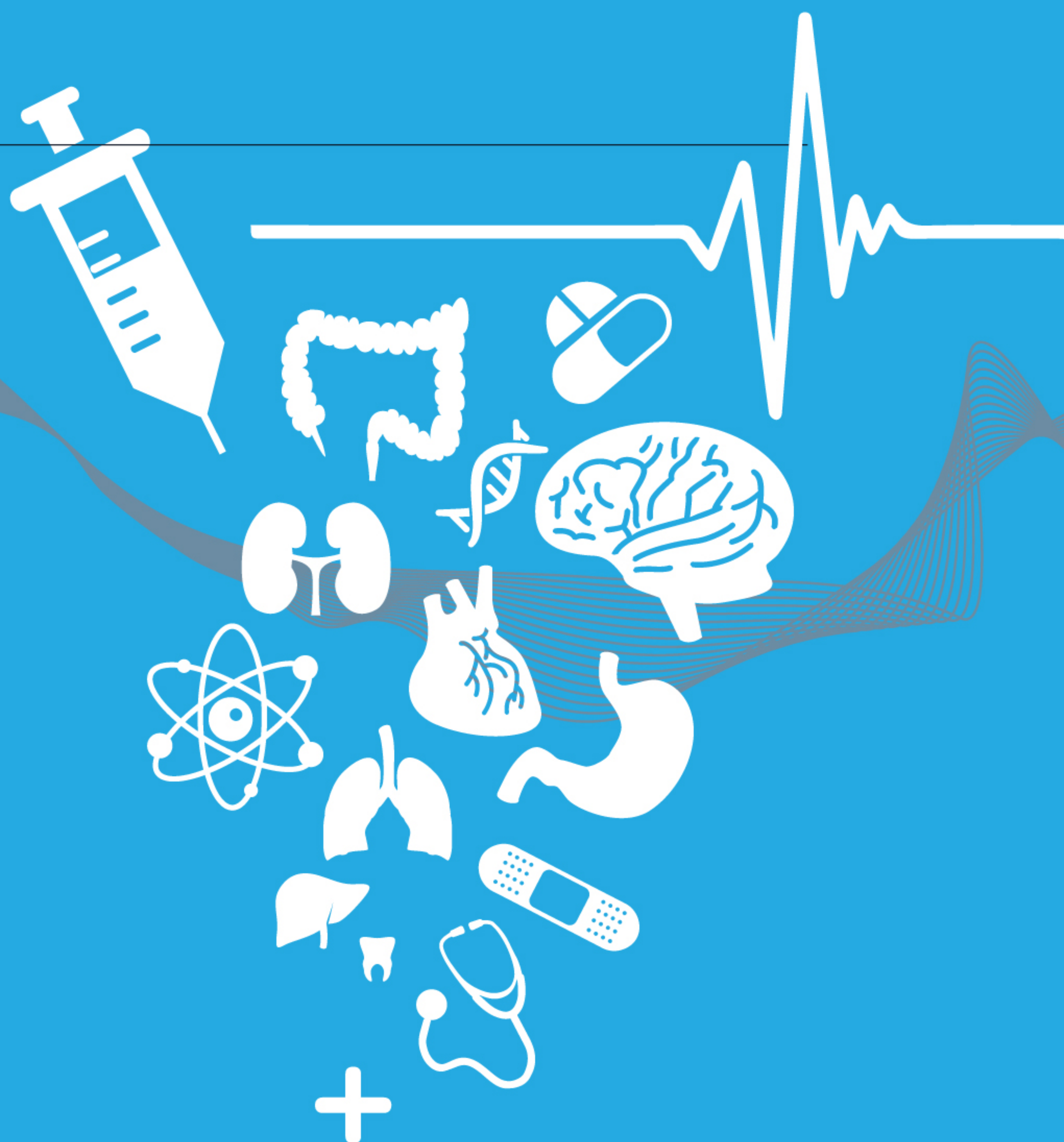


INTERNATIONAL JOURNAL OF CLINICAL SKILLS

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Contents

Foreword

Welcome to the latest edition of the International Journal of Clinical Skills (IJOCS), Volume 8, Issue 3, May 2014.

Sensitive examinations, including female pelvic and breast exams, are considered integral components of the clinical physical examination. It follows that mastering these essential skills is important for making a correct diagnosis and early detection of disease. Successful examination requires competence in both technical and communication skills. In the USA, University of Minnesota Medical School Professor, Dr Sharon Allen and her research colleagues have studied two models of teaching pelvic examinations and present their findings in a very informative paper. The outcomes of this study are important for all those involved in the teaching of sensitive examination skills.

In order to gain competence in key clinical skills it is crucial for students to have opportunities to practise skills safely without risks to themselves or patients. Researchers from Vietnam and The Netherlands investigate the validity of a national list of recommended 'medical skills' which are taught in clinical skills laboratories. The findings of their study are presented in this paper which will no doubt influence future decision makers in their choice of clinical skills curriculum contents.

