Title: Impact of Reduced Clinical Time on NBME and OSCE Performance in the Ob/Gyn Clerkship: A Quas-Experimental Study.

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ABSTRACT.

Background

Clinical clerkships are crucial in medical education for developing competent physicians. This study examined reduced clinical time during an Obstetrics and Gynecology (Ob/Gyn) clerkship on performance in the National Board of Medical Examiners (NBME) and Objective Structured Clinical Examination (OSCE). It arose from the need to modify curriculum due to pandemic-related restrictions such as social distancing and lockdowns.

Methods

This retrospective quasi experimental study evaluated four student groups with different clinical exposures. Group 1-7 (n=110) completed standard rotations, while Groups 8-10 had reduced clinical time: Group 8 (n=15) by 50%, Group 9 (n=19) with no clinical time but made up 2 weeks later, and Group 10 (n=14) by 17%. Reductions were supplemented with virtual learning and independent study. NBME and OSCE scores were analyzed to assess the effects of reduced clinical time on performance.

Results

Analysis using the Wilcoxon rank-sum test revealed no significant difference in NBME and OSCE scores. Groups 8 and 10 displayed slight improvements in median NBME performance, while OSCE scores varied minimally. These findings suggest that reduction in clinical experience did not affect the performance on examinations.

Conclusion

The results demonstrated no significant differences in NBME and OSCE scores when comparing the experimental groups to the control group. Confounding variables include the differences in motivation levels, varying workloads, and student's sense of burnout. Given the small sample size, the study is quite underpowered. To optimize the learning environment, future studies are recommended to collect data from other clerkships at other universities with similar curricula.

Key Words:

Medical Education, Undergraduate Medical Education, Clinical Clerkships, Curriculum, Competency-Based Education, Problem-Based Learning, Obstetrics, Gynecology, Medical Students, Health Occupations Students, Comparative Study, Evaluation Study, Multicenter Study, Clinical Competency, Educational Measurements, Academic Performances, Academic Success, Learning, Self Directed Learning as Topic, Teaching Hospital, University Hospitals, Teaching Methods, Quasi-Experimental Study, Retrospective Study, Time Management, Online Learning, Pandemics, COVID-19, Physical Distance, Nonparametric Statistics, Universities, Students, Workload, Goals, Personal Satisfaction, Fatigue, Perception.

INTRODUCTION.

Core clinical clerkships are vital to medical education, providing essential hands-on experience. Medical students' positive experience during the clinical years is crucial for several reasons, including the development of clinical skills, exam preparation, managing burnout, and making informed decisions about future specialties. Striking a balance between these aspects is particularly challenging in clerkships that demand 10 to 12-hour workdays. Clerkship directors face the difficult task of enhancing student satisfaction and well-being while acquiring medical knowledge and attaining clinical competency within these constraints.

One of the primary challenges throughout the clerkship is balancing clinical responsibilities with adequate study time. Prior to the imposed reduction in clinical hours, the Ob/Gyn clerkship at this institution involved ten to twelve-hour workdays, six days a week, with most of this time spent on the wards, in labor and delivery, and in the operating room, leaving a half-day on Friday as the only protected time dedicated to didactics and mastering Ob/Gyn topics. Medical students often express concerns about long work hours, which can impede their preparation for NBME exams; this was no exception at this medical school. The cumulative effects of extended hours, intense workloads, and fatigue significantly contribute to burnout and hinder students' ability to find sufficient time to study Ob/Gyn topics. As a result, students may develop a negative perception of their overall satisfaction with their clerkship experience.

Several studies have explored the consequences of reduced clinical time on medical student performance, providing valuable, though at times methodologically varied insights. Coronel-Couto et al. examined the impact of shortened internal medicine clerkships on the NBME examination performance and clinical experiences.[1] Their findings revealed no statistically significant difference in mean NBME scores between cohorts with traditional eight-week rotations and those with five-week rotations. However, students with shorter rotations reported fewer clinical experiences, suggesting that while exam performance may remain unaffected, the breadth of clinical exposure could be compromised. Nonetheless, the study's generalizability is limited by a relatively small sample size and single-institution design, which may hinder boarder applicability.

Monrad et al investigated the impact of a 25% reduction in overall clerkship duration (from 48 weeks to 36 weeks) on medical student performance and perceptions.[2] Specifically, the Ob/Gyn clerkship was shortened from six weeks to four and a half weeks at the University of Michigan Medical School during the 2016–2017 academic year to avoid overlapping cohorts, with no other systemic structural changes implemented. The study found no significant differences in NBME examination scores or clinical skills exam scores between shortened and traditional clerkship cohorts. The authors acknowledge that due to a variety of reasons (dual degree programs, leave of absences, etc.) the sample sizes of each cohort vary throughout the year and recognize that there were no significant differences regarding MCAT score, undergraduate GPAs and USMLE step 1 scores. All students in this study were required to take USMLE step 1 prior to entering the clerkships and took a multi-station clinical competency assessment at the completion of their clerkship year. Interestingly, perceptions of clerkship quality improved in some cases despite the reduced duration, suggesting that shorter, more focused clinical experiences could still be effective.

