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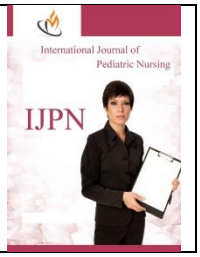

LEARNING FACILITATION FOR ADVANCED PURPOSE EMPIRIT IN PEDIATRICS THROUGH WEB-BASED EXPERIENCES IN PHARMACEUTICALS

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ABSTRACT

An evaluation of the effectiveness of web-based training (WBT) modules in developing learning and providing student pharmacists' abilities to give pharmaceutical care to children in the context of pediatric advanced pharmacy practice experience (APPE). A rotation of four weeks was designed for pharmacy practice students to complete pediatric-specific training modules. Among the pediatric modules covered were antimicrobial use and monitoring; developmental pharmacology; drug information, fluids, electrolytes, and dehydration. All modules must be completed by students within the first week of the pharmacy practice experience. Ten multiple-choice questions were included in the pre- and post-assessments, ranging from zero to 100. In order to analyze the data, descriptive statistics as well as t-tests were used. Three of the four modules showed statistically significant improvements. The monitoring module and antimicrobial use did not show significant improvements. It was generally accepted by student pharmacists that the modules contributed toward their knowledge of the pharmaceutical care of children to some or great extent. Student pharmacists may be able to gain a more comprehensive understanding of pharmaceutical care in pediatric patients by completing web-based modules during an advanced practice rotation.

INTRODUCTION

A quarter of the US population was children in 2008, and 13% of them took a medication regularly for at least three months [1, 2]. In order to improve effectiveness in pediatric patients of all ages, medication safety, pharmacists should understand the unique physiology as well as the organ and system ontogeny affecting their condition These differences increase the risk of medication errors and adverse effects in this patient population [3]. Although these factors are largely responsible for the omission of pediatric diseases and drugs from pharmacy curricula, many hours are still dedicated to them [4]. Among the 55 doctor of pharmacy programs in the United States, Low et al. [4] conducted a survey in 1999. The mean number of hours spent on particular pediatric topics in the 37 programs that

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responded was 16.7 ±11.6. However, only 18% of programs offered electives on pediatric pharmacotherapy [4]. In a 2005 opinion paper, the American College of Clinical Pharmacy Pediatric Practice and Research Network stated that the ideal pediatric curriculum within an beginner doctor of pharmacy scheme should consist of 20 to 35 hours of didactic instruction in pediatric-specific topics, the availability of an elective course in pediatric pharmacotherapy, and one required advanced pharmacy practice experience in pediatrics that is "facilitated by a pediatric specialist" [5]. Consequently, many pharmacy programs do not provide adequate training to their graduates in pediatric pharmaceutical care in light of these recommendations. In India, there are two entry-level doctoral programs in pharmacy. No program meets the pediatric practice and research network's recommendations, as do many pharmacy schools and colleges. Pedagogical sessions are available at both schools on developmental pharmacology, pediatric practice and electrolyte and fluid therapy for pediatric patients. The core curriculum does not include a lecture on pediatric-specific drugs. Purdue University does not provide pediatric-specific pharmacokinetics lectures, but Butler University does. Pediatric pharmacotherapy electives are available in each of the programs, which cover extra pediatric topics not covered in the main curriculum. APPE rotations with a pediatrician are available at both colleges. Pediatric elective APPE rotations are not pre-requisites for completing the pediatric pharmacotherapy elective. Students at these two colleges can benefit from web-based pediatric-specific training modules developed by faculty experts working at one center for experiential education.

Students participating in a pediatric pharmacy practice experience were evaluated for their ability to perform pharmaceutical therapy on children using Web-based training modules.

METHODS

A pediatric pharmacy faculty member who tekes responsibility for didactic and experiential pediatric education developed 4 pediatric-specific WBT modules and pre- and post-assessments. As a result of these modules, didactic pharmacy curriculum had material that focused on pediatrics reinforced and/or supplemented. Both didactic and experiential pediatric faculty members developed pre- and post-assessments.

