened in 0.9% Physiological Serum introduced into the rectum (approximately 3 to 4 cm deep) and withdrawn in a spiral motion to allow sampling the anal canal TZ [38,39,40].

According to Nadal et al. (2009), the deeper the brush is inserted, the more effective the test will be [37]. Darragh and Winkler (2012) also recommend inserting the brush as deep as possible, usually 5-7 cm (2-3 inches) until finding resistance [35]. The endocervical brush adopted in our practice has two cm-long bristles (approximately 0.7 cm diameter); therefore, the entire length of the bristles shall be introduced into

the anal orifice to assure proper material collection (Figure 6).

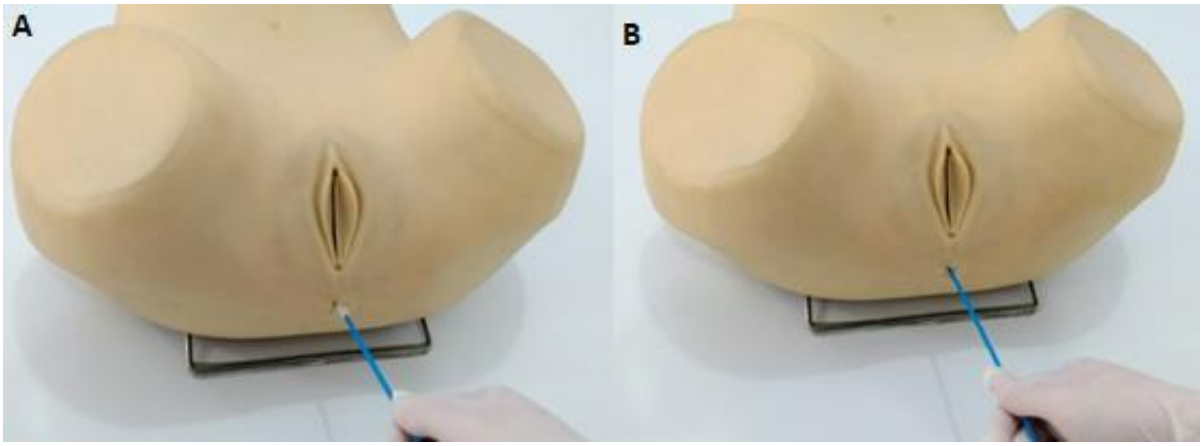

Figure 6. Sample collection for anal cytology examination purposes. (A) Brush positioning; (B) Total brush insertion 3 to 4 cm deep into the anal canal. Source: Authors' files.

The collected material is smeared on a glass slide through rotational, zig-zag or longitudinal movements [38] and immediately fixed with the aid of a cytological fixative agent positioned approximately 20 cm from the slide (as in the cervical cytology examination - see Figure 4C) [28]. We adopt the rotational movement longitudinally applied to the slide in our practice (Figure 7) since it allows homogeneously distributing the collected material and enables good cell preservation.