Similarly, Ouyang et al analyzed the effects of clerkship sequence and length on NBME examination performance in the Internal Medicine clerkship.[3] Their study discovered that completing Surgery, Pediatrics, and Family Medicine clerkships prior to the Internal Medicine examination improved scores, and the length of the clerkship positively correlated with exam performance. On average, each additional week of Internal Medicine training was associated with a 0.23-point increase in subject examination scores. Although the finding

of a dose-response relationship strengthens the conclusion, the authors did not account for differences in student preparedness or inherent academic abilities, which may confound the relationship between duration and performance. This indicates that both the sequence and duration of clinical rotations may be crucial for exam preparation.

Additionally, Harris et al conducted a retrospective cohort analysis to explore the relationship between student duty hours during an Ob/Gyn clerkship and exam performance.[4] Students recorded their duty hours, which were compared with their NBME subject examination score percentiles. The study defined "long" hours as those exceeding the 75th percentile of weekly duty hours. They found that longer duty hours, with the 75th percentile being 47.1 hours per week, did not correlate with higher shelf exam scores or overall clerkship grades. However, students who worked longer hours during the final two weeks of the rotation, with the 75th percentile being 55.2 hours in the fifth week and 36.9 hours in the sixth week, performed better on the end-of-rotation NBME Ob/Gyn subject examination. These results prompt consideration of how recent, concentrated clinical exposure may influence exam performance; however, the reliance on self-reported duty hours may lead to recall bias and potential misclassification.

In surgery, Myers et al found that heavier clinical loads and less self-study time correlated with higher NBME Surgery subject examination scores.[5] Conversely, lighter clinical loads did not result in higher scores despite increased self-study time, highlighting the importance of hands-on clinical experience in surgical education. Barnum et al discovered that the average number of hours worked per week during the surgical clerkship did not correlate with students; NBME Subject examination scores, clinical performance evaluations, or final clerkship grades of honors.[6] The conflicting findings between these two studies may reflect variation in how workload was measured, differences in institutional culture, or unmeasured student-level variables such as motivation or resilience. This suggests that the quality of clinical exposure may be more critical than the quantity.

On January 30th,2020 the World Health Organization (WHO) declared the outbreak of COVID-19 to be a public health emergency of international concern.[7] The COVID-19 pandemic not only affected public health but also disrupted education at all levels, including graduate and professional schools. In response to the COVID-19 pandemic, the AAMC issued guidance on March 17th, 2020, recommending that all medical schools suspend their clinical rotations [8]. Medical education faced challenges due to lockdowns and social distancing measures, which hindered students' access to hospitals and hands-on training essential for their development as physicians. These restrictions significantly impacted the ability to teach critical skills and provided fewer opportunities for students to practice the art of patient care, which is vital for their performance on standardized exams integral to medical school evaluation.[9-12]

Noel et al. conducted a retrospective cohort study at the University of Hawai'i to assess the impact of these changes.[13] They found that while clinical exposure—measured by patient logs—declined significantly for Ob/Gyn and other clerkships, NBME subject exam scores did not decline and even improved in some specialties. Notably, students affected by COVID performed worse on physical exam components of the OSCE but better on notetaking and USMLE Step 2 CK, suggesting that increased study time and alternative learning formats may have partially compensated for lost clinical time. However, Ob/Gyn clerkship grades were significantly lower in the COVID-affected cohort, possibly due to decreased in-person learning without adequate grading modifications.

The pandemic prompted rapid adaptations in medical education. Krasowski et al documented adjustments to preclinical medical school curricula in response to COVID-19 restrictions, emphasizing the integration of remote

learning strategies.[9]Similarly, Sohrabi et al reviewed the broader implications of the outbreak, highlighting the global challenges faced by educational institutions.[7] Watson et al advocated for innovative teaching methods to ensure the continuity of medical training during these unprecedented times.[10] Although informative , many of these studies are descriptive and lack rigorous pre-post evaluation designs, making it difficult to isolate the effect of specific interventions. Internationally, the impact of the pandemic on medical education was also notable. Bongomin et al described the disruptions in clinical learning experiences at Makerere University in Uganda, including reduced opportunities for outpatient and emergency care, limited interactions with nurses, fewer peer discussions, and decreased exposure to physical examinations, and ward procedures.[11] Similarly, Tzeng et al evaluated the impact on Objective Structured Clinical Examination (OSCE) performance among Taiwanese medical students, noting that those affected by the pandemic performed worse compared to their pre-pandemic peers.[12] These findings, while compelling, must be interpreted with caution as they are highly context-specific and influenced by regional healthcare infrastructure, student resilience, and local curriculum design. The literature collectively reveals that the impact of reduced clinical time is complex and varies across disciplines, institutions, and geographic settings. Methodological inconsistencies, such as differences in sample size, confounding variables, and study design, limit direct comparisons. The COVID-19 pandemic has offered insights and opportunities for innovative adaptations and strategic changes in medical education, helping to mitigate the negative impacts on student performance. This study aims to contribute to this body of knowledge by examining how changes to the Ob/Gyn clerkship curriculum at Loma Linda University School of Medicine during the COVID-19 pandemic impacted the NBME Ob/Gyn subject examination and the OSCE examination, specifically by evaluating the effect of reduced clinical rotations on these student performance exams.

