

The Impact of a Longitudinal Curriculum on Medical Student Obstetrics and Gynecology Clinical Training

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Abstract

Clinical training in most medical schools consists of separate rotations, based out of tertiary-care facilities, across the core medical disciplines. In addition to a traditional clinical curriculum, the University of Hawai'i offers a longitudinal clinical curriculum as an option to medical students. The longitudinal curriculum provides students with an innovative, alternative educational track to achieve their educational goals in clinical medicine. The objective of this study was to describe the obstetrics and gynecology procedural experiences of third-year medical students who participated in a longitudinal curriculum versus a traditional block clerkship. The number of procedures reported by third-year medical students who participated in a non-traditional, longitudinal clerkship was compared with the number of procedures reported by students who participated in the traditional block third-year curriculum between July 2007 and June 2009. National Board of Medical Examiners (NBME) subject scores, clerkship grade and chosen residency specialty were also compared. The mean number of pelvic exams (longitudinally-trained 36 [SD 33] versus block-trained 8 [SD 6], [t=4.3, P<.01]) and pap smears (longitudinally-trained 28 [SD 26] versus block-trained 7 [SD 3] [t=4.4, P<.01]) was significantly higher for longitudinally-trained students compared to block-trained students. No significant differences in overall clerkship grades or NBME shelf scores emerged.

Keywords

obstetrics, gynecology, clerkship, medical student, curriculum

Introduction

In the United States, a medical student's third-year of training usually consists of separate rotations across the basic clinical disciplines of medicine including Obstetrics and Gynecology, Surgery, Internal Medicine, Family Medicine, Pediatrics, and Psychiatry. Rotations typically last for four- to eight-weeks and are based out of tertiary-care facilities in urban settings. Medical educators have criticized this traditional curriculum for its lack of continuity and focus on hospital-based care¹⁻³

Instead of a traditional third-year clerkship, medical students at the University of Hawai'i John A. Burns School of Medicine can participate in a longitudinal curriculum in which students spend six continuous months in the ambulatory setting and six continuous months in a hospital-based setting. During the ambulatory portion of the clerkship, students spend one half-day each week with a preceptor in each of the major disciplines including Family Medicine, Internal Medicine, Obstetrics and Gynecology, Pediatrics, Psychiatry, and Surgery. During the hospital-based portion of the rotation, longitudinal students participate in abbreviated focused rotations in all of the above disciplines except Family Medicine.⁴

The longitudinal curriculum seeks to more accurately mimic the actual practice of physicians, particularly primary care physicians. Previous studies at other institutions have demonstrated that students who participate in this type of curriculum are

more likely to choose a career in primary care and establish a practice in a rural setting.^{1,6}

The longitudinal curriculum emphasizes patient- and learner-centered education.^{3,5} In the longitudinal curriculum, students follow patients over six months allowing them to better understand chronic illness and patient-physician relationships.¹ Preceptors in the longitudinal curriculum also interact with students over six months which is hypothesized to result in greater trust in the students' abilities and greater investment in their education.

Although the number of medical schools offering a longitudinal curriculum is increasing, no studies have compared the procedural experience of students who participate in a longitudinal curriculum versus a traditional curriculum.⁶ Some studies have shown that longitudinally-trained students score similarly on clinical evaluations compared to their traditionally block-trained counterparts.^{4,6} The objective of this study was to describe the obstetrics and gynecology procedural experiences of third-year medical students who participated a traditional block clerkship versus a longitudinal curriculum.

Study Design

This study was granted exempt status from the University of Hawai'i Institutional Review Board. A de-identified database of all third-year medical students rotating through the obstetrics and gynecology clerkships at the University of Hawai'i (Honolulu, HI) between July 2007 and June 2009 was used for analysis. All third-year medical students are required to record the number of pelvic examinations, obstetric deliveries, and surgical procedures they participate in during their rotation. Students can either log procedures through a personal digital assistant (PDA) program or via an online computer program.