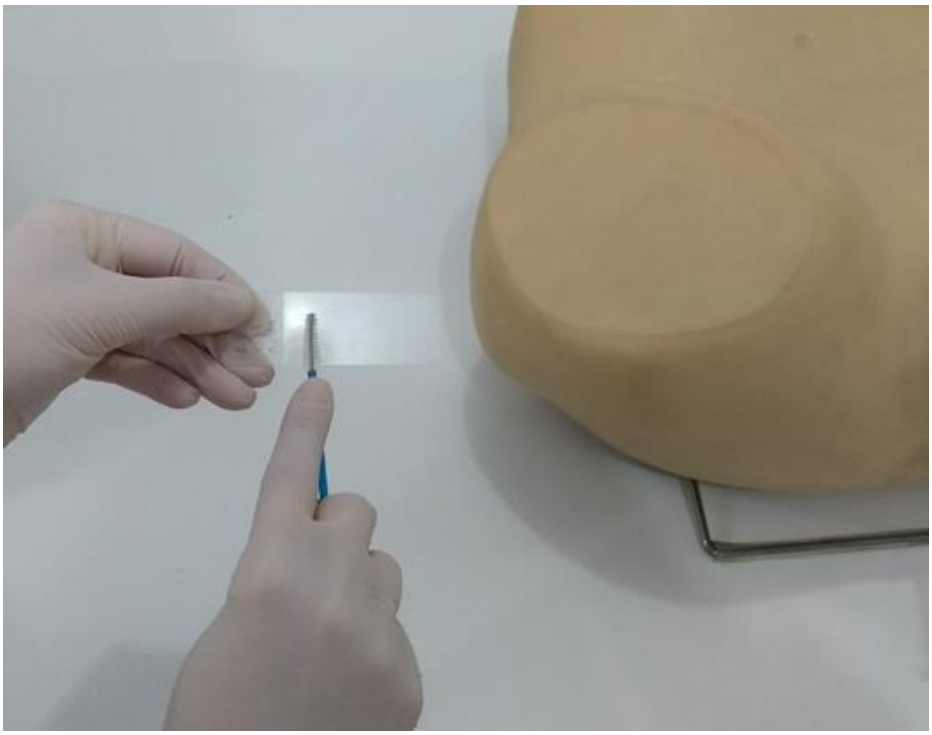

Figure 7. Simulation is showing the anal cytological smear preparation. Source: Authors' files.

The sample embedded in an appropriate medium (e.g., cervical cytology - see figure 4D) shall be referred to the laboratory, where it will be processed according to the Papanicolaou technique and analyzed in an ophthalmic microscope by the cytologist in charge [40]. Similar to the cervical cytology, anal cytology results are classified according to the Bethesda System [41]. The TBS, which is a system developed by a group of cytologists, histologists and oncology therapists, introduced the classification of results, as well as the criteria to be applied to the smear quality analysis conducted in the cytopathological examination by taking into account the components found in the sample [41].

Studies indicate sensitivity ranging from 47% and 90% and specificity ranging from 16% to 92% [42]. Some methodological limitations can make the sample unsatisfactory, among them: smearing presenting acellular or hypocellular material (cells in less than 10% of the smear), contamination with fecal material in more than 75% of the smear, and anucleated cells in more than 75% of the smear [38].

The sampling collection stage is essential to avoid these limitations; therefore, the procedure shall constantly be trained and improved during its application. We recommend some precautions to be taken in order to help get good-quality samples, namely: I) preventing the brush from touching the external region of the anus aiming at reducing the possibility of contaminating the smear with anucleated cells; II) properly fixing the smear in order to cover the entire slide and prevent the sample from drying; and III) inserting the brush up to 4 cm deep into the anal canal by making rotational movements to make sure of getting samples of cellular representativeness.

5. Conclusion

It is recommended using gynecological simulators as complementary instruments in teaching-learning scenarios focused on cervical and anal cytology examinations. Simulations based on the herein described procedures may contribute to the qualification of this important examination, which helps screening neoplasms presenting high morbidity and mortality rates.

