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Satisfaction and Self-confidence of Students' of 5th year in Medicine after cervical smear Simulation-based Workshop a pre- and post-intervention comparison study

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Medical student, Gynecological examination, Cervical smear, Disease announcement, Simulation-based teaching.

ABSTRACT

This study aimed to evaluate the impact of simulation as a teaching tool for the technique of the cervical-uterine smear and the announcement of the results as part of the training of 5th year students of medicine at the Faculty of Medicine and Pharmacy of Agadir (FMPA). This is a monocentric cross-sectional descriptive study. Seven sessions were held, and each session consisted of a practical workshop and two simulation sessions. Two questionnaires were used to collect the data. They focused on the evaluation of knowledge (pre-test), then the evaluation of the knowledge and skills acquired (post test) of the students. Ninety-two students participated in this training. The results showed that 78% of the learners had an improvement in their level of knowledge (p=.00001) after the session. 95% expressed apprehension before taking a cervical smear compared to 3% at the end of the session (p=0.000). In addition, learners expressed difficulties in communicating with patients, especially in the non-verbal aspect, with a significant improvement (48% at the beginning of the session vs. 16% at the end of the session (p=.00001)). Finally, all learners were willing to attend another simulation training session. This study has shown that simulation training for Pap smear and announcement consultation leads to a significant improvement in the knowledge and skills of the learners. To improve patient care, simulation-based training for Pap smear should be included in the curriculum for students as well as sessions of certified training for practicing physicians.

1. Introduction

Cervical cancer is the second most common cancer in women worldwide with an incidence of 500,000 new cases per year [1] with a frequency of 500,000 new cases per year [1]. This is also the case in Morocco with an incidence of 14.1 per 100,000 women [2], [3]. Human papillomavirus (HPV) is the major risk factor for

cervical cancer [4]. Despite prophylactic vaccines against HPV, protection against cervical cancer is only 70%, hence the importance of screening [5- 7]. Around the world, several screening strategies are recommended depending on the economic level of states and individuals [8]. The World Health Organization (WHO) recommends screening by visual inspection after applying acetic acid or lugol to the cervix in low-income settings, Pap smear or liquid Pap smear in middle- and high-income settings and HPV serology screening in high-income settings [9], [10]. Cervical screening aims to prevent carcinoma by detecting and treating precancerous lesions [11]. Uterine cervical smear (UCS) reduces the risk of cervical cancer by 90.8% and also reduces the risk of death from cervical cancer by 20% for the female population [5]. A national cervical cancer control strategy has been adopted in recent years to fight this scourge. One of the screening techniques used is the Pap smear. Its performance, interpretation and especially the announcement of the result of precancerous lesions are particularly stressful situations for both the patient and the doctor [12- 15]. In the context of clinical education, the examination of a patient requires her prior consent according to the deontological and ethical code [16]. This is particularly true for procedures involving the privacy of the patient, which can be a major obstacle to its routine practice during the training of medical students. Simulation in the medical environment is recognized as an essential pedagogical tool in evidence-based education [17]. It allows medical learners to acquire knowledge, technical skills, and non-technical competences without risk to the patient and without obstacles [17]. It thus enables them to receive quality training in the context of continuing professional development, enabling them to acquire and maintain skills with safety in care and the possibility of repeating common or rare situations over and over again.

In Morocco, the need for practice of physicians qualified in cancer screening and the absence of previous studies on the modalities of training by simulation in the techniques of carrying out the Pap smear, the interpretation of the results and the announcement of precancerous lesions pushed us to undertake this study.

This study planned to assess the impact of simulation as a teaching tool for the cervico-uterine smear technique and the announcement of results within the framework of the training of 5th year medical students at the Faculty of Medicine and Pharmacy of Agadir (FMPA).