In this issue of the International Journal of Clinical Skills, Dr Stephen Ali and Ms Lisa Pitkin of the Royal Surrey County Hospital (UK) present an extremely useful overview on how health professionals should approach the examination of neck masses. The paper describes how to systematically examine a neck mass, provides practical tips and a framework for basic examinations. This review is particularly useful for students undertaking clinical skills examinations.

As always, your feedback is invaluable for the continued development of the International Journal of Clinical Skills – the only peer reviewed international journal devoted to clinical skills. E-mail: feedback@ijocs.org

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Student perceptions of educational effectiveness and relative cost of two strategies for teaching sensitive exam skills

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Keywords

Pelvic exam

Medical education

Cost management

Clinical skills

Standardized patients

Abstract

Objectives:

Since limited access to patients and burden for clinical teaching faculty have led to new models for teaching pelvic exams, the objective of this study was to determine the impact of two different instructional teaching strategies of the pelvic exam. Specifically we compared relative cost and assessed and compared students' perceptions of the two models and perceived readiness for performing pelvic exams.

Design:

A 3 hour required pelvic exam skills workshop in year two medical school was conducted with two educational strategies due to budget constraints: Cohort A "no hands-on" had faculty led practice on a table top model followed by faculty demonstration of a pelvic exam;

Cohort B “hands-on” had faculty led table top experience followed by performance of a pelvic exam on a Patient Educator (PE).

Setting:

Year two medical school curriculum between 2009 - 2011 at the University of Minnesota Medical School.

Outcome measures:

Comfort and confidence levels of performing a pelvic exam pre and post- required obstetrics and gynaecology (obs & gynae) clerkship were determined as proxy for a clinical skills performance exam.

Results:

All students gained confidence and comfort levels from pre- to post-clerkship ($p < 0.0001$ respectively). Cohort B showed a downward drift of comfort and confidence levels post-workshop to pre-clerkship. Cohort A compared to Cohort B had lower confidence levels ($p = 0.0137$) and lower comfort levels ($p = 0.0672$) pre-clerkship. Cohort B rated the workshop higher for positive impact. Cost for Cohort A was lower than for Cohort B, but overall cost per student was low.

Discussion:

Regardless of educational strategy all students gained confidence and comfort levels pre- to post-clerkship. The downward drift of comfort and confidence levels in Cohort B question the value of an early sensitive exam experience although the positive impact of one three hour workshop reported by Cohort B suggests PE experiences can have a lasting positive impact on students' preparation for sensitive exams.

Conclusion:

Regardless of the instructional model, curriculum flexibility, timing of the instruction, maintaining PE pools and recruiting clinical faculty remain challenging issues and we need to continually explore new models of teaching this important sensitive exam.

Background

Sensitive examinations, including female pelvic and breast exams, are considered integral components of the clinical physical examination. Mastering these skills is important for making a correct diagnosis and for early detection of diseases. Yet, the female pelvic exam is one of the most difficult physical exam procedures to perform. Successful examination to reduce patient discomfort and

improve patient engagement requires competence in both technical and communication skills.

Consequently, teaching the sensitive exam has long been recognized as having specific challenges [1, 2, 3]. When curriculum relies on clinical patients they must give consent and their cooperation is required. Both patients and novice practitioners experience embarrassment, anxiety and potential discomfort around any discussion or physical exam related to sexuality [4]. Additionally, medical students' expectations and qualities present some unique challenges. The combination of technical and interpersonal skills required creates considerable anxiety with performing the pelvic examination [5]. Gender also plays a role where males report greater fear compared to females and males are less confident in performing the pelvic exam [6].

Additional evidence suggests that undergraduate medical students are not acquiring sufficient sensitive exam skills. Medical students rate their psychomotor skills poorly. In one study, only 7% rated themselves as confident in finding an abnormality on pelvic exam. In another study, only 14% considered their ability to perform a Pap test as good [7]. A more recent study [8] surveyed medical interns just after graduation: 32% had never performed a breast exam and 57% never performed a female pelvic exam. The most common reasons for not performing the pelvic exam included patient refusal (52%), followed by perceived lack of competence to perform the examination (30%), bothersome (28%), uneasiness in examining the opposite gender (25%) and ethical issues (24%). The confidence in performance of sensitive exams was correlated to the increased number of times conducting the breast exam ($r = 0.817$) and the pelvic exam ($r = 0.526$). Medical students typically have limited opportunities for practical experience of a gynecological (gynae) exam with males having even fewer opportunities [9].

This relationship between practice, comfort, and competence is borne out in the literature on clinical education and skill acquisition. While the problems with self-assessment of skills are well-documented [10, 11], comfort and confidence seem to be fundamental to improvement of skills. As Norman and Hyland point out [12], the learner's confidence can act as either a barrier or a facilitator to the acquisition of new knowledge and/or skills. Even when learners receive feedback, their doubts may override the evidence of their skill acquisition if their confidence is low to begin with [13]. Creating more opportunities for “*enactive mastery experiences*” [13] can improve comfort and confidence as a foundation for the

ongoing development of sensitive exam procedural skills.