Four WBT modules dealt with antimicrobial use and monitoring, development pharmacology, (focusing on vancomycin and aminoglycosides), drug information, fluids, electrolytes, dehydration. The purpose of the session was to assist in providing a refresher on concepts taught in the didactic portion of the professional curriculum. There was also another module available for refresher information on pediatrics, but no assessment was performed. Training modules were completed within the first five days of the rotation by all students assigned to the respective faculty members. The pre-assessment for each module was scored on a scale of 0 to 100, while the post-assessment was scored on a scale of 0 to 100. The same questions were asked on the pre-assessment as on the post-assessment. Unless fluids, electrolytes, and dehydration were assessed, there were ten multiple-choice questions throughout each assessment. Despite receiving scores after completing every pre-assessment, students did not receive feedback about how to answer the questions until the post-assessment. Students could complete post-assessments immediately following or sometime after viewing the training module, regardless of the order in which assessments were completed or when they reviewed the module material. The university's web-based learning management system administered the web-based modules and assessments. A survey assessing students' perception of a web-based learning experience was administered with permission of the Institutional Review Board at the end of practice experience. We administered the survey through Survey Monkey, which contained nine questions. Following the completion of rotations, students were provided with the link to the survey.

For continuous data, descriptive statistics were used to analyze pre-assessment and post-assessment scores. Comparison of preassessment and post assessment scores was done using the paired-samples t-test. Students from the two universities were compared using independent sample t-test or Mann-Whitney U test after completing a course year and after completing the APPE. For the comparisons on pre and post assessment mark, independent sample t-test or Mann-Whitney U test was used. Descriptive statistics were used for the analysis of survey results. The significance level was set at p, 0.05

RESULTS

An elective pediatric practice was offered to 15 students by the Office of Experiential Education. Each student took the pre-assessment, completed the web-based training, and completed the post-assessment. Despite the highest mean preassessment score for anti-microbial use and monitoring, all modules showed significant improvements between preassessment and post assessment scores (Table 1). In the start and second half of the course year, students taking pediatric pharmacy practice experiences had the same mean pre-module assessment scores (Table 2). Table 3 shows that students from the two groups did not differ in their average pre-module assessment scores or their improved module assessment scores. After completing the practice experiments, 8 students (55%) completed the voluntary

survey. Table 4 shows that seven out of ten students (73%) agreed that the web-based training repeated or updated the material in the core didactic pediatric curriculum. The most effective modules in enhancing practice experience were the antimicrobial use and monitoring modules, as well as fluids, electrolytes, and dehydration modules (90%).

Table 1: Pre-module and Post-module Assessment Scores*

	Pre-module (N=150)	Post-module (N=15)	P Value
Pharmacology Development	61±14.95	82.95±9.98	<0.001
Usage of anti-microbial and its monitoring way	76.94±15.87	83.07±13.47	0.165
Electrolytes, Fluids and Dehydration	47.45±13.74	58.97±12.5	<0.005
Information about drug	62.5±17.89	95.87±5.91	<0.001

Table 2: Mean Pre-module Assessment Scores for Students Completing the Rotation in the First vs. the Second Half of the Academic Year*.

	First Half Preassessment (N=7)	Second Half Pre-assessment (N=8)	p value
Pharmacology Development	61.98±10.98	59.68±17.81	0.578
Usage of anti-microbial and its monitoring way	69.11±20.78	80.45±11.99	0.141
Electrolytes, Fluids and Dehydration	54.78±8.9	42.98±14.99	0.071
Information about drug	57.54±10.08	67.19±20.47	0.481
* Data are reported as mean ±SD.			