The primary objective was to compare the number of pelvic examinations performed by students in the longitudinal curriculum to students in the traditional block curriculum. Pelvic examination was selected as the primary outcome because it was thought to be the most important clinical tool for medical students to learn while on rotation. Although vaginal deliveries and hysterectomies are critical surgical procedures for Obstetrician, Gynecologists, many different kinds of physicians including Internists, Family Medicine Physicians, Emergency Department Physicians, and Pediatricians may be required to perform pelvic examinations in their clinical practice. Secondary objectives were to compare the number of Pap smears collected and the number of vaginal deliveries, Cesarean sections, hysterectomies and laparoscopies that students participated in.

Demographic data, clerkship grades, National Board Medical Examiner (NBME) shelf scores and eventual residency specialty were also compared.

Approximately twice as many students participate in the traditional block curriculum compared to the longitudinal curriculum. Thus, unequal group sizes were anticipated. A difference of 5 pelvic examinations was deemed to represent a clinically significant difference and a standard deviation of 5.0 based on previously calculated procedural averages was anticipated. Sample size calculations determined 50 students in the block-trained group and 22 students in the longitudinally-trained group were needed to demonstrate this difference (80% power, significance of 0.05). In order to fulfill the sample size calculation, data for two consecutive academic years (2007-08; 2008-09) was used. T-tests were used to compare procedural numbers and test scores between longitudinally-trained versus the block-trained students. Prior to analysis, a natural log transformation was applied to non-normally distributed data to address distributional assumptions. Chi-Square Tests and Fisher's Exact Tests were used to determine the significance of association for categorical variables. All analyses were performed with SPSS version 16.0 (Chicago, Illinois).

Results

Twenty-eight students completed the longitudinal curriculum and 94 completed the block curriculum. The longitudinally-trained and block-trained groups were similar in terms of age and gender (Table 1). The mean age for the longitudinally-trained group was 27 (SD 3) years compared to 27 (SD 3) in the block-trained group ($t=0.59$, $P=.95$). More than half of students in both groups were female, including 52% of students in longitudinally-trained group and 60% of students in the block-trained group (Chi Square=0.64, $P=.55$). All continuous variables with the exception of pelvic examinations and

pap smears were normally distributed. Longitudinally-trained students performed significantly more pelvic examinations (36 [SD 33]) than block-trained students (8 [SD 6]), ($t=4.3$, $P<.01$) (Table 2). They also performed more Pap smears (longitudinally-trained 28 [SD 26] versus block-trained 7 [SD 3], $t=4.4$, $P<.01$). Students who participated in traditional block rotations participated in more vaginal deliveries, (block-trained 18 [SD 7] versus longitudinally-trained 15 [SD 4], $t=-3.4$, $P<.01$) and cesarean deliveries (block-trained 11 [SD 4] versus longitudinally-trained 8 [SD 2], $t=-4.5$, $P<.01$). We found no difference in the number of hysterectomies (block-trained 4 [SD 2] versus longitudinally-trained 5 [SD 3], $t=1.1$, $P<.5$) and laparoscopies, (block-trained 5 [SD 3] versus longitudinally-trained 6 [SD 4], $t=0.4$, $P=.70$). No significant differences emerged in NBME shelf scores or in the clinical grades emerged (Table 2). Students who participated in the traditional curriculum varied significantly in regards to subsequent career choices compared to students who participated in the longitudinal curriculum (Table 1). Overall, 8% of students who participated in the traditional block curriculum entered a residency in Obstetrics and Gynecology as compared to 4% of longitudinal students. One quarter of the longitudinal students chose to pursue a career in Family Medicine compared to 3% of traditional students. A similar proportion of students (32% in both groups) went into other primary care specialties (Internal Medicine, Pediatrics). About half of the block-trained students chose to pursue a non-primary care specialty as opposed to 29% of longitudinally-trained students.