2. Materials and methods

2.1 Material

Our study is a descriptive cross-sectional analysis of simulation-based teaching of the FCU technique and results management. It consists of assessing students' knowledge (pre-test) and acquisition (post-test) before and after simulation training. The study protocol was approved by the FMPA ethics committee. The training was carried out at the Centre for Simulation and Innovation in Health Sciences (CSISS) of the FMPA. The study involved all the 5th year medical students of the FMPA class of 2020/2021. They have acquired sufficient knowledge and skills in anatomy of the female reproductive system, clinical gynaecological examination, anatomopathology of precancerous lesions, gynaecological pathology and the place of the Pap smear in cervical cancer screening. 3 They also had contact with patients in the gynaecology department, which enabled them to acquire adequate medical communication. It should be noted that none of the students had previously received training in a simulation centre on the performance of the ECF or on the announcement consultation. They were recruited on a voluntary basis. They were divided into seven groups of 13 to 14 learners per session. Our study was carried out over 7 half-days. The teaching was provided by two Assistant Professors of the FMPA, one in Radiotherapy and the other in Gynaecology and Obstetrics. They were assisted by three interns from the University Hospital Center Souss Massa of Agadir. A midwife

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with 35 years of experience in the gynaecology department of Hassan II Hospital in Agadir was asked to help with the drafting of the scenarios. She also participated in the preparation of the locations and materials during the different sessions. The curriculum of this training was formalised and developed in collaboration with the pedagogical manager of the simulation centre. The locals used for this work comprised three rooms. The first room was used for the Pap smear workshop on procedural mannequins. It was equipped with a video-projection to perform and visualise the Pap smear technique for all learners. The second room was dedicated to simulation. It reproduced a fictitious consultation room. It was equipped with a desk and an examination table. It was equipped with audiovisual means for transmission and communication with the control room. The control room, next to the second room, was used to visualise the transmissions and allowed the trainer to direct the scenario and modulate it if necessary, communicating with the collaborators who played the roles of the patient and the nurse. A third room was dedicated to the live transmission of the rehearsal of the two scenes to the other participants. It also served as a briefing and debriefing room. The simulation sessions were filmed by four cameras which transmitted the general atmosphere of the simulations to the rest of the group. Three low-fidelity mannequins were used for the practical workshops and the first staging session. They were used for the performance of the Pap smear and for the pelvic examination. For the first staging session we used a simulation with a hybrid mannequin where a collaborating doctor played the role of the patient (Figure 1). The same intern played the role of the standardised patient in the second staging.

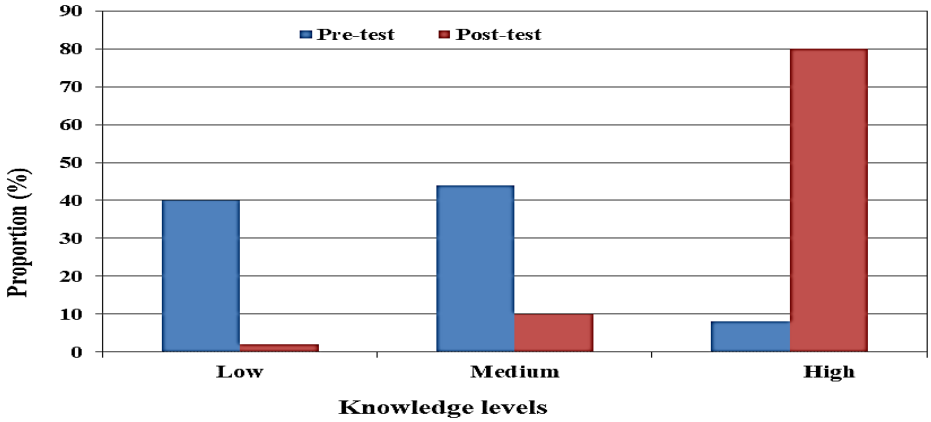

Figure 1 Evolution of the global knowledge levels between the two stages of the evaluation.

2.2 Methods

The work is done in the form of a 4-hour session. It consists of a practical procedural workshop and two situational sessions (reproduction of a real consultation environment and for the realization of the Pap smear and announcement). The learners are welcomed at the CSISS. They give their oral consent to participate in this training. Then a brief overview of the programme and the educational objectives of the session are presented to the participants. At the beginning of the session, an anonymous questionnaire (pre-test) for the evaluation of the theoretical knowledge on Pap smear and on the announcement consultation was filled in by the learners. This was followed by an interactive presentation on the different screening modalities, the techniques for performing an Pap smear and what to do with the Pap smear results. At the end of the session, another questionnaire was completed (post-test). The workshop on a low-fidelity mannequin provided learners with practical training on gynaecological examination, on performing and mastering the conventional Papanicolaou method and the liquid-based Pap smear technique. At the beginning of the workshop, a practical demonstration of 4 the different technical gestures was given by the trainers on a low-fidelity mannequin. At the end of the workshop, all learners performed the clinical examination, the two