METHODS.

Study Design

The Ob/Gyn clerkship director conducted this quasi-experimental retrospective study at a large academic medical center in Southern California from March 2020 to June 2020. As these clerkship curriculum changes were forced restrictions instituted due to the pandemic, there was no voluntary consent to be part of this retrospective study. This study was reviewed by the Loma Linda University Institutional Review Board and deemed exempt from IRB oversight as it involved retrospective analysis of de-identified student performance data (IRB# 5250403).

The outcomes of the changes were retrospectively evaluated. The primary objective was for third-year MD students completing their Ob/Gyn rotation during this unprecedented time was to acquire a general understanding of caring for Ob/Gyn patients and perform well on standardized assessments, despite reduced or absent clinical exposure due to COVID-19 regulations. During the study period, the medical school had ten Ob/Gyn rotations per year, each lasting six weeks. This retrospective aimed to assess and compare NBME Ob/Gyn shelf examination and the OSCE scores among four distinct groups: Group 1-7 (control groups n=110), which received the standard clinical rotation as per LCME requirements, and Group 8 (n=15), 9 (n=19, & 10 (n=14), which had a modified curriculum due to reduced or absent clinical experiences. NBME and OSCE scores were evaluated after the six-week rotation. A quasi-experimental design was used to investigate the differences and similarities in overall standardized scores.

Participants

The class of 2021 third year medical students at Loma Linda University School of Medicine (LLUSM) enrolled in ten separate blocks of six-week Ob/Gyn rotations were included in the study; students in other classes were excluded. The School of Medicine LIFE Community Director prior to the start of the freshman year assigns students into LIFE Community Groups of around ten students with a LIFE Community Mentor. These assignments are based on race, religion, gender, values they mentioned in their application and the college or university students graduated from in an attempt to balance the groups. They are not based on academic status, professional status, or specialty interest. Students were randomly assigned to third year tracks unrelated to the life group they had been assigned to. Prior to the start of each block, in general, there is no shared information about students from prior clerkships already completed. The only information that is shared is if a student has failed greater than 1 NBME to enable these students to be provided additional support. LLUSM students rotate through five sites for the Ob/Gyn clerkship: Loma Linda University Health, Riverside University Hospital System, Adventist Health White Memorial in Los Angeles, AdventHealth in Orlando and Kettering Health Systems in Dayton, Ohio. Each year, the OBGYN clerkship along with all the other clerkships analyzes the comparability of the NBME and OSCE scores along with the student's evaluation of the learning environment for each site. Although there are relatively small numbers at sites other than the main campus, there were no statistical differences in any of the data points for each of the sites for the class of 2021.

Study groups & Interventions

The study involved four main groups:

(1) Groups 1-7, (n=110) (Control Group): This group followed the standard LCME-approved curriculum for the Ob/Gyn third-year medical clerkship. It consisted of six ten-to-twelve-hour days per week in the clinic or hospital, divided equally between Ob and Gyn. In addition, students attended four hours of didactics weekly and a one-hour journal club per rotation. They were required to complete 540 uWise questions, a question bank with clinical vignettes linked to the 11th edition of the APGO Medical Student Educational Objectives.

(2) Group 8, (n=15): This group followed Curriculum A, an independent learning and online program, with a 50% reduction in clinical time, resulting in a total of three weeks less clinical time during the Ob/Gyn clerkship.

(3) Group 9, (n=19): This group followed Curriculum B, an independent learning and online program, with no clinical time. However, students were required to make up two weeks of clinical time in their senior year.

(4) Group 10, (n=14): This group followed Curriculum B with a 17% reduction in clinical time, totaling one week less clinical time. Once COVID-19 restrictions were lifted, Group 10 returned to the clinical component of their rotations, resuming the standard experience as in Groups 1-7

A 33-year-old woman, gravida 1, para 1, spontaneously delivers a 2460-g (5 lb 7oz) female newborn at 38 weeks' gestation. The newborn has hepatosplenomegaly, patent ductus arteriosus, and cataracts. At 8 weeks' gestation the mother developed a maculopapular rash, enlarged cervical lymph nodes, sore throat, and arthralgias that spontaneously resolved in 1 week. The subsequent prenatal course was uncomplicated. Which of the following tests during pregnancy is most likely to have predicted the findings in the fetus?

A. Amniocentesis to determine karyotype
B. Culture for herpes simplex virus
C. Serial rubella titers
D. Urinalysis for cytomegalovirus
E. VDRL test

Remember to provide rationale why the answer is right and why the others are wrong. Do not circle the correct answer; instead indicate it in the explanation.

RESULTS.