Discussion

Longitudinally-trained students performed more pelvic exams and Pap smears than their block-trained counterparts. Potential reasons for this difference include a longer amount of time spent in the ambulatory care setting and a longer amount of

Table 1. Demographics, Clinical Scores, NBME Shelf Exam Scores, and Career Choices for Block-trained and Longitudinally-trained curriculum students, 2007-2009. University of Hawai'i, Honolulu, HI.			
	Block Mean (SD), n (%)	Longitudinal mean (SD), n (%)	P-value
Nn	94	28	
Age (years)	27 (3)	27 (3)	.55
Gender*			
Female	49 (52)	17 (61)	.42
Male	45 (48)	11 (39)	
Clinical Scores	83 (7)	84 (7)	.72
NBME Shelf Exam Scores	75 (8)	74 (8)	.93
Career choices**			
Obstetrics/Gynecology	8 (9)	1 (4)	<.01
Family Medicine	3 (3)	7 (25)	
Other Primary Care	30 (32)	9 (32)	
Non Primary Care	46 (49)	8 (29)	

*Chi-Square Test. **Fisher's Exact Test, total n for this category is different because some students did not apply for residency.

Table 2. Number of Procedures Performed by Block-trained and Longitudinally-trained curriculum students, 2007-2009. University of Hawai'i, Honolulu, HI.			
	Block Mean (SD)	Longitudinal Mean (SD)	P-value
n	94	28	
Pelvic Examination	8 (6)	36 (32)	<.01
Pap Smear	7 (3)	28 (26)	<.01
Vaginal Delivery	18 (7)	15 (4)	.01
Cesarean Section	11 (4)	8 (2)	<.01
Hysterectomy	4 (2)	5 (3)	.32
Laparoscopy	5 (3)	6 (4)	.53

time spent with a single preceptor which could result in the preceptor giving the student more opportunities to perform examination procedures. In addition, block-trained students received their ambulatory experience at resident clinics while longitudinally-trained students were at ambulatory sites that did not have residents present. This difference may have also resulted in more opportunity for the longitudinally-trained students to perform office procedures. The standard deviations for these outcomes were large, indicating a large variation in the number of pelvic exams and pap smears performed by different students. This could be related to the abilities of the students themselves, the preceptors' comfort with supervision or the clinical volume of the different ambulatory sites. Despite the abbreviated hospital-based experience of longitudinally-trained students, there was no difference in the number hysterectomies or laparoscopies, though there was a difference in the number of vaginal deliveries and cesarean sections. In addition, this study confirmed findings from previous studies by finding similar clinical grades and NBME shelf scores for these two groups.⁴

Longitudinally-trained students were more likely to pursue primary care specialties such as Family Medicine. If the number of pelvic exams and pap smears performed by students during their third year clerkship is a reflection of the quality and clinical exposure gained during this year, one could hypothesize that an improved ambulatory experience resulted in more students selecting a primary care specialty. A limitation of this study is that assignment to the longitudinal or block curriculum, however, was not random. Students applied and were selected to participate in the longitudinal program. The default was participating in the traditional block curriculum. Therefore, it is possible that students who were interested in primary care purposefully selected to participate in the longitudinal curriculum.

Interestingly, more block-trained students pursued a career in Obstetrics and Gynecology. Other studies suggest students selecting Obstetrics and Gynecology have different personality types than those selecting Family Medicine, Internal Medicine and Pediatrics.⁶ The increased ambulatory experience may not have the same impact on students that choose Obstetrics and

Gynecology versus other primary care specialties. Block-trained students also performed more in-patient procedures such as vaginal deliveries and Cesarean sections. It is possible this more robust in-patient experience led to more students in the traditional curriculum selecting Obstetrics and Gynecology. Similar to our findings in primary care fields, students with an established interest in Obstetrics and Gynecology may have purposefully chosen to participate in the traditional block curriculum. Many medical schools are motivated to increase interest in certain specialties depending on the needs of their community. Future studies should assess students' intended residency prior to their third year of medical school to determine whether the different curriculums have influenced a student's eventual career choice.