Limited accesses to clinical patients and clinical faculties (as well as an acknowledged need for more structured skill development) have led to the emergence of multiple models for teaching female pelvic exam. Standardized patients (SPs) have been increasingly employed to teach medical students since the 1970s. Teaching strategies include: lay women who both teach and serve as patients, attending physicians who teach while lay women serve as patients [14], and training conducted by standardized patient educators [15 – 18]. All have been shown to be effective in teaching pelvic examination technique.

Although SPs help to address limited access to clinical faculty, are well-accepted by students, and are effective teachers, this model also presents particular challenges. Recruitment of SPs and maintenance of SP pools is time-consuming. Teaching this type of exam requires specialized training of the SP, women who are sensitive to the issues of a pelvic exam and willing to undergo several pelvic exams during a teaching session. In addition, most programs pay SPs more for sensitive examination sessions.

To our knowledge, there is no evidence to suggest the optimal timing for teaching these techniques and no cost-benefit analysis linking expenses to educational outcomes. Changes to the undergraduate curriculum and educational budget in 2009-2011 presented the authors with an opportunity to study these questions. Specifically the objectives were:

1. To determine the impact of two different instructional strategies on teaching of sensitive exam skills. Two models – one with and one without hands-on experience practicing pelvic exam skills on a live Patient Educator (PE) – were compared for educational outcomes. Due to assessment limitations, confidence and comfort levels were used as a proxy for objective performance evaluation.
2. To determine the relative cost of the two different teaching strategies.
3. To assess and compare the students' perceptions of the overall value of the two models and their perceived readiness for performing pelvic exams as they entered and completed a required obstetrics and gynaecology (obs & gynae) clerkship 4 - 16 months after participating in the workshop.

Methods

This study (IRB# 0911E74061) was considered exempt by the Institute Review Board of the University of Minnesota Medical School (06 November 2009).

At the University of Minnesota Medical School Twin Cities campus, a total of 378 second year medical students were taught female pelvic exam skills between 2009 and 2011 (Cohort A 2009 - 2010, N = 191, and Cohort B 2010 - 2011, N = 187). These workshops were part of a clinical skills course and were taught at the end of year two (Figure 1). At completion of the breast / pelvic workshop, students were expected to demonstrate that they could fluidly perform a breast exam, as well as a speculum and bimanual pelvic exam, with faculty supervision.

Figure 1: Educational timeline

Cohort		Y2	Y3 / 4		
"A" 2009 - 2010	Lecture & student prep	3 hour B/P Workshop (Table top & live demo) No hands on	Opportunity for pelvic exams in clinical setting	Obs & Gynae Clerkship 6 week rotation within months 4-16	
		‡	†	‡	†
"B" 2010 - 2011	Lecture & student prep	3 hour B/P Workshop (Table top & hands on exam with PE)	Opportunity for pelvic exams in clinical setting	Obs & Gynae Clerkship 6 week rotation within months 4-16	
		‡	†	‡	†
		‡ Pre Questionnaire † Post Questionnaire			

The workshop consisted of one, three-hour session and was repeated six times at the end of year two to accommodate class size. The objectives of the workshop remained the same over the study period. However, the method of teaching changed, largely due to a reduction in funding. Both cohorts received a lecture by faculty covering breast and pelvic anatomy and exam technique prior to the workshop. Students were also expected to view two videos: the California Department of Health

Services' vertical strip method for the breast exam and The New England Journal of Medicine, Performing Medical Procedures – Pelvic Examination [19]. Finally, students were also expected to review a presentation on the reproductive and obstetrical history interview and complete a module on sexually transmitted infections. All educational material was available on the course website.

Cohort A (2009 - 2010) received:

- 1) Faculty supervised practice using a table top model
- 2) Observation of a faculty-led pelvic exam demonstration on a Patient Educator (PE)

Instruction was delivered to groups of six students, requiring two-three faculties and only one PE per workshop. There was no hands-on pelvic exam experience for the students. In Cohort B (2010 - 2011), PEs received several hours of additional training to teach the pelvic exam. As with Cohort A, the workshop began with faculty supervised practice on a table top model. PEs then taught the complete pelvic exam on themselves. Students were divided into groups of three to four and each had hands-on experience performing the exam. This model required three faculties and 8 - 9 PEs per workshop. Rectal exam skills were practiced only with the table top models in both cohorts. The breast exam was taught by the PEs as part of this workshop.