Third-year medical students at Loma Linda University were randomly assigned into four groups

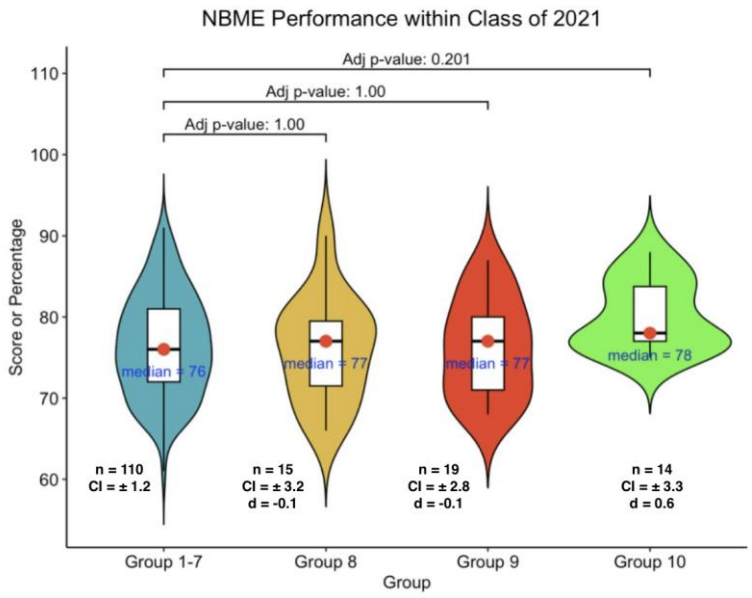
1. Group 1-7, the designated control group, underwent the full six-week Ob/Gyn clerkship.
2. Group 8 had clinical time reduced by half for a total of three weeks of the six-week Ob/Gyn clerkship.
3. Group 9 had participated in zero weeks of clinical activity during the Ob/Gyn clerkship.
4. Group 10 had clinical time reduced by one week, underwent five weeks of the six-week Ob/Gyn clerkship.

Statistical analysis was performed using the Wilcoxon rank sum test which is the nonparametric equivalent of the paired t-test. A predetermined p-value of 0.05 was used to compare the adjusted p-values of the test groups to the control. The descriptive statistics of the Median and Interquartile range (IQR) were used to summarize standardized NBME and OSCE scores for each study group.

NBME Performance

Comparing Groups 8, 9, and 10 to the control group, a slight increase in the median NBME performance was appreciated. Group 8 and 9 had a one-point average increase in median performance while Group 10 had a two-point average increase when compared to Group 1-7. Using the Wilcoxon test, the adjusted p-value for Group 8, 9, and 10 were respectively 1.00, 1.00, and 0.201 **(Figure 3)**. As the predetermined p-value was 0.05, there was no statistical difference between the groups as it relates to the performance on the NBME. Cohen's d were –0.1, -0.1, and 0.6 for group 8, 9, and 10 respectively. This indicates a very small negative effect size for group 8 and 9, when compared to control group 1-7, likely statistical noise. Medium to large effect size for group 10, which suggests a moderately strong improvement compared to control group 1-7. However, CI +/- 1.2 implies none of the effects are statistically significant, possibly due to small sample sizes and/or high variability.

Figure 3. Comparison of NBME performances based on percentage between groups of students from the Class of 2021 with differing amounts of clinical time, displaying adjusted p-values, confidence intervals and effect size for pairwise comparisons and median scores for each group.

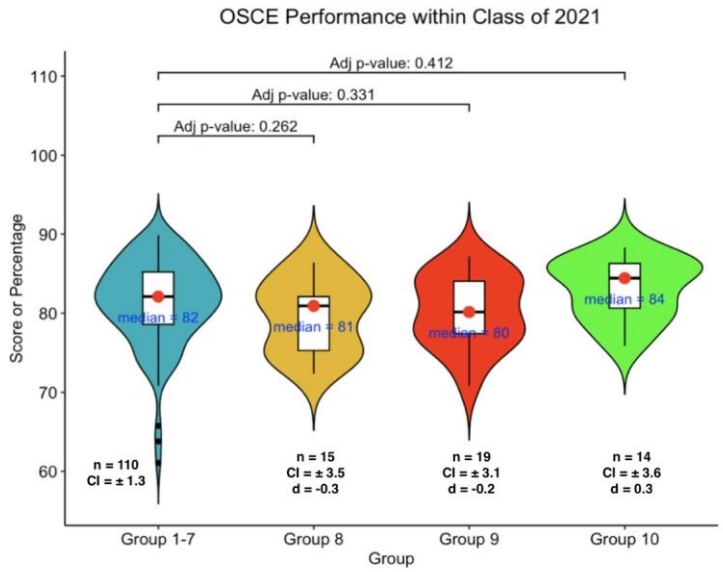


OSCE Performance

Unlike the slight increase in NBME performance comparing Groups 8, 9, and 10 to the control, the OSCE performance of Groups 8 and 9 demonstrated a decrease in median scores when compared to the control group. Group 10 exhibited an increase compared to the control group. The control group scored a median of 82% on the OSCE. Group 8 scored a median of 81%, Group 9 scored a median of 80%, and Group 10 scored a median of 84%. A predetermined p-value of 0.05 was used to determine statistical significance and the Wilcoxon Rank Sum test determined the adjusted p-values for Groups 8, 9, and 10 which were respectively 0.262, 0.331, and 0.412 **(Figure 4).** This indicated that a reduction in clinical time did not yield a statistically significant change in OSCE performance. Cohen's d were –0.3, -0.2, and –0.3 for group 8, 9, and 10 respectively. This indicates small negative effect size for group 8, 9, and 10, when compared to control group 1-7. However, given CI +/-0.3, the effect is likely negligible.