Pap smear techniques on the mannequins and the spreading and fixation on the slides under the control of the trainers. The first role-playing session consisted of placing the learner in the role of a doctor. The learner had to conduct a consultation with a patient, including an interview. The first objective was to explain and convince the patient to have an Pap smear and the second objective was for the learner-physician to perform a gynaecological examination and an Pap smear on a hybrid simulator (the patient with a procedural dummy). The second role-playing exercise focused on the ability to interpret the result of the Pap smear, to make the appropriate therapeutic decision and to announce the suspicion of precancerous disease to a patient. Before the sessions started, a general rehearsal of the scenes was carried out on two occasions. The aim was to check their feasibility and relevance. This exercise allowed for a review of the case information with all facilitators (the three interns who played the patient, the nurse and the midwife) and the two trainers of the different sessions. Furthermore, different adjustments of the scenarios were prepared in order to recreate the most observed reactions in given clinical situations. Additional levels of difficulty were tested to adapt to the different possible situations (patient's reluctance to have Pap smear, cancer cases in the family, evoking a phobia of hysterectomy, fertility preservation, denial of the disease etc.). The intervention of the nurse as a facilitator was also envisaged in order to keep the learners in a problem-solving situation and thus avoid situations of failure of the scenarios or deviation from the objectives set. These dress rehearsals made it possible to review and check all the equipment and the fidelity of the environment of the two simulations and also to finalise all the evaluation grids for the various simulated exercises. They also allowed to specify all the items (technical, procedural and non-technical practice) that will be evaluated and debriefed during the session. These rehearsals were also an opportunity to test and evaluate the pre-test and post-test questionnaires. At the beginning of each simulation session, a 5 to 10 minute briefing was conducted by the trainers with all the participants. First, a reminder of the principles of the simulation was presented to the learners. The objective was to create an environment conducive to learning. They also received essential information on the simulation scenario with a presentation of the clinical case, the context of the consultation and the status of the facilitators (the two interns). The presentation also focused on the hybrid dummy (an intern plays the role of the patient and the low-fidelity dummy) and on the objectives of the simulation. Finally, the trainers reassured the learners and encouraged them to play the role of the doctor spontaneously. The duration of each simulation session was set at twenty minutes. During the simulation sessions, in order to keep the learners in a problem-solving situation while avoiding failure, the trainers made adjustments to the scenarios from the control room, if necessary. Each simulation session was followed by a debriefing. This took place in three stages. First, a debriefing of the learner on their feelings and what they perceived as their strengths and points for improvement. Next, the trainer debriefed the technical and non-technical skills acquired and the difficulties encountered during the performance of the Pap smear and the consultation in the first simulation. In the second debriefing, the trainer debriefs all phases of the announcement consultation from the reception, the environment, the questioning, the announcement, the listening phases and the respect 5 of the patient's silence phase. Particular attention is paid to the learner's non-verbal communication and empathy. At the end of the debriefing, a synthesis is made by the learners. 3.

2.3 Statistical Analysis

The analysis of the results was done in two steps for each scenario separately. The data from the questionnaire designed to assess the learners' knowledge before the simulation and the one designed to assess their acquisition after the session were analysed. Then, a comparative analysis of the pre-test and the post-test was made to estimate the impact of the session on the learners' knowledge evolution. Finally, a rating scale containing three levels of knowledge was established to facilitate the interpretation of the results. For the low level of knowledge the number of correct answers is less than or equal to 3. The medium level of knowledge has a number of correct answers between 4 and 5. The high level of knowledge

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has a number of correct answers higher than 6. The data collected in the course of this work, entered into an Excel spreadsheet, was analysed using the Statistical Package for the Social Sciences (SPSS version 13.0). The description of quantitative and qualitative variables was expressed in numbers and percentages. Descriptive statistical analysis and analysis of variance (ANOVA) tests were used. The Scheffe test was used to analyse the variance after the ANOVA test to determine the level of significance (5%).

3. Results

In order to carry out this study, we collected data from the participants in the seven simulation sessions. Of the 100 students enrolled in the 5th year of the FMPA, ninety-two agreed to participate in the simulation sessions, a rate of 92%. All participants answered both questionnaires. The male/female ratio of the study population was 0.53. The age of the participants ranged from 22 to 24 years with a mean value of (23.2 ± 0.59) years. None of these learners had previously attended simulation training on the gynaecological examination or on the announcement. Figure 2 shows the learners' knowledge of the Pap smear at three levels in the pre-test and post-test.