After this early training in year two, students were required to participate in a lottery-assigned, six-week obs & gynae clerkship, in either their third or fourth year, 4 – 16 months following the sensitive exam workshop (Figure 1). A brief questionnaire assessing their comfort and confidence levels were administered pre- and post- obs & gynae clerkship for both cohorts. The students were asked to assess their comfort and confidence level performing a pelvic exam using a Likert scale of one to five (five being “very comfortable” and one being “uncomfortable”). Students were also queried about the number of pelvic exams that they had performed in the interval between the sensitive exam workshop and the beginning of their obs & gynae clerkship. Although this lag time varied, the majority of students entered their obs & gynae clerkship between 4 - 16 months post-workshop.

For Cohort B, 8 PEs were selected and trained to teach the pelvic exam. A three-hour training session, led by the physician course director and Standardized Patient Program staff, was developed following the techniques described in Bates [20]. PEs were trained to determine the difference between correct and incorrect technique,

following a step-by-step, 14-point guide to patient positioning, visual inspection, manual exam, equipment handling, and clean technique. PEs were selected from a large SP pool and receive ongoing training in guided discovery and facilitation techniques.

Statistical analysis

Descriptive statistics were calculated for each cohort. For each cohort, pre- and post-clerkship comfort and confidence measures were compared with two-group t-tests. Paired t-tests were not used because unique identifiers were not collected from the students. Two group t-tests were used to compare the mean comfort and mean confidence levels prior to the clerkship between both cohorts. Two-way analysis of variance (ANOVA) was used to investigate gender effects. Spearman correlation coefficients were calculated between the number of pelvic exams prior to the clerkship and the pre-clerkship comfort and confidence measures. For Cohort B, pre- and post-workshop were compared with two-group t-tests. P-values less than 0.05 were deemed statistically significant. SAS V9.3 (SAS Institute Inc., Cary, NC) was used for the analysis.

Results

Comfort and confidence levels for pre- and post-workshop in Cohort B

For Cohort B, we were able to administer a pre / post comfort and confidence questionnaire for the workshop. We saw a mean comfort level for the pre-workshop to be similar to the comfort level pre-clerkship ($p = 0.1872$). Further, the increase in comfort and confidence levels pre- and post-workshop were similar to the increase in comfort and confidence levels pre- and post-clerkship ($p = 0.7365$ and $p = 0.4859$, respectively). This was somewhat surprising, given that the workshop involves only one pelvic exam experience and the clerkship involved multiple pelvic exams. Both the comfort and confidence means at the post-workshop in Cohort B are higher compared to the pre-clerkship levels ($p < 0.0001$). This may be due to the very limited number of opportunities for pelvic exam between the workshop and the clerkship. No statistically significant differences were found between genders in comparing comfort and confidence measures surveyed at pre- and post-workshop (Table 1).

Table 1: Cohort B comfort and confidence levels by gender pre- and post-Y2 Breast/Pelvic Workshop and pre- and post-Obs & Gynae Y3-4 Clerkship

Sex		Female	Male	Total
<i>Number of Surveys</i>				
	Pre-workshop	73	88	162
	Post-workshop	74	83	160
	Pre-clerkship	62	78	140
	Post-clerkship	62	70	132
<i>Comfort, mean (SD)</i>				
	Pre-workshop	2.3 (1.0)	2.4 (1.1)	2.4 (1.0)
	Post-workshop	4.0 (0.8)	4.0 (0.8)	4.0 (0.8) *
	Pre-clerkship	2.5 (0.8)	2.5 (0.9)	2.5 (0.9)
	Post-clerkship	4.3 (0.9)	4.1 (1.0)	4.2 (1.0) *
<i>Confidence, mean (SD)</i>				
	Pre-workshop	1.7 (0.8)	2.0 (1.0)	1.9 (0.9)
	Post-workshop	3.7 (0.7)	3.8 (0.8)	3.8 (0.8) *
	Pre-clerkship	2.3 (0.8)	2.2 (0.7)	2.3 (0.8)
	Post-clerkship	4.3 (0.8)	4.2 (0.8)	4.2 (0.8) *
<i>Number of Pelvic Exams, median (range)</i>				
		1.5 (0 - 20)	1 (0 - 9)	1 (0 - 20)

* $p < 0.0001$ (two group t-test comparing pre- and post-)

Comfort and confidence levels for pre- and post- obs & gynae clerkship

Comfort levels

In both cohorts, the mean comfort level was lower pre-clerkship compared to post-clerkship ($p < 0.0001$). In comparing A versus B, pre-clerkship there was a lower level of comfort for Cohort A (no hands-on group) when compared to Cohort B (PE taught); however, this was not statistically significant ($p = 0.0672$) (Table 2, Figure 2). For both cohorts there were no differences between females and males in pre-clerkship comfort levels ($p = 0.1359$); the interaction between gender and cohort was also not significant ($p = 0.1976$).