For both OSCE & NBME performances, there are no baseline comparability or adjustment for potential covariates such as GPA, step 1 score, or rotation order, which can be confounding factors for these results.

Figure 4. Comparison of OSCE performances between groups of students from the Class of 2021 with differing amounts of clinical time, displaying adjusted p-values, confidence intervals and effect size for pairwise comparisons and median scores for each group.



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DISCUSSION.

The results of our quasi-experimental retrospective study of third year medical students revealed no significant differences in NBME and OSCE scores between the experimental groups with reduced clinical time and the control groups. This finding suggests that a clerkship with reduced or no clinical time does not negatively impact students' median NBME score or OSCE performance. Our results challenge the traditional assumption that increased clinical exposure leads to improved standardized exam scores.

The lack of significant differences in OSCE and NBME scores despite reduced clinical time offers an opportunity to consider re-evaluating and potentially modifying the third-year Ob/Gyn clerkship.

Because this quasi-experimental retrospective study obtained data from a single medical school site rotating through the six-week Ob/Gyn clerkship, the study is considerably underpowered leading to a greater Type II error given the small sample size. Additionally, confounding factors include students rotating at one of five clinical sites, which while required to provide the same amount of clinical time, students may have varying expectations placed on them by residents and attendings and variable patient loads. Moreover, the students may have different motivations in studying for the Ob/Gyn NBME and OSCE. This may have been affected by their personal exposures to illnesses such as COVID-19, difference in at-home responsibilities leading to discrepancies in time dedicated to studying amongst students, or their level of burn out depending on the third-year rotation order. The particular factors utilized in placement of students into specific LIFE Community Groups which invariably led to varying levels of camaraderie, peer support and mentor involvement may be an additional confounding factor.

We propose that curricula incorporating interactive components and additional learning tools that cater to students' learning styles while prioritizing student well-being by balancing clinical time with dedicated study periods, students can create an optimal learning environment, reducing the stress associated with prolonged clinical exposure. While clinical care is essential for developing competent physicians, our results indicate that more clinical time does not necessarily correlate with better exam performance.

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Implementing these changes could lead to a more balanced and less stressful clerkship experience, potentially improving overall student satisfaction and well-being without compromising educational outcomes. Overall, future studies may include a pre-clerkship and post-clerkship survey to account for students' level of burnout, an analysis of students' pre-clinical test scores (e.g., GPA, pre-clinical block scores, Step 1 score), and a review of site variation in expectations and workload. Moreover, to increase the power and thus the ability to increase generalizability, future studies may include data collected on students rotating through different clerkships in this study's medical school but also other medical schools with similar curricula. This is additionally suggested by the low external validity demonstrated amongst experimental groups.

Further studies should investigate the long-term impact of reduced clinical time on the mastery of clinical skills and patient care competency. However, our study indicating that reducing clinical time does not decrease OSCE or NBME scores serves as a launching point for rethinking and re-innovating medical education to better support future physicians.

Appendix:

Curriculum A

Due to COVID-19 regulations, students in Group 8 were removed from clinical rotations and were given Curriculum A as an independent learning and online replacement. They were required to complete seven distinct tasks to enhance their understanding and application of core clinical cases and Ob/Gyn principles. Student requirements included:

(1) *Core Clinical Cases:* Write up 35 core clinical cases, each spanning one page and formatted as single-spaced documents. These cases included 15 obstetric cases, 15 gynecological cases, and five gynecological cancer cases.

(2) *uWise Questions:* In addition to the required 540 uWise questions, students were required to complete an additional 150 comprehensive uWise questions and provide evidence of completion to the clerkship coordinator.

(3) *Ob/Gyn Uworld Questions:* Complete approximately 470 Ob/Gyn Uworld questions and provide proof of completion. The workload was divided weekly to help students stay on track. Uworld is a leading question bank with detailed explanations and educational objectives.

(4) *Association of Professors of Gynecology and Obstetrics (APGO) Videos:* Watch 46 educational videos prepared by APGO, ranging from three to 11 minutes, covering topics in low and high-risk Ob/Gyn, benign gynecology/ female pelvic medicine and reconstructive surgery (FPMRS), gynecology oncology and reproductive/endocrine/infertility. Students were also required to watch one YouTube or Netflix documentary on COVID-19's impact on pregnant women. A complete list of videos and topics is provided in **Table 1.**

(5) *OB CaseX Interactive Patient Encounters:* Engage in eight OB CaseX interactive patient encounters on the OnlineMedEd website, providing a brief critique for each case. CaseX includes interactive pre-recorded videos with patient scenarios, backgrounds, vitals, and imaging studies, guiding students through diagnosis and treatment.

(6) *Reading Assignment:* Read Beckmann's & Ling's Obstetrics and Gynecology (8th edition) in its entirety. This textbook provides foundational knowledge for Ob/Gyn rotation, national standardized exams, and competent patient care.

(7) *Video-based Test Questions:* Develop 47 unique test questions, one for each video, and an additional question on the impact of coronavirus on pregnancy. Questions must adhere to NBME style, including a stem and four to five answer options, with detailed explanations for correct and incorrect answers. Test questions were reviewed by the clerkship director, and feedback was provided to students. An example test question was also provided as shown in **Figure 1**.

