

# Does an Advanced Pelvic Simulation Curriculum Improve Resident Performance on a Pediatric and Adolescent Gynecology Focused Objective Structured Clinical Examination? A Cohort Study



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## ABSTRACT

**Study Objective:** To determine the effect of an advanced pelvic simulation curriculum on resident performance on a pediatric and adolescent gynecology (PAG) focused objective structured clinical examination (OSCE).

**Design:** Obstetrics and gynecology residents in a single academic Canadian center participated in a PAG simulation curriculum. An OSCE on prepubertal vaginal bleeding was administered at the biannual OSCE examination 2 months before the simulation curriculum and again 3 months after the simulation curriculum.

**Setting:** Academic half-day at the University of Ottawa Skills and Simulation Centre.

**Participants:** Obstetrics and gynecology residents from the University of Ottawa.

**Interventions:** Participants completed 4 stations teaching PAG-appropriate history-taking, genital examination, Tanner staging, vaginal sampling and flushing, hymenectomy, vaginoscopy, laparoscopic adnexal detorsion, and approach to the child and/or adolescent. Advanced pelvic models were used for procedure-specific stations.

**Main Outcome Measures:** The primary outcome measure was change in mean score on a prepubertal vaginal bleeding OSCE station. Secondary outcome measures were changes in individual component scores.

**Results:** Fourteen residents completed the simulation curriculum and the PAG OSCE at the 2 separate time points (before and after simulation curriculum). The mean OSCE score before the simulation curriculum was 54.6% (20.5 of 37) and mean score after the curriculum was 78.1% (28.9 of 37;  $P < .001$ ). Significant score increases were found in history-taking, examination, differential diagnosis, identification of organism, surgical procedures, and identification of foreign body ( $P < .01$  for all).

**Conclusion:** This innovative PAG simulation curriculum significantly increased residents' knowledge in PAG history-taking, examination skills, operative procedures, and approach to the child and/or adolescent. Obstetrics and Gynecology Program Directors should consider incorporating PAG simulation training into their curriculum to ensure that residents meet their learning objectives and increase their knowledge and confidence, which will ultimately benefit patient care.

**Key Words:** Pediatric, Adolescent, Simulation, Curriculum, Teaching, Gynecology, Postgraduate medical education, Objective structured clinical examination, OSCE

## Introduction

Pediatric and adolescent gynecology (PAG) is a growing subspecialty of obstetrics and gynecology (Ob/Gyn). Because of work-hour limitations and limited PAG patient encounters and PAG providers, residents do not always graduate feeling comfortable with the PAG population despite recommendations by the Royal College of Physicians and Surgeons of Canada and the Council on Residency Education in Obstetrics and Gynecology in the United States to teach this subspecialty.<sup>1,2</sup> There are few formal curricula in PAG in Ob/Gyn residency programs in North America.<sup>3,4</sup>

We have previously shown that an advanced pelvic simulation curriculum improved residents' self-perceived gain in knowledge and that trainees agreed PAG

simulation curriculums should occur annually during their academic half-days.<sup>5</sup>

Our objective was to determine if an advanced PAG simulation curriculum results in an objective gain in knowledge measured according to resident performance on a PAG focused objective structured clinical examination (OSCE).

## Materials and Methods

We conducted a prospective cohort study involving Ob/Gyn trainees at the University of Ottawa, Canada, who participated in a PAG simulation curriculum using an OSCE before and after intervention (simulation curriculum) between 2012 and 2013.

A PAG simulation curriculum was designed and piloted at the University of Ottawa Skills and Simulation Centre (uOSSC) in January 2013 during the Ob/Gyn postgraduate academic half-day. Residents from postgraduate years 1-5 were included and had variable simulation experience from no previous exposure to significant previous experience in

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simulation on the basis of their year of residency and where they trained for medical school. No residents had previous PAG simulation exposure. Advanced pelvic models were developed before the curriculum in collaboration with the uOSSC. The simulation curriculum consisted of four 45-minute stations and residents were expected to complete assigned readings before the curriculum day.<sup>5,6</sup> A specialist in PAG was assigned to each station and residents were divided into 4 groups according to level of training. The stations addressed patient counseling, examination techniques, as well as basic and intermediate surgical procedures. These stations have been previously detailed by Dumont et al.<sup>5</sup>

In November 2012, 2 months before the simulation curriculum, residents completed their mandatory biannual OSCE session. One OSCE station was on the topic of prepubertal vaginal bleeding. In April 2013, 3 months after the simulation curriculum, we administered the same OSCE station to the residents during their mandatory OSCE session. The same marking scheme was used for the November 2012 and April 2013 prepubertal vaginal bleeding OSCEs (Appendix A) and residents were evaluated by the same examiner on both occasions.