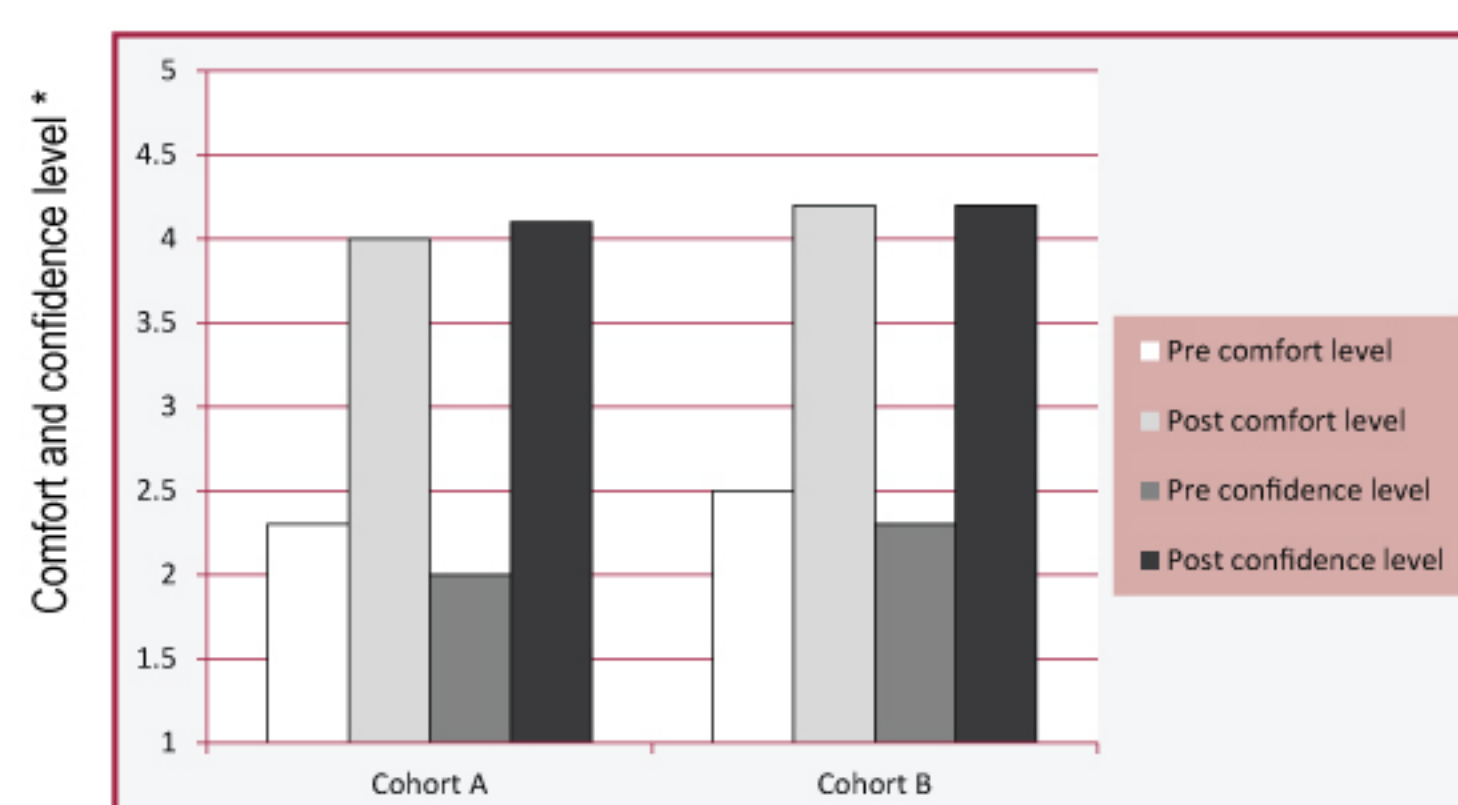
Table 2: Comfort and confidence levels: pre- and post-Obs & Gynae Y3-4 Clerkship

		A	B
<i>Number of Surveys</i>			
	Pre-clerkship	180	140
	Post-clerkship	131	132
<i>Gender †, n (%)</i>			
	Female	83 (46)	62 (44)
	Male	96 (54)	78 (56)
<i>Comfort, mean (SD)</i>			
	Pre-clerkship	2.3 (1.0)	2.5 (0.9)
	Post-clerkship	4.0 (1.1)*	4.2 (1.0)*
<i>Confidence, mean (SD)</i>			
	Pre-clerkship	2.0 (0.8)	2.3 (0.8)
	Post-clerkship	4.1 (0.9)	4.2 (0.8)*
<i>Number of Pelvic Exams, median (range)</i>			
		0 (0-20)	1 (0-20)

† From pre-clerkship surveys. One survey had missing gender information

* $p < 0.0001$ (two group t-test comparing pre- and post-)

Figure 2: Comfort and confidence levels: pre- and post-Obs & Gynae Y3-4 Clerkship



*Likert scale;

Uncomfortable / not confident = 1, Very comfortable / very confident = 5

Confidence levels

In both cohorts, the mean confidence level was lower pre-clerkship compared to post-clerkship ($p < 0.0001$). Analysis showed a statistically significant difference in mean confidence levels pre-clerkship when comparing the two cohorts ($p = 0.0137$). Cohort A, the no hands-on group, had a lower level of confidence pre-clerkship (Table 2, Figure 2). Females reported higher confidence levels pre-clerkship [mean (SD) = 2.24 (0.07) vs. 2.06 (0.06); $p = 0.0451$]. The interaction between gender and cohort was not significant ($p = 0.4414$).