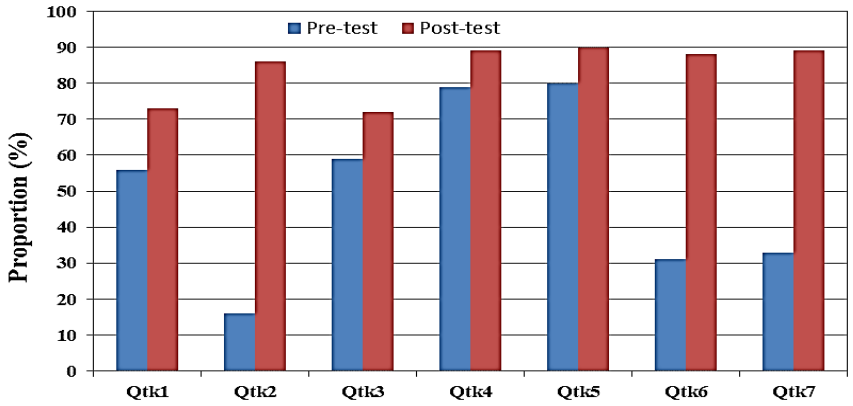

Figure 2 Evolution of the rate of correct answers of our learners to the multiple choice questions relating to the theoretical knowledge of the Pap smear between two stages of the evaluation.

The results of the pre-test showed that 43% of the participants had a low level, 48% an intermediate level and only 9% a high level. At the end of the session, only 2% of the students had a low level of response, 11% an intermediate level and 87% a high level. A favourable evolution in the knowledge levels of the majority of learners was noted between the beginning and the end of the session. Indeed, 78% of learners showed a progression towards the high level ($P < .00001$) (Figure 2). The first seven questions of the questionnaire were designed to assess the students' knowledge of cervical cancer screening, indications of techniques and interpretation of the Pap smear. Before the session, 60% of the learners had correct knowledge of the indications for Pap smear, the techniques of Pap smear and the contribution of the clinical examination in uterine cancers. In the post-test, the rate of correct answers on these topics increased to 78%. Furthermore, a comparative analysis of the responses before and after the training session confirmed a significant increase in the rate of correct responses to these items ($p < 0.05$) (Figure 3).

Pre-test Post-test

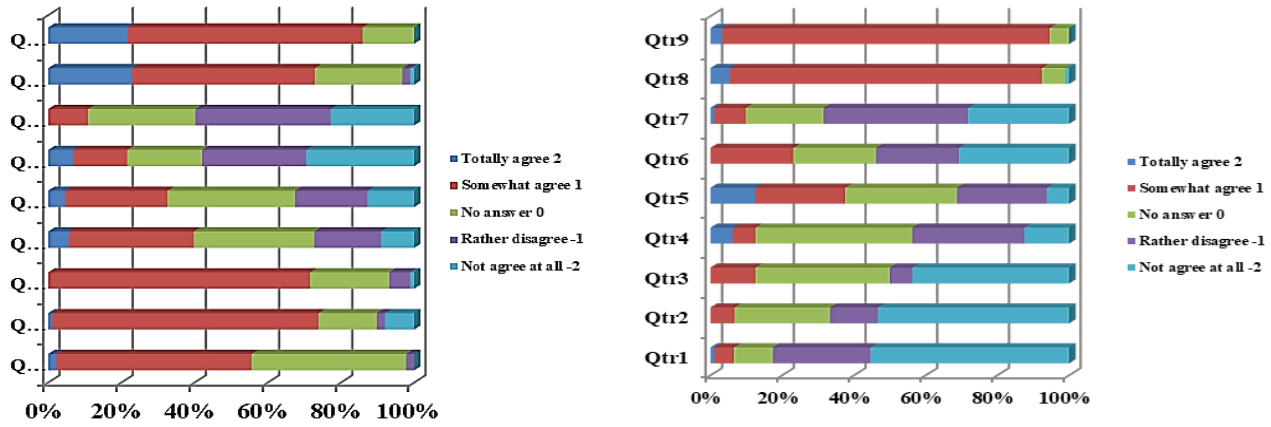

Figure 3: Evolution of the correct answers of our learners on various items on the technique of realization of the Pap smear between the two times of the evaluation.