Table 1: All 36 APGO-Prepared Videos by Category, Topic, Educational Objective and Duration, Available on the APGO YouTube Channel.

Category	Topic	Objective #	Duration (min)
Low-risk Obstetrics & Gynecology (n=9)	Maternal-fetal physiology	8	10
	Antepartum care	10	8
	Intrapartum care	11	8
	Postpartum care	13	6
	Lactation	14	8
	Preeclampsia	18	7
	Abnormal labor	22	11
	Postpartum hemorrhage	27	7
	Postpartum infection	28	4
High-risk Obstetrics & Gynecology (n=10)	Alloimmunization	4	8
	Aneuploidy	5	10
	Multifetal gestation	20	4
	Third trimester bleeding	23	4
	Preterm labor	24	9
	Premature rupture of membranes	25	7
	Intrapartum fetal surveillance	26	9
	Anxiety & Depression	29	10
	Post-term pregnancy	30	6
	Fetal growth abnormalities	31	4
Reproductive / Endocrinology / Infertility (n=9)	Preconception	9	8
	Puberty	42	7
	Amenorrhea	43	5
	Hirsutism	44	8
	Normal/Abnormal uterine bleeding	45	9
	Dysmenorrhea	46	3
	Menopause	47	6
	Infertility	48	9
	Premenstrual syndrome	49	3
Benign Gynecology / Female Pelvic Medicine & Reconstructive Surgery (n=10)	History	1	8
	Preventative care	7	10
	Ectopic pregnancy	15	4
	Spontaneous abortion	16	4
	Family planning	33	9
	Vulvar & Vaginal disease	35	7
	Sexually transmitted infections	36	9
	Pelvic floor disorders	37	10
	Endometriosis	38	6
	Chronic pelvic pain	39	4
Gynecology / Oncology (n=8)	Pap smear	3	4
	Disorders of the breast	40	7
	Gestational Trophoblastic Disease	50	5
	Vulvar neoplasia	51	5
	Cervical Disease & Neoplasia	52	9
	Leiomyoma	53	7
	Endometrial hyperplasia & Cancer	54	8
	Ovarian Neoplasia	55	6

Figure 1. Example of an NBME-style question that was provided by the clerkship director, used as a guideline for students to create mandatory practice test questions during their clerkship.

> A 33-year-old woman, gravida 1, para 1, spontaneously delivers a 2460-g (5 lb 7oz) female newborn at 38 weeks' gestation. The newborn has hepatosplenomegaly, patent ductus arteriosus, and cataracts. At 8 weeks' gestation the mother developed a maculopapular rash, enlarged cervical lymph nodes, sore throat, and arthralgias that spontaneously resolved in 1 week. The subsequent prenatal course was uncomplicated. Which of the following tests during pregnancy is most likely to have predicted the findings in the fetus?
>
> A. Amniocentesis to determine karyotype
> B. Culture for herpes simplex virus
> C. Serial rubella titers
> D. Urinalysis for cytomegalovirus
> E. VDRL test
>
> Remember to provide rationale why the answer is right and why the others are wrong. Do not circle the correct answer; instead indicate it in the explanation.

Curriculum B

Groups 9 and 10 were required to complete ten distinct tasks to enhance their understanding and application of core clinical cases and principles in Ob/Gyn. Modifications were made to Curriculum A: the number of test questions students needed to write was reduced from 47 to five, as the original requirement was deemed excessive for Group 8 and challenging for the clerkship director to review comprehensively.

Additionally, participants were required to write 10 reflection paragraphs per week on each APGO videos, attended weekly test review sessions, and participated in a two-hour team-based learning session each week. Requirements 1-6 are the same as in Curriculum A, while requirements 7-10 are alterations or additions.

(1) *Core Clinical Cases*
(2) uWise
(3) Ob/Gyn *Uworld Questions*
(4) *APGO and COVID-19 Videos*
(5) *OB CaseX Interactive Patient Encounters*
(6) *Reading Assignment*
(7) *Video Reflections:* Write a paragraph on each of the 46 APGO videos and submit 10 reflections by the end of each week on Friday.
(8) Test Question Creation: Develop five, as opposed to 47, test questions from assigned chapters in the reading, adhering to NBME style, and providing detailed explanations of why the correct answer is right and why the others are incorrect.
(9) *Test Question Review Session:* Attend a weekly test question review session where a compilation of 19 student-written test questions were reviewed and discussed with the clerkship director.
(10) *Team Based Learning (TBL) sessions:* Attend weekly two-hour sessions via zoom. Participants were provided with reading material that must be studied ahead of time and expected to come prepared for a 15-minute individual readiness quiz (iRAT) followed by a 10-minute team readiness test (tRAT). A discussion of the quiz questions and topic followed for 20-25 minutes. The final component involved one to three complicated cases related to the topic with questions on presentation, workup, and

treatment. Students discussed these in a small group breakout room then finally within the whole group with the facilitator (**Figure 2).** The topics for the TBL were hypertensive disorders in pregnancy, first trimester bleeding, third trimester bleeding, abnormal uterine bleeding, and primary amenorrhea. TBL, originally designed by Professor Larry Michaelsen in the 1980s for business school, is defined as an active learning and small group instructional strategy that provides students with opportunities to apply conceptual knowledge through a sequence of activities that includes individual work, teamwork, and immediate feedback.