The number of opportunities students had to perform a pelvic exam prior to the clerkship was low. The median for Cohort A was zero and for Cohort B the median was one (both with a range of 0 - 20) (Table 2). The number of pelvic exams prior to the clerkship was positively correlated with pre-clerkship comfort ($r = 0.51$; $p < 0.0001$) and pre-clerkship confidence ($r = 0.55$; $p < 0.0001$) in Cohort A. A smaller correlation was seen for comfort ($r = 0.40$; $p < 0.0001$) and confidence ($r = 0.37$; $p < 0.0001$) in Cohort B.

Overall value of the each workshop model

When students were queried on the pre-clerkship questionnaire as to the value of the early workshop, significantly more students in Cohort B thought the workshop was valuable. Only 53% of the respondents in Cohort A found the workshop valuable while 91% in Cohort B found it valuable for preparing them for the obs & gynae clerkship (Table 3).

Table 3: Overleaf

Table 3: Student preference by cohort

	A	B
Valuable Workshop, n (%)		
Yes	91 (53%)	125 (91%)
No	82 (47%)	13 (9%)

$p < 0.0001$ (Fisher's exact test comparing A and B)

Comparative Cost

The cost of the two models – including PEs (teaching time and training time), equipment, exam models, staff, and skills facilities – is presented in Table 4. Cohort B was the most expensive, whereas the no hands-on cohort A was lower cost. Faculty costs were not included in these figures. However, faculty burden needs to be taken into consideration in the large picture even though it was similar - Cohort A had two to three faculty sessions and Cohort B had three faculty sessions. Cost per student was higher for Cohort B, but overall cost per student was not high.

Table 4: Financial burden of teaching cohort strategies (US Dollars)

	Cost for: Patient Educator ± training ± skill lab ± models	Cost per student	Number of Faculty	Number of students enrolled
Cohort A	\$6,483	\$33.94	2-3	191
Cohort B	\$11,089	\$59.30	3	187

Discussion

Following the implementation of two different teaching strategies, students' perceptions of comfort and confidence performing pelvic exams and of overall usefulness of the workshop were compared. All students had early sensitive exam training with the same objectives, but received different levels of hands-on experience. The cohort with no hands-on experience (Cohort A) had lower comfort ($p = 0.0672$) and confidence levels ($p < 0.0001$) prior to the obs & gynae clerkship. However, regardless of educational strategy, both cohorts showed a significant gain in comfort and confidence levels from pre- to post-obs & gynae clerkship. This would be expected, as students throughout the obs & gynae clerkship do numerous pelvic exams, creating more opportunities for "enactive mastery experiences" [13].

Overall, students with hands-on experience (Cohort B) rated the value of the workshop much higher than the

students with no hands-on experience (Cohort A). While this finding is not particularly surprising (students usually evaluate active learning experiences more highly), the amount of difference between the cohorts is. Since the question about the value of the workshop was asked 4 to 16 months after completing it, the time lag may have created opportunities for students to test their skills in other clerkships and reflect on how prepared they felt for those experiences. This interpretation may be supported by the higher comfort and confidence levels in Cohort B, in spite of the fact that the overall number of opportunities to perform a pelvic exam prior to the clerkship was very low for both cohorts. This suggests that the PEs more structured teaching protocol and direct, supportive feedback had a more lasting impact on learners' comfort (if not perceived competence) than a faculty-led demonstration.

Interestingly, there was not a gender difference in pre-clerkship comfort level across the cohorts. Some studies [6, 21] report gender differences in anxiety and confidence in performing the pelvic exam. The lack of gender findings in comfort level in our study could relate to overall high levels of anxiety for performing the pelvic exam for both men and women, since the time from the workshop to the pre-clerkship survey varied from 4 to 16 months. However, we did see females reporting higher confidence levels pre-clerkship, which could relate to the fact that females might have had more opportunities to perform pelvic exams than males.

It is also worth noting that the increase in comfort level pre- and post-workshop was similar to the increase in comfort level pre- and post-clerkship, in spite of the fact that the workshop involved only one pelvic exam experience and the clerkship involved multiple pelvic exams ($p = 0.7356$). One might expect higher gains in comfort and confidence for the clerkship. Once again, this may be a function of the timing of the questionnaire. While the workshop is very focused on developing physical exam skills, the pelvic exam is only part of the clerkship experience. The variability of faculty instruction may have influenced these results as well.