Apprehension before the gynaecological examination and Pap smear was expressed by 95% of the learners, but at the end of the session only 3% retained it (p< .00001), clumsiness (64% pre-test vs. 50% post-test p= 0.926333) and feeling uncomfortable performing this examination (35% pre-test vs. 37% post-test p= 0.610866). The gynaecological consultation was a stressful situation for 40% of learners in the pre-test period compared to 31% after the session with a non-significant p-value (p=0.80) (Figure 4).

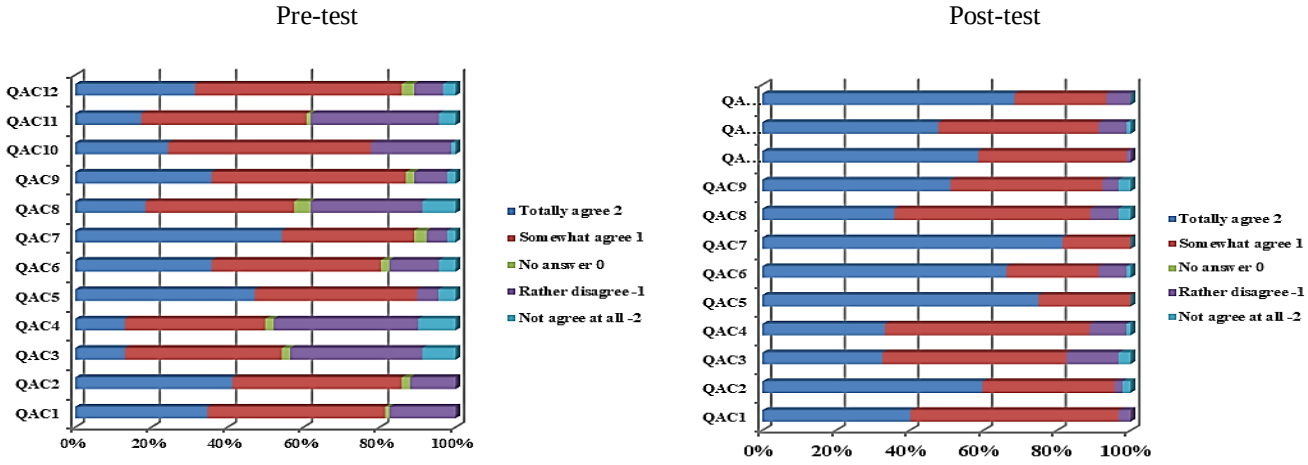

Figure 4 Evolution of the correct answers rate for various items of the Pap smear announcement consultation between the two stages of the evaluation of our learners.

Regarding the results of the second simulation, communication and especially its non-verbal component with the patient was a problem for 48% of the participants at the beginning of the session compared to 20% at the post-test. Indeed, 54% of learners could clearly name the disease at the beginning of the session vs. 83% at the end of the session (p=0.000013). A vocabulary adapted to the announcement consultation was adopted by 52% of participants in the pre-test phase compared to 89% in the post-test phase (p=<.00001). Furthermore, 95% of learners felt comfortable at the consultation at the beginning of the session vs. 98% at

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the end of the session (p<.00001). The ability to create a good contact with the patient was confirmed by 88% of participants at the beginning of the session vs. 96% at the end of the session (p=0.001). It should also be noted that only 90% of the students asked and rephrased questions to check whether the patient had understood the information given. In addition, the learners encouraged the patients to ask questions and felt that they were able to adapt to their reactions both before and after the training session (92% vs. 100% (p= 0.16)). Furthermore, during the announcement exercise, the patient's time of silence was respected in 82% of cases at the beginning of the session vs. 91% at the end of the session (p= 0.16). On the other hand, 87% of the learners declared being empathetic towards the patient at the beginning of the session vs. 93% at the end of the session (p= 0.16). On the other hand, 22% of the participants did not know how to convey important messages at the beginning of the session compared to only 1% at the end of the session (p=<.00001). The closing of the interview during the consultation was mastered by 62% of learners in the pre-test compared to 91% in the post-test (p=<.00001). Finally, 11% of the participants confirmed giving hope to the patient at the beginning of the session vs. 6% at the end of the session (p=0.00002).