Figure 2. Flowchart of the steps involved in a Team-Based Learning session.

Caption: Reproduced from Burgess A et al., *Team-Based Learning: Design, Facilitation, and Participation*, BMC Medical Education, 2020. Licensed under CC BY 4.0 https://creativecommons.org/licenses/by/4.0/.

Clinical Time Makeup for Group 9

Group 9 was required to undergo two weeks of clinical time makeup during their fourth year of medical school, one week focusing on obstetrics and the other week on gynecology. Although not meant to completely replace the missed clinical components of the rotation, the goal was to give medical students an introduction to the varied clinical experience while ensuring a balanced workload during the limited time available during the medical school curriculum.

The first week had the following specifications:

- One full day or at least a half-day at a local federally qualified health clinic (FQHC). If only a half-day was spent at the FQHC clinic, another clinic experience was scheduled for the remaining half-day.
- Two days of inpatient low risk obstetrics.
- Two days of inpatient high-risk obstetrics.

The second week had the following specifications:

- Two days on benign gynecology or urogynecology female pelvic medicine and reconstructive surgery (FPMRS).
- One day of FPMRS, benign gynecology or gynecology clinic.
- Two days of gynecology oncology.

SUMMARY - ACCELERATING TRANSLATION

Title: Impact of Reduced Clinical Time on NBME and OSCE Performance in the Ob/Gyn Clerkship

Main problem to solve: Medical clerkships are essential in preparing students for clinical practice and standardized exams. However, the COVID-19 pandemic introduced unique challenges by limiting hands-on clinical exposure due to restrictions like social distancing and lockdowns. This raised concerns about the potential impact on student performance in standardized evaluations like the National Board of Medical Examiners (NBME) and Objective Structured Clinical Examinations (OSCE).

Aim of the Study: To assess the effects of reduced clinical time on the performance of third-year medical students in NBME and OSCE exams during their Obstetrics and Gynecology (Ob/Gyn) clerkship and to explore alternative methods of ensuring competency without compromising student well-being.

Methodology: This study included third-year medical students from Loma Linda University divided into four groups based on their level of clinical exposure during the Ob/Gyn clerkship:

- Group 1, (n=110)(Control): Standard six-week clinical rotation.
- Group 8, (n=15) Clinical time reduced by 50%.
- Group 9, (n=19): No clinical time, with two weeks of clinical makeup in their senior year.
- Group 10,(n=14):Clinical time reduced by 17%.

Students with reduced clinical time participated in either curriculum A or B which included virtual learning modules, independent study, and other alternative educational activities, such as completing case studies, APGO videos, and question bank exercises. Exam scores for NBME and OSCE were analyzed using statistical tests to determine differences among the groups.

Results:

- NBME Scores: Groups with reduced clinical time demonstrated slight improvements in median NBME scores (1-2 points higher), but these differences were not statistically significant.
- OSCE Scores: Variability in OSCE scores was observed, with slight declines in Groups 8 and 9 compared to the control, while Group 10 showed a marginal improvement. None of the changes reached statistical significance.

Conclusion: Reduced clinical time was not associated with statistically significant performance differences in the NBME nor OSCE exams in the students who had reduced clinical time compared to those who completed the standard rotation in this Quasi-experimental study. Furthermore, the effect size of the curriculum change was insignificant. However, it was reassuring to see that with the reduction in clinical time in this small sample size study, there was no statistically significant decrease in the NBME nor OSCE scores. While clinical exposure remains crucial for skill development, the findings possibly challenge the assumption that more clinical hours directly correlate with better exam performance. This suggests the possibility that alternative, approaches to curriculum design—emphasizing flexibility, independent learning, and student well-being replacing some of the time spent in clinicals may maintain academic outcomes and improve student satisfaction with the clerkship.

Further research is recommended to explore long-term effects on clinical competency and to refine individualized learning plans that accommodate diverse learning preferences while ensuring comprehensive training.

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FIGURES AND TABLES.

Figure 1. Example of an NBME-style question that was provided by the clerkship director, used as a guideline for students to create mandatory practice test questions during their clerkship.

A 33-year-old woman, gravida 1, para 1, spontaneously delivers a 2460-g (5 lb 7oz) female newborn at 38 weeks' gestation. The newborn has hepatosplenomegaly, patent ductus arteriosus, and cataracts. At 8 weeks' gestation the mother developed a maculopapular rash, enlarged cervical lymph nodes, sore throat, and arthralgias that spontaneously resolved in 1 week. The subsequent prenatal course was uncomplicated. Which of the following tests during pregnancy is most likely to have predicted the findings in the fetus?

A. Amniocentesis to determine karyotype
B. Culture for herpes simplex virus
C. Serial rubella titers
D. Urinalysis for cytomegalovirus
E. VDRL test

Remember to provide rationale why the answer is right and why the others are wrong. Do not circle the correct answer; instead indicate it in the explanation.

Figure 2. Flowchart of the steps involved in a Team-Based Learning session.

Caption: Reproduced from Burgess A et al., *Team-Based Learning: Design, Facilitation, and Participation*, BMC Medical Education, 2020. Licensed under CC BY 4.0 https://creativecommons.org/licenses/by/4.0/.