Outcomes for both cohorts highlight the question of the optimal time to introduce sensitive exam skills. For Cohort B (hands-on experience) we saw increases in comfort and confidence levels post-workshop in year two. However, both levels drifted downward by the pre-clerkship survey 4 - 16 months later. Based on comfort and confidence levels alone, one could argue that this workshop should be offered later in the students' clinical curriculum. On the other hand, early introduction

of sensitive exam technique emphasizes its importance for physical diagnosis. Students need to be taught these skills in a consistent and rigorous manner. Studies [17, 22] show students trained by professional patients were more skilled in performing a pelvic examination and better prepared to examine their own patients than students trained using clinical patients. Further low confidence and comfort levels may result in decreased willingness to attempt pelvic exams when opportunities arise, further compromising the students' comfort and confidence [12].

As indicated above, the relative cost of each instructional model needs to be considered in light of outcomes. In a review of teaching models [1] short-term benefits of PE's teaching were student and patient satisfaction, as well as improvement of technical competency. However, this model necessitates the maintenance of a reliable and consistent Patient Educator pool which qualified staff support and PE compensation costs. Some combination of each of these different teaching modalities may offer viable alternatives for providing consistent, effective instruction. Fourth year students who are trained have been shown to teach physical exam skills as effectively as faculty preceptors [23]. Hybrid simulations combining a task trainer and a standardized patient can be effective for teaching both patient communication and procedural exam skills [24]. A more recent hybrid model includes a video clip and a training model [25]. Each of these methods has received high degrees of satisfaction from students. Depending on the context, each of these methods may prove to be more cost effective and would provide an early experience to improve student confidence and comfort prior to their first clinical patient.

Conclusion

In summary, regardless of the educational strategy employed in year two, all students gained confidence and comfort levels from pre- to post-clerkship. The downward drift of comfort and confidence levels post-workshop to pre-clerkship in Cohort B suggests that the educational value of an early sensitive exam experience is questionable unless it is more tightly coupled with opportunities to practice skills. However, the great disparity between the two cohorts' assessment of each model's utility suggests that early experiences with PEs can have a lasting positive impact on students' preparation for sensitive exams. Regardless of the instructional model, curriculum flexibility, maintaining PE pools, and recruiting clinical faculty remain challenging issues in undergraduate medical education.