Figure 5 presents the learners' assessments of the simulation session. At the end of the session, 100% of the learners appreciated the theme, the quality of the trainers, the supervision, the choice of subject and the means used during the simulations and the workshop. In addition, for 95% of the participants the duration of the session was appropriate. All the learners also felt that this training met their expectations and that they felt capable of doing the Pap smear. On the other hand, 1% of the learners felt unable to make adequate decisions based on the outcome of the Pap smear. Finally, all learners stated that they would be willing to attend simulation training.

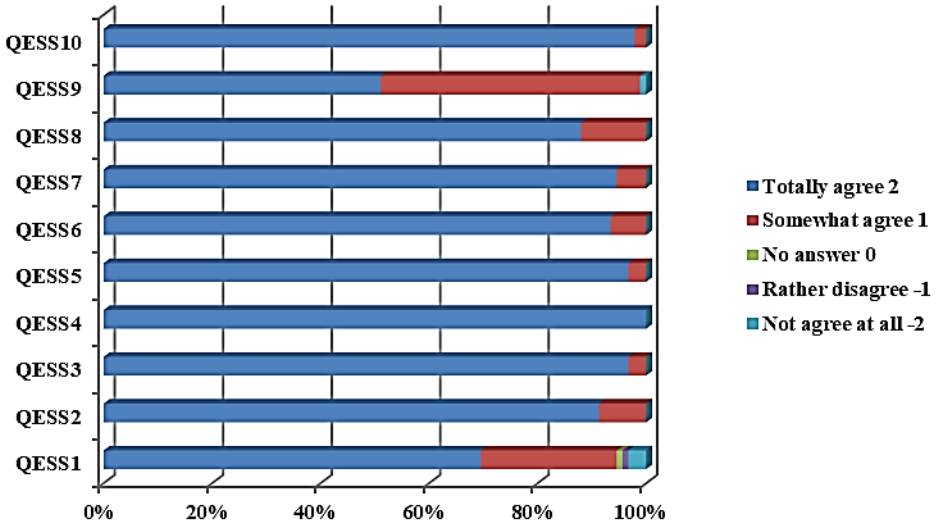

Figure 5 Evaluation of the simulation session by the learners.

4. Discussion

This work evaluates the simulation training of FMPA outpatient students (5th year of medical studies) in learning the technique of Pap smear and the management of results according to the recommendations of the WHO and the Moroccan medical code of ethics [9], [16]. One of the main findings of our work is that 95% of the learners expressed apprehension before performing a Pap smear, 85% had never seen a Pap smear performed and the gynaecological-obstetric (GO) consultation was a stressful situation for 40% of the learners even though they had all had their GO training. This could be explained by the low supervision rate in the training grounds (the ratio of learners to medical teachers was 14 to 16). The same finding was

reported by [18] in a similar study. Indeed, it is relatively tricky to schedule consultations for all learners in our institution as reported by [18]. Moreover, in our country, ECF is mainly conducted in health centres and reproductive health referral centres and not in university hospitals. Unfortunately, our learners did not benefit from any passage at the level of these centres. In this context, teaching on a simulator is probably an interesting learning tool to initiate and maintain a sufficient level of training because of the scarcity of training sites and the difficulty of access to gynaecological practices for our learners [19], [20]. This same finding was reported in the two French studies conducted by [18], [21]. Indeed, they reported that 96% of hospital students in the second cycle of medical studies (DCEM) felt that simulator-based gynaecology training was very beneficial to them. The learners in this study reported that the simulation allowed them to significantly decrease the level of technical difficulties, vaginal touching, speculum placement and performing the Pap smear. They also confirmed a significant decrease in stress after simulation training ($p < 0.05$) [18], [21]. The results obtained in our study are consistent with the literature in that only 3% of our learners remained apprehensive and still considered the GO consultation a stressful situation after simulation training.