Figure 1 shows the OSCE scenario presented to the residents. Residents had 1 minute to read the scenario, 9 minutes to perform the OSCE, and 1 minute for feedback.

In the first part of the OSCE, residents were expected to take a thorough pediatric gynecology history, which they had previously learned in station 1 of the simulation curriculum (Appendix A).

Trainees were then expected to describe their pediatric gynecologic examination including assessment of Tanner staging, labial retraction for vulvar and hymenal assessment, and vaginal sampling for culture and sensitivity. These techniques had been taught in station 2 of the simulation curriculum. Photos of Tanner staging 1 for breast and pubic hair were shown to the residents and they had to correctly identify the stage. A picture of a prepubertal vulva with a beefy red hymenal opening was shown. Labial traction had to be demonstrated on a pelvic model. They had to explain how they would obtain a sample for culture using a 2-team approach.

Questions then included: differential diagnosis of all prepubertal vaginal bleeding, the most likely diagnosis for this patient (vulvovaginitis) including the pathophysiology (cross-contamination from an upper respiratory tract infection with *Streptococcus A*), and the appropriate antibiotic regimen (penicillin). This information was part of the assigned readings before the simulation curriculum.

Residents were then asked to describe the management of vaginal bleeding that did not resolve with

antibiotic treatment. They were required to describe in detail either how to perform vaginal irrigation (learned in station 2) or vaginoscopy (learned in station 3) and identify the most common foreign object, toilet paper (learned in station 3).

As per the marking scheme, 2 points were deducted at any time during the OSCE if they performed a speculum examination. This information point was reviewed in the assigned readings and stations 1 and 2.

Mean OSCE scores before and after the simulation curriculum were calculated. The primary outcome measure was change in total mean score on the prepubertal vaginal bleeding OSCE station. Secondary outcome measures were changes in individual component scores. Paired *t* tests were used to test for significant differences in total mean scores and individual station scores for residents who completed all 3 events. All analyses were calculated using SAS version 9.2 (SAS Institute Inc, Cary, NC).

Ethics approval from the Ottawa Hospital Research Ethics Board was obtained for the simulation curriculum and this cohort study (20120647-01H).

## Results

Of the 35 residents in the Ob/Gyn postgraduate training program at the University of Ottawa, 24 participated in the PAG simulation curriculum, 16 completed the presimulation curriculum OSCE and 14 residents completed all 3 events (both OSCEs and simulation curriculum) and could be included into this cohort study's paired *t* test. These numbers are small because all 3 events occurred over a 5-month period and had to accommodate for residents' postcall status, maternal, paternal, and parental leaves, vacations, electives out of the city, and sickness.

The mean OSCE score before the simulation curriculum was 55.4% (20.5 of 37). After the simulation curriculum, the mean score increased significantly to 78.1% (28.9 of 37;  $P < .001$ ). Significant increases were also noted in history-taking, examination, differential diagnosis, identification of organism, surgical procedures, and identification of foreign body ( $P < .01$  for all; Table 1). No significant change was noted for antibiotic regimen. There was a decrease in score for diagnosis.

During the first OSCE, 4 residents lost 2 points because they indicated they would perform a speculum examination as part of their assessment. Two performed it during the "examination" component and another 2 during the "surgical procedure" component. During the second OSCE, only 2 residents lost points for a speculum examination and both during the "surgical procedure" component.

Sara is a 7-year old girl referred to your office for vaginal bleeding. Please take a history from her and from the accompanying mother as needed. You will then be asked to perform an examination if appropriate and asked questions on your findings.

Fig. 1. Objective structured clinical examination scenario and instructions for residents.

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