7. References

1. Goff BA. Best Practice & Research Clinical Obstetrics and Gynaecology Training and assessment in gynaecologic surgery: the role of simulation. Best Pract Res Clin Obstet Gynaecol. 2010;24(6):759-66.
2. Souza CDF, Antonelli AB, Oliveira DJ. Metodologias ativas de ensino aprendizagem na formação de profissionais da saúde. Revista da Universidade Vale do Rio Verde. 2016;14(2):659-77.
3. Gaba DM. The Future Vision of Simulation in Healthcare. Simul Healthcare. 2007;2(2): 126-35.
4. Gaba DM. Do As We Say, Not As You Do: Using Simulation to Investigate Clinical Behavior in Action. Simul Healthcare. 2009;4(2):67-9.
5. Oliveira SND, Prado MLD, Kempfer SS. Utilização da simulação no ensino da enfermagem: revisão integrativa. Rev Min Enf. 2014; 18(2), 487-504.
6. Silveira MS, Cogo ALP. Contribuições das tecnologias educacionais digitais ensino de habilidades de enfermagem: revisão integrativa. Am. J. Surgery. 2017; 38(2):e66204.
7. Kohn LT, Corrigan JM, Donaldson MS. To err is human: building a safer health system. Washington, DC: National Academy Press; 2000.
8. Pugh CM, Salud LH. Fear of missing a lesion: use of simulated breast models to decrease student anxiety when learning clinical breast examinations. Am. J. Surgery. 2007;193(6):766-70.
9. Varga CRR, Almeida VC, Germano CMR, Melo DG, Chachá SGF, Souto BGA, Fontanella BJB, Lima VV. Relato de Experiência: o Uso de Simulações no Processo de Ensino-aprendizagem em Medicina. Rev Bras Educ Med. 2009;33(2):291-7.
10. Brandão CF, Collares CF, Marin HF. A simulação realística como ferramenta educacional para estudantes de medicina. Sci Med. 2014;24(2):187-92.
11. Mccaughey CS, Traynor MK. Nurse Education Today The role of simulation in nurse education. Nurse Educ Today. 2010;30(8):827-32.
12. Mbbs TD, Wadey V, Archibald D, et al. Cognitive and Psychomotor Entrustable Professional Activities : Can Simulators Help Assess Competency in Trainees ? Clin Orthop Relat Res. 2016;474(4):926-34.
13. World Health Organization - WHO. Cancer control: knowledge into action: WHO guide for efective pogrammes [Internet]. Switzerland; 2007 [cited 2017 September 29]. Available from: http://www.who.int/cancer/modules/Prevention%20Module.pdf
14. Buffon A. Anatomia, Histologia e Citologia Normal do Trato Genital Feminino. In: Consolaro MEL, Maria-Engler SS, organizers. Citologia Clínica Cérvico-vaginal - Texto e Atlas. [Reprint.]. São Paulo: Roca; 2012. p. 1-14.
15. Inca. Instituto Nacional de Câncer José Alencar Gomes da Silva. Coordenação de Prevenção e

Vigilância. Divisão de Detecção Precoce e Apoio à Organização de Rede. Diretrizes Brasileiras para Rastreamento do Câncer do Colo do Útero [Internet]. 2ª ed. Rio de Janeiro; 2016 [cited 2017 September 29]. Available from: http://colposcopia.org.br/files/consensos/diretrizesparaorastreamentodocancerdocolodoutero2016corrigido-1448538996.pdf

16. Albuquerque KM de, Frias PG, Andrade CLT de, Aquino EML, Menezes G, Szwarcwald CL. Cobertura do teste de Papanicolaou e fatores associados à não-realização: um olhar sobre o Programa de Prevenção do Câncer do Colo do Útero em Pernambuco, Brasil. Cad Saude Publica. 2009;25:s301-s309.

17. Falcão GB, Ibiapina FLP, Feitosa HN, Feitosa TS, Lacerda PD de, Braga JU, Carvalho FHC. Fatores associados à realização de citologia para prevenção de câncer do colo uterino em uma comunidade urbana de baixa renda. Cad Saúde Coletiva. 2014;22(2):165-72.

18. Amaral AF, Araújo ES, Magalhães JC, Silveira ÉA, Tavares SBDN, Amaral RG. Impacto da capacitação dos profissionais de saúde sobre o rastreamento do câncer do colo do útero em unidades básicas de saúde. Rev Bras Ginecol e Obs. 2014;36(4):182-87.

19. Godfrey C, Firnhaber CS, D'Souza G, Heard I. Anal dysplasia in HIV-infected women: a commentary on the field. Int J STD AIDS. 2015;1-7.

20. Elorza G, Saralegui Y, Enríquez-Navascués JM, Placer C, Velaz L. Anal intraepitelial neoplasia: A narrative review. Rev Esp Enferm Dig. 2016;108(1):31-9.

21. Aguiar MTM, Bosso NCC, Leal CBQS, Lira CF, Cabral LAO, Silva AMTC et al. Clinicopathological aspects and prevalence of human papillomavirus in anal cancer. J Coloproctol. 2014;34(2):76-82.

22. Patel J, Salit IE, Berry MJ, Pokomandy A, Nathan M, Fishman F et al. Environmental scan of anal cancer screening practices: worldwide survey results. Cancer Med. 2014;3(4):1052-61.

23. Diefenthäler VL, Cardoso MAC, Zanella JFP, Moreira PR, Coser J. Lesão anal por papilomavírus humano em mulher vivendo com HIV/aids. Sci Med. 2017;27(3):1-5.

24. Martins JCA, Mazzo A, Baptista RCN, Coutinho VRD, Godoy S de, Mendes IAC, Trevizan MA. A experiência clínica simulada no ensino de enfermagem: retrospectiva histórica. Acta Paul Enf. 2012;25(4):619-25.