The study design does not allow comment on whether the longitudinal or traditional curriculum is better for the clinical education of medical students in general. As mentioned before, students self-selected into traditional or longitudinal groups which can introduce selection bias. Students who complete the longitudinal curriculum may be more interested in primary care thus more motivated or adept at office-based care than their traditional counterparts. Thus, the difference in procedural experience may be the result of this difference in motivation instead of the difference in the curriculum itself. Additionally, procedure numbers are self-reported by students and the motivation to log procedures may vary among students, which could result in reporting errors. The authors suspect errors in reporting would not be different between students participating in a traditional versus a longitudinal curriculum resulting in non-differential reporting errors which would bias our results towards the null hypothesis. As residency training begins to incorporate milestone based evaluations, students will need to achieve a certain level of competency prior to starting clinical training. This may allow future studies to investigate how these differences in experience translate into preparing students for residency.

This study is also unable to comment on whether all medical schools should integrate a longitudinal curriculum. The longitudinal curriculum adds logistical complexity and possibly increased cost if students travel to a rural location during the six month ambulatory portion of their rotation.^{1,7} Additionally, a longitudinal program requires a large number of physician preceptors. The University of Hawai'i depends heavily on non-paid community physicians who volunteer to precept longitudinally-trained students in the ambulatory setting. Not all medical schools would be able to implement such a program.

The landscape of obstetric and gynecologic practice is continually evolving. Pap smear guidelines have changed dramatically in the last few years and screening for chlamydia and gonorrhea no longer requires a pelvic examination.⁸ These revised guidelines may result in fewer female pelvic exams in general. Additionally, robotic surgery and non-surgical interventions for menorrhagia have decreased the overall number of abdominal and vaginal hysterectomies being performed.⁹ Therefore, findings from 2007 to 2009 may not be generalizable to future groups of medical students as guidelines and practice patterns continue to change.

To the authors' knowledge, this is the only study to describe procedural differences between students who participate in a longitudinal versus a traditional block third-year curriculum. The findings suggest students who select a longitudinal curriculum gain more exposure to office-based gynecologic clinical examination skills such as pelvic examination. These skills are especially important for those students who ultimately pursue non-obstetric and gynecologic specialties, since they may rely heavily on the gynecologic skills learned during their medical school training.

Conflict of Interest

None of the authors identify a conflict of interest.

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References

1. Norris TE, Schaad DC, DeWitt D, Ogur B, Hunt DD. Longitudinal integrated clerkships for medical students: an innovation adopted by medical schools in Australia, Canada, South Africa, and the United States. *Acad Med.* 2009;84(7):902-7.
2. Ogur B, Hirsh D. Learning through longitudinal patient care-narratives from the Harvard Medical School-Cambridge Integrated Clerkship. *Acad Med.* 2009;84(7):844-50.
3. Ogur B, Hirsh D, Krupat E, Bor D. The Harvard Medical School-Cambridge integrated clerkship: an innovative model of clinical education. *Acad Med.* 2007;82(4):397-404.
4. Frattarelli LC, Kamemoto LE. Obstetrics and gynecology medical student outcomes: longitudinal multispecialty clerkship versus traditional block rotations. *Am J Obstet Gynecol.* 2004;191(5):1800-4.
5. Carney PA, Pipas CF, Eliassen MS, Mengshol SC, Fall LH, Schifferdecker KE, et al. An analysis of students' clinical experiences in an integrated primary care clerkship. *Acad Med.* 2002;77(7):681-7.
6. Borges, N, Savickas, M. Personality and medical specialty choice: A literature review and integration. *J Career Assessment* 2002;10(3): 362-380.
7. Ogrinc G, Mutha S, Irby DM. Evidence for longitudinal ambulatory care rotations: a review of the literature. *Acad Med.* 2002;77(7):688-93.
8. Hobbs MM, van der Pol B, Totten P, Gaydos CA, Wald A, Warren T, et al. From the NIH: proceedings of a workshop on the importance of self-obtained vaginal specimens for detection of sexually transmitted infections. *Sex Transm Dis.* 2008;35(1):8-13.
9. Merrill RM. Hysterectomy surveillance in the United States, 1997 through 2005. *Med Sci Monit.* 2008;14(1):CR24-31.