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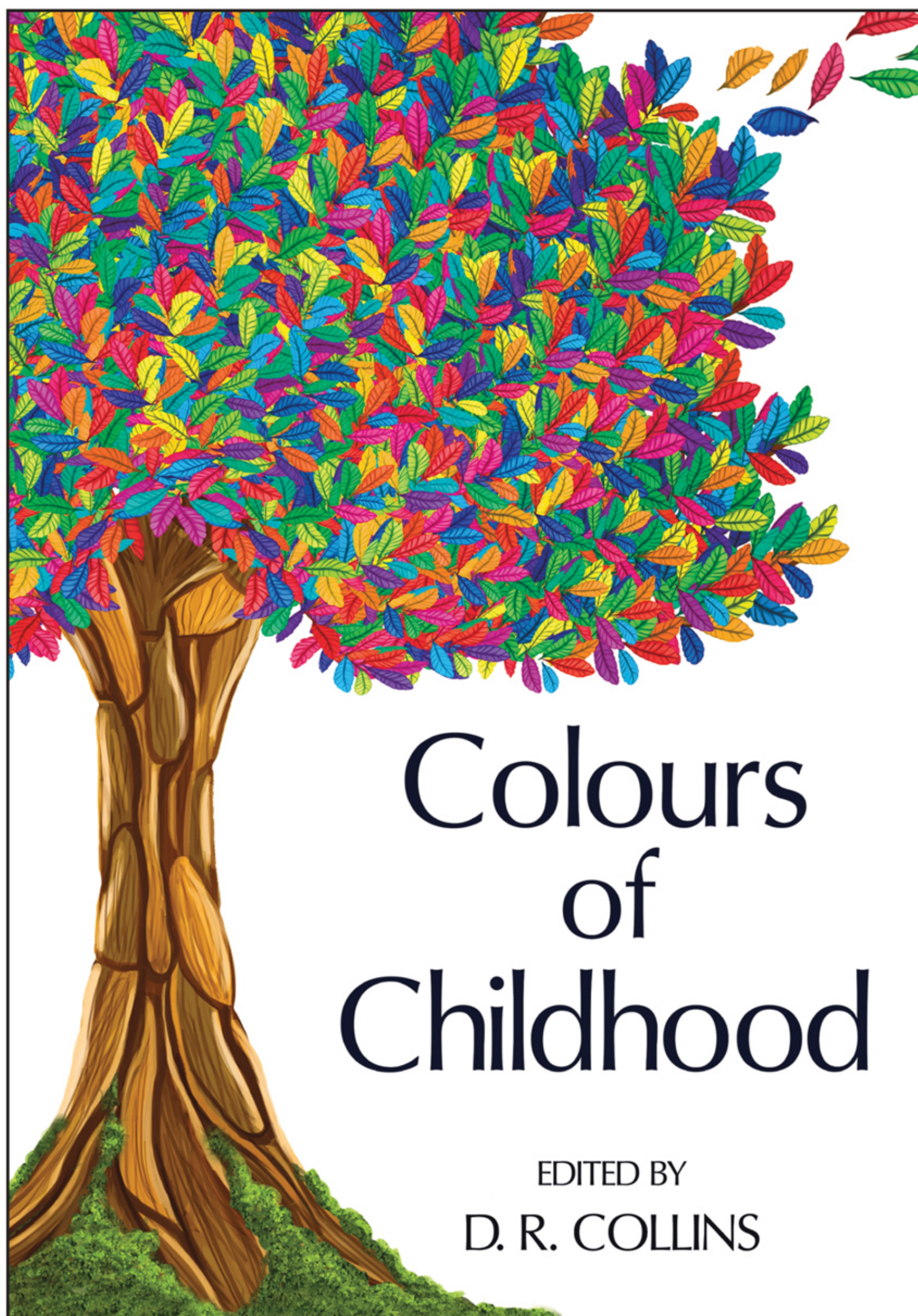
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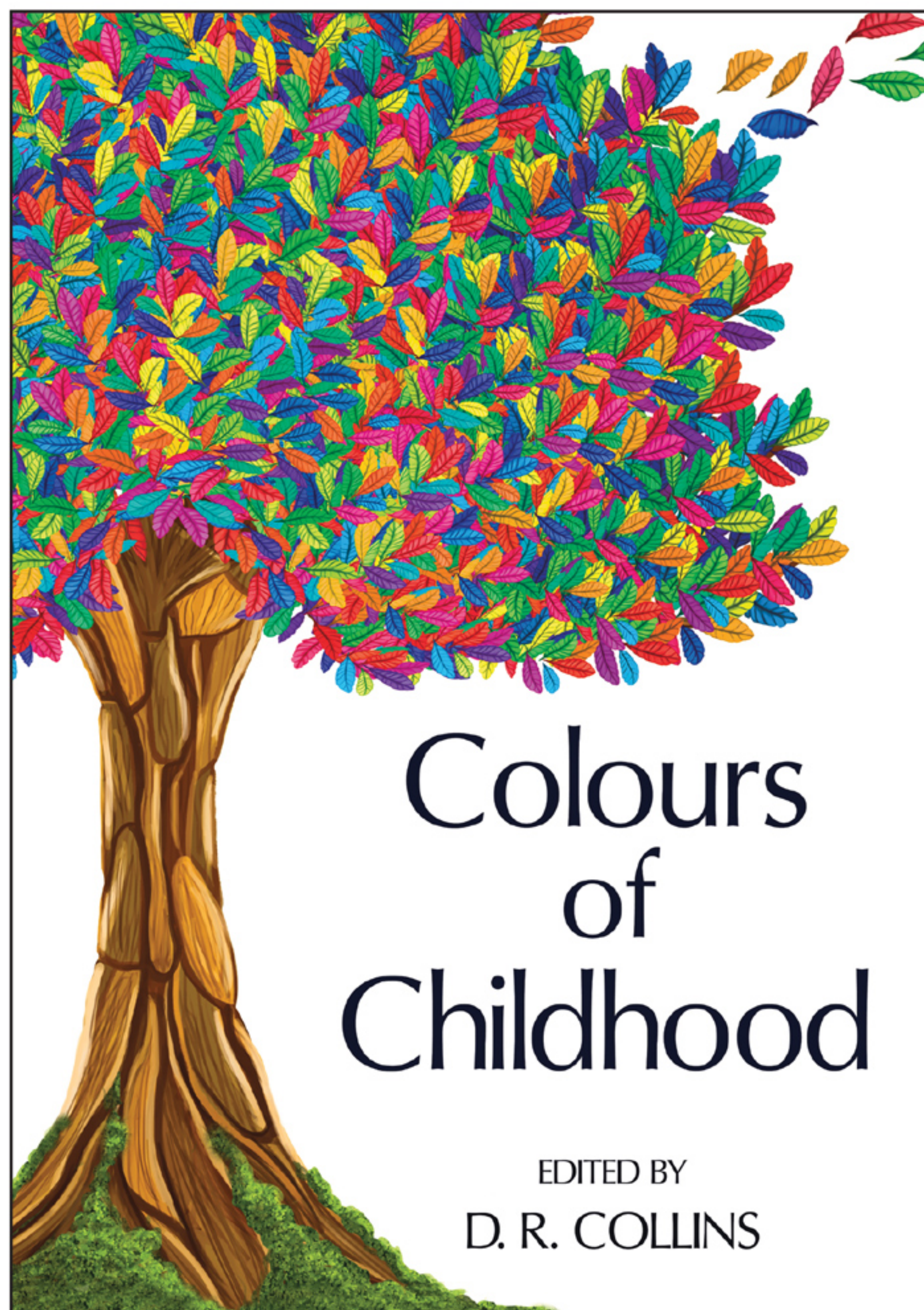
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