

SIMULATED CASES AS A PREDICTOR OF ASSESSED CLINICAL SKILLS

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ABSTRACT

Objective: An influx of computer-based patient simulations are being used at all levels of training in medical education. The premise is these cases allow learners to improve clinical reasoning skills in a structured format. However, few studies have been done to determine if simulations improve clinical skills.

Hypothesis: Increased use of simulated cases may enhance performance on a structured oral examination.

Methods: As part of the pediatrics clerkship at the University of Nebraska Medical Center (UNMC), approximately one-third of the students are assigned to a private clinic in locations throughout the state of Nebraska (CP) every 8 weeks. The other students rotate through various services at UNMC. During 2006 to 2008, junior medical students (n=217) were required to maintain a core experience log documenting either direct patient experiences or completing a corresponding Computer-assisted Learning in Pediatrics Program (CLIPP) case. For accreditation standards, students also maintain a patient log required by the College of Medicine (COM). Students conduct a structured patient interview on the last day of the clerkship over some general pediatric problem, such as cough, fever, etc. Statistical analyses were conducted to determine what measured variables provide the best predictor for oral exam results.

Results: Data collected is from a normal distribution, verified by Shapiro-Wilks' W test ($W > 0.8$). Correlation analyses were conducted to identify a relationship between oral exam scores with average time spent on CLIPP cases, total completed CLIPP cases, core experience log patients, or COM's patient log. These findings were not significant for any measured variables. Stepwise regression analyses were conducted based on site (CP versus UNMC) and time of year students completed the clerkship to determine the best predictor of oral exam performance. Interestingly, the more CLIPP cases completed, CP students' oral exam scores in one rotation improved (Rotation 1: $r = 0.739$, $p < 0.05$) and one decreased (Rotation 5: $r = -0.657$, $p < 0.05$). For UNMC students, COM patient log totals negatively correlate student performance on the oral exam (Rotation 5: $r = -0.400$, $p < 0.05$).

Conclusions: The CLIPP cases are used to ensure students receive similar exposure to pediatric problems. Although a useful means of standardizing experiences, in only two rotations did total CLIPP cases completed have a relationship with exam scores. Although these cases are helpful for students, they have not translated to applied clinical skills.

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BACKGROUND

Medical schools have employed trained, standardized patients to test medical students' clinical diagnostic skills in objective structured clinical exams (OSCE). Albeit time consuming and costly, these OSCEs have been researched and proven to be valid and reliable examinations (1). Abbeduto (2) notes computers have now infiltrated every aspect of daily living. This has led to development of virtual patients as an educational method, raising the question of their efficacy in formal education. Turner et al. (3) conducted a randomized, controlled trial using web-based patient simulation. They compared it to standardized patient-based teaching with mixed overall results. However, they still concluded use of virtual patients to be as effective as real standardized patients and more cost effective. Novack et al. (4) support the use of standardized patients. However, they also recognize the need to use complementary technology to make this type of educational modality more widely available and cost effective. Their support of both live and teleconferenced patient encounters provides a counterbalance to Turner et al. The use of standardized patients in clinical diagnosis is being challenged in the computer age. Rising costs require new innovations in education. Some studies have been done indicating the use of simulations prepares students for live interactions with patients or standardized patients (3, 5-7). This study will provide insight into the utilization of the Computer-assisted Learning in Pediatrics Program (CLIPP) cases and whether or not they enhance student ability to conduct a structured oral examination.

TABLE 1. Regression Coefficients for CP Rotation 1

Model	Unstandardized Coefficients		Standardized Coefficients		t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta				Lower Bound	Upper Bound
(Constant)	2.060	.323			6.377	.000	1.296	2.824
TotalCases	.056	.019	.739		2.906	.023	.010	.102

TABLE 2. Regression Coefficients for CP Rotation 5

Model	Unstandardized Coefficients		Standardized Coefficients		t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta				Lower Bound	Upper Bound
(Constant)	3.770	.233			16.179	.000	3.233	4.308
TotalCases	-.028	.011	-.657		-2.467	.039	-.054	-.002

RESULTS

Aggregate results of the correlation analysis were insignificant. However, when analyses were done looking at training track (CP or UNMC) as well as rotation, some rotations had significant findings. These were conducted because students' level of skill may be different depending on the time of year the clerkship was completed.

For CP students, Rotations 1 and 5 demonstrated that the number of CLIPP cases completed were significant. For Rotation 1, the relationship was positive ($F(1,7) = 8.448$, $p < 0.05$). Based on standardized β , students in this Rotation may see an increase of 0.739 standard deviations in their oral exam score with increased number of CLIPP cases completed (Table 1). However, in Rotation 5, the relationship was negative ($F(1,8) = 6.084$, $p < 0.05$), indicating that oral exam results would decrease by -0.657 standard deviations with the number of cases completed.

For the UNMC track, the number of patients logged had a significantly negative relationship with oral exam results during Rotation 5, $F(1,27) = 5.141$, $p < 0.05$. Figure 1 shows the results of the regression model. Based on standardized β , as more patients are logged, oral exam scores decrease by 0.400 standard deviations.

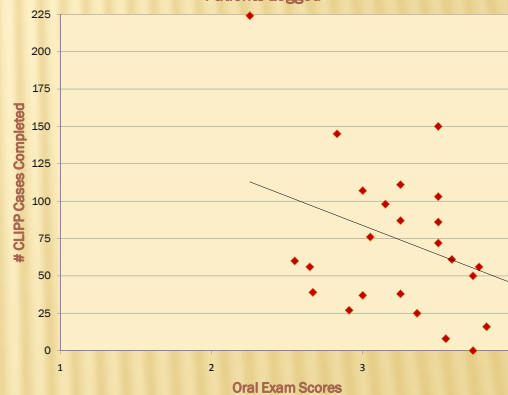
METHODS

At the University of Nebraska Medical Center (UNMC), the pediatrics clerkship is 8 weeks. The clerkship has two tracks – a community-based (CP) or university. The CP students complete the clerkship in private clinics throughout the state of Nebraska. The UNMC students complete inpatient and outpatient rotations in Omaha.

From 2006 to 2008, third year clerks (n=217) maintained a core experience log documenting either direct patient experiences or completion of a corresponding Computer-assisted Learning in Pediatrics Program (CLIPP) case. For accreditation standards, students also maintain a patient log required by the College of Medicine (COM). Students conduct a structured patient interview on the last day of the course related to a general pediatric problem, such as cough, fever, etc.

Correlation analyses were conducted using SPSS Statistical Software to identify a relationship between oral exam scores with average time spent on CLIPP cases, total completed CLIPP cases, core experience log patients, or College of Medicine's patient log. These were followed by regression analyses to identify what variables may be predictors for oral exam results.

Figure 3. Rotation 5 UNMC Oral Exam Results based on # Patients Logged



DISCUSSION & CONCLUSIONS

The CLIPP cases provide a more structured clinical problem-solving approach to general pediatric problems. Although a useful means of standardizing experiences, these cases have not translated to applied clinical skills. This is evidenced by the lack of significant relationship to structured oral examination performance for most rotations. In fact, increased numbers of cases negatively correlated with one group of students (Table 2).

Although actual patient encounters should provide greater experience in clinical reasoning, this too was negatively correlated with students' oral examination performance (Figure 1). This may be due to a more passive role in patient care, which was not factored into the analysis. Therefore, these cases offer knowledge about clinical diagnosis, but do not appear to translate to clinical interviewing skills.