4.1 Training of externs in interpreting and announcing the result

Good communication between caregivers and patients is an essential tool when announcing a disease or suspected cancer to patients. It has been considerably improved by simulation according to previous studies [22- 27]. Indeed, simulation has been shown to improve the communication skills of healthcare professionals and to optimise the consultation to improve the transmission of medical information and to address the expectations and concerns of patients with empathy [28]. In Morocco, the first study on announcement consultation was conducted in 2017 at the Faculty of Medicine and Pharmacy in Marrakech [29]. Regarding the state of stress in learners, our study showed that simulation significantly reduces it. This is in agreement with the data in the literature [28], [30]. Indeed, [30] found that 24 doctors found that breaking bad news was a stressful experience especially for inexperienced and/or tired doctors and that simulation significantly reduced stress. The same finding was confirmed in the study by [28]. For patient rephrasing of messages by learners, the results of our study showed a progression of this item from 90% to 100% between the beginning and the end of the simulation training. In a systematic review, [31] reported that empirical work on communication competence training (CCT) has shown little consensus on the components of best practice in CCT, the outcomes to be measured and the methods for assessing the effectiveness of CCT. It also raised the difficulty of developing an objective grid for assessing skill levels. Indeed, assessment is based on subjective criteria which may vary from one learner to another and also for the same learner. He also noted a difference between the learners' perception and the coach's perception of their skills with a tendency to overestimate their skills before the simulation and underestimate their skills after the simulation. In our study the majority of learners had an improvement in self-assessment parameters with only 7% of learners retaining a negative self-assessment of their skills in conducting a consultation. The majority of studies have reported an improvement in the results of all the learners' self-assessment parameters in the short and medium term after the simulation [28], [30]. In our work, 54% of learners could clearly name the disease at the beginning of the session vs. 83% at the end of the session ($p=0.00001$). A vocabulary adapted to the announcement consultation was adopted by 52% of our participants in the pre-test vs. 89% in the post-test ($p=<.00001$). In [32] series, 83% of learners had an adapted vocabulary and 92% had clearly named the disease. But according to the observers, only 67% had an adapted vocabulary and 92% had clearly named the disease. Simulation improved these items immediately after training and also helped to maintain them in the long term according to the study by [28].

For the feeling of empathy at the time of the announcement, in our series 87% of the learners declare having this feeling at the beginning of the session versus 93% at the end of the session ($p= 0.16$). Our results are

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comparable to those obtained in a similar study published by [32]. Indeed, 75% of the participants declared that they were empathetic whereas the observers estimated that 100% of the participants expressed empathy. In our series, the simulation made our learners more attentive to the respect of the patient's silence time (82% before simulation vs. 91% after). The same conclusion was reached in the study by [28] (57% pre-test vs. 100% post-test) and in the long term. Whereas only 33% of the learners were able to leave time for silence in the work of [32]. The simulation also improved our learners' interview closing skills very significantly (62% in the pre-test vs. 91% post-test (p=<.00001)). Our results are significantly better than those found in the series of [32] (17% of the participants after the simulation felt they were able to properly close the consultation vs. 50% according to the observers) and also to those of [28] (12% of the participants were able to properly close the interview and a clear improvement in the long term in more than 50% of the participants).

4.2 Satisfaction with simulation

In their study on satisfaction with simulation training, [33] reported that more than 90% of learners were satisfied or very satisfied with learning the gynaecological examination on mannequins. This result was largely confirmed in the meta-analysis and series published to date [28]. In our series, the reported satisfaction rate of learners was well over 98%. Thus, simulation training provides high satisfaction to learners and is confirmed by their wish to have further similar training.

5. Conclusion

The findings of our study suggest a real benefit of the simulation training sessions. These sessions allowed our learners to become familiar with the technique of the Pap smear, the gynaecological examination, the management of results and the announcement consultation. In particular, they also enabled them to improve their practices and reduce their levels of difficulty and stress during the announcement consultation. It therefore seems interesting to us to introduce simulation as a pedagogical tool in order to facilitate the learning of cervical cancer screening techniques and the announcement consultation. We therefore recommend the introduction of this training as a teaching module in the curriculum for 5th year medical students and also as a training course for practising doctors.

6. Ethical Clearance

The study was approved by the joint ethics committee of the FMPA, Morocco. All participants gave their informed consent before participating and ensuring confidentiality were considered throughout the study.

7. Conflict of interest

The authors declare that they do not have any links of interest.

8. Funding Information

This study received no funding.

9. Authors' contributions

The final version of this manuscript was read and approved by all authors. BA and SS were involved in the design of the study, the analysis and interpretation of the data and the drafting of the manuscript. AE was involved in the scripting and facilitation of the simulation sessions. SA contributed to the validation of the scientific content of the sessions and HN supervised and facilitated the sessions and the critical review of the manuscript.

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