25. Quilici AP, Abrao K, Timerman S, Gutierrez F. Simulação clínica: do conceito a aplicabilidade. São Paulo: Atheneu; 2012.

26. Oliveira NC, Moura ERF, Diógenes MAR. Desempenho de enfermeiras na coleta de material cervicouterino para exame de Papanicolaou. Acta Paul Enferm. 2010;23(3):385-91.

27. Inca. Instituto Nacional de Câncer José Alencar Gomes da Silva. Coordenação de Prevenção e Vigilância. Divisão de Detecção Precoce e Apoio à Organização de Rede. Manual de gestão da qualidade para laboratório de citopatologia [Internet]. 2ª ed. Rio de Janeiro; 2016 [cited 2017 September 29]. Available from: http://www1.inca.gov.br/inca/Arquivos/livro_completo_manual_citopatologia.pdf

28. Brasil. Ministério da Saúde. Secretaria de Atenção à Saúde. Departamento de Atenção Básica. Controle dos cânceres do colo do útero e da mama [Internet]. 2ª ed. Brasília; Editora do Ministério da Saúde, 2013 [cited 2017 September 28]. Available from: http://bvsms.saude.gov.br/bvs/publicacoes/controle_canceres_colo_utero_2013.pdf

29. Fonseca AJ Da, Murari RSW, Moraes IS, Rocha RF, Ferreira LCDL. Acurácia dos exames citológicos cervicovaginais em Estado de elevada incidência de câncer de colo de útero. Rev Bras Ginecol e Obs. 2014;36(8):347-52.
30. Nadal SR, Calore EE, Nadal LRM, Horta SHC, Manzione CRM. Citologia anal para rastreamento de lesões pré-neoplásicas. Rev Assoc Med Bras. 2007;53(2):147-51.
31. Nobre MS, Jacyntho CM, Eleutério Jr J, Giraldo PC, Gonçalves AK. Abnormal anal cytology risk in women with known genital squamous intraepithelial lesion. Braz J Infect Dis. 2016;20(3):294-7.
32. Mindel A, Carmody C. Região anal e perianal: diagnóstico e tratamento: lesões perianais e anais em adultos. In: Gross GE, Barrasso R. Infecção por papilomavírus humano: atlas clínico de HPV. Porto Alegre: Editora Artes Médicas Sul Ltda., 1999.
33. Maluf FC, Buzaid AC, Varella D. Vencer o câncer. São Paulo: Dendrix; 2014.
34. Sinnatamby CS. Last's anatomy: regional and applied. 10th ed. Edinburgh: Churchill Livingstone; 1999.
35. Darragh TM, Winkler B. Screening for anal neoplasia: anal cytology – sampling, processing and reporting. Sexual Health. 2012;9:556-61.
36. Oliveira RG. Blackbook Enfermagem. 1 ed. Belo Horizonte: Blackbook Editora, 2016.
37. Nadal SR, Horta SHC, Calore EE, Nadal LRM, Manzione CR. Quanto a escova deve ser introduzida no canal anal para avaliação citológica mais eficaz? Rev Assoc Med Bras. 2009;55(6):749-51.
38. Heráclio AS, Pinto FRG, Cahen K, Katz L, Souza ASR. Anal cytology in women with cervical intraepithelial or invasive cancer: interobserver agrément. J Bras Patol Med Lab. 2015;51(5):315-22.
39. Smyczek P, Singh AE, Romanowski B. Anal intraepithelial neoplasia: review and recommendations for screening and management. Int J STD AIDS. 2013;24(11):843-51.
40. Roberts JR, Siekas LL, Kaz AM. Anal intraepithelial neoplasia: A review of diagnosis and management. World J Gastrointest Oncol. 2017;9(2):50-61.
41. Solomon D, Nayar R. Sistema Bethesda para Citopatologia Cervicovaginal – Definições, Critérios e Notas Explicativas. Rio de Janeiro: Revinter; 2005.
42. Long KC, Menos R, Bastawrous A, Billingham R. Screening, Surveillance, and Treatment of Anal Intraepithelial Neoplasia. Clin Colon Rectal Surg, 2016;29:57-64.