Figure 3. Comparison of NBME performances based on percentage between groups of students from the Class of 2021 with differing amounts of clinical time, displaying adjusted p-values for pairwise comparisons and median scores for each group.

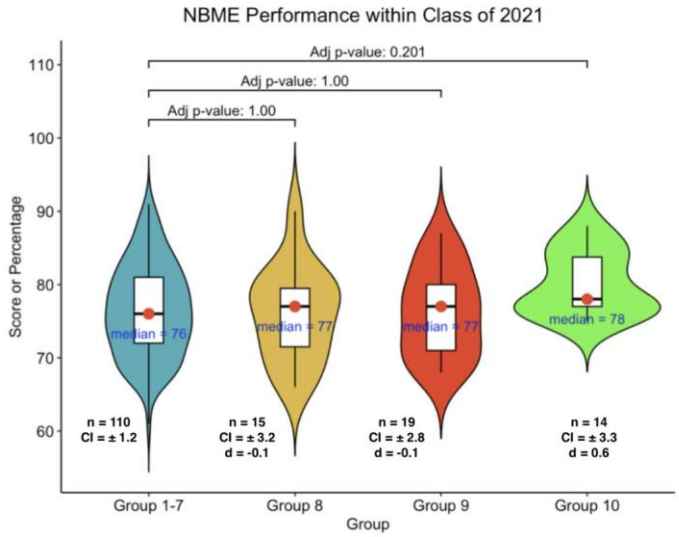

Figure 4. Comparison of OSCE performances between groups of students from the Class of 2021 with differing amounts of clinical time, displaying adjusted p-values for pairwise comparisons and median scores for each group.

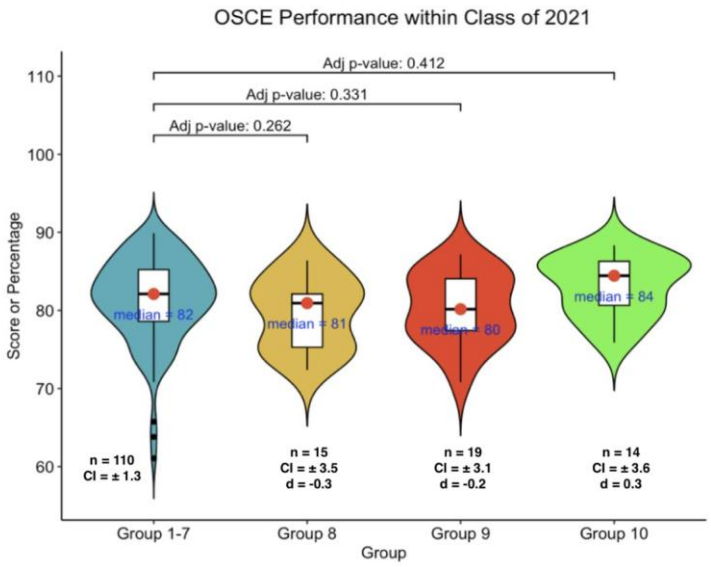

Table 1. All 36 APGO-Prepared Videos by Category, Topic, Educational Objective and Duration, Available on the APGO YouTube Channel.

Category	Topic	Objective #	Duration (min)
	Maternal-fetal physiology	8	10
	Antepartum care	10	8

	Intrapartum care	11	8
	Postpartum care	13	6
Low-risk Obstetrics & Gynecology (n=9)	Lactation	14	8
	Preeclampsia	18	7
	Abnormal labor	22	11
	Postpartum hemorrhage	27	7
	Postpartum infection	28	4
	Alloimmunization	4	8
	Aneuploidy	5	10
	Multifetal gestation	20	4
	Third trimester bleeding	23	4
	Preterm labor	24	9
High-risk Obstetrics & Gynecology (n=10)	Premature rupture of membranes	25	7
	Intrapartum fetal surveillance	26	9
	Anxiety & Depression	29	10
	Post-term pregnancy	30	6
	Fetal growth abnormalities	31	4
	Preconception	9	8
	Puberty	42	7
	Amenorrhea	43	5
Reproductive / Endocrinology / Infertility (n=9)	Hirsutism	44	8
	Normal/Abnormal uterine bleeding	45	9
	Dysmenorrhea	46	3
	Menopause	47	6
	Infertility	48	9
	Premenstrual syndrome	49	3
	History	1	8
	Preventative care	7	10
	Ectopic pregnancy	15	4
	Spontaneous abortion	16	4
Benign Gynecology / Female Pelvic Medicine & Reconstructive Surgery (n=10)	Family planning	33	9
	Vulvar & Vaginal disease	35	7
	Sexually transmitted infections	36	9
	Pelvic floor disorders	37	10
	Endometriosis	38	6
	Chronic pelvic pain	39	4
	Pap smear	3	4
	Disorders of the breast	40	7
	Gestational Trophoblastic Disease	50	5
Gynecology / Oncology (n=8)	Vulvar neoplasia	51	5
	Cervical Disease & Neoplasia	52	9
	Leiomyoma	53	7
	Endometrial hyperplasia & Cancer	54	8
	Ovarian Neoplasia	55	6

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