Table 3: Pre-assessment scores and improvements

	Pre-assessment scores			Improvements from Pre-assessment to Post-assessment		
	Group A N=7	Group B N=8	P values	Group A N=7	Group B N=8	P Values
Pharmacology Development	58.18±13.35	60.41±18.87	0.771	22.87	20.41	0.787
Usage of anti-microbial and monitoring	76.71±13.89	76.51±19.98	0.931	2.25	10.98	0.254
Electrolytes fluids, and Dehydration	49±11.98	43.98±16.95	0.399	5.1	21.96	0.014
Drug Information	60.75±12.89	66.15±25.78	0.691	32.87	12.04	0.714

Table 4: Student Pharmacist (n=8) Perception on Effectiveness of Web-Based Training Modules*

	Agreed strongly	Agreed somewhat	Neutrally agreed	Disagreed Somewhat	Disagreed strongly
Improvement on understanding of Pediatric pharmaceutical care	2 (25.1)	4 (54.5)	2 (25.04)	0	0
Level of pediatric pharmaceutical care during pharmacy showing increase	1 (5.4)	5 (59.1)	0	2 (11.2)	0
Enhancement of APPE	2 (18.2)	6 (60.14)	0	0	0
Didactic curriculum supplementation	3 (27.25)	2 (17.14)	2 (18.1)	1(9.09)	0
Repetition among Didactic pediatric curriculum	4(31.85)	2 (18.05)	1 (9.08)	0	0

DISCUSSION

In the Office of Experiential Education, 15 students completed an elective practice in pediatrics. Pre-assessments, post-assessments and web-based training, were taken by all students. All modules showed significant improvements from preassessment to post assessment, despite monitoring and antimicrobial use having the highest mean score (Table 1). Pediatric

pharmacy practice experiences students had the same mean pre-module assessments in the start and second halves of the academic year (Table 2). The average pre-module assessment scores of the two groups did not differ between them, nor did their improved module assessments. The voluntary survey was completed by 8 students (55%) following the practice experiments. Approximately seven out of ten students (73%) agreed that the web-based training repeated the didactic pediatric curriculum material or refreshed it. Antimicrobial use and monitoring modules, as well as modules dealing with dehydration, fluids, electrolytes, , proved to be the most effective modules in improving practice experience (90%).

Several schools of pharmacy, including ours, do not need experience in patient care for this population and dedicate only a small part of the curriculum to it. Students and new graduates with APPE degrees may be unable to provide care to this population due to this lack of knowledge and comfort level.

Pediatric pharmacy curriculum was reinforced and supplemented with WBT modules. Current students may find it appealing to learn in modular form using technology and to ask their preceptor questions directly [6, 7]. APPE for pediatric students has never been approached in this way before to enhance their learning. In addition, by using WBT to review previously taught curricular content, APPE educational time was optimized, while advanced topics could be discussed based on these previous exposures to curricular content.

All modules, except anti-microbial use and monitoring, showed significant improvements over pre-assessments after reviewing the training. There was no significant difference between this module and the other modules due to its highest mean pre-assessment score. Moreover, this module contains much of the same content found in other part of the pharmacy curriculum, albeit from a different perspective. It is likely that the improvement in memory could be attributed to the identical questions used in both pre and post assessments, but students were not given proper answer following the pre and post assessment, only following the post-assessment. Fluid, electrolyte, and dehydration scores were below acceptable for pediatric patients in spite of substantial improvement between pre-assessment and post-assessment. It is probable that students in the second half of the academic year have received more didactic education on this topic, which is why their mean pre-assessment scores were lesser than students in the first half of the year. In the fluids, electrolytes, and dehydration module, the mean score for both universities was fifty percent or lower. Students from group B showed statistically significant improvements in their preassessment score compared to their post assessment score. Perhaps this is due to the fact that this knowledge is not used routinely in APPEs leading up to the pediatric APPE. Based on the results, extra reinforcement should be provided by discussions between preceptors and students as well as updating or adding content to the current module to make it clearer. In addition, the core curriculum could be enhanced with didactic instruction on pediatric fluids, dehydration and electrolytes. For the current generation of students, it was essential to assess the students' perceptions of learning in order to ensure that WBT modules offered the intended education in a manner conducive to learning.

Despite the relatively small population size, we would have preferred a higher response rate in our electronic survey [8]. After receiving final evaluations and completing their next APPE experience, students were requested to take part in this survey. Only 55% of the invited students took part, which may have contributed to the low participation rate. Most survey respondents either strongly agreed that the modules helped to develop their understanding of drug therapy in the care in pediatric patients; enhanced their comfort level in providing pharmaceutical care to pediatric patients; and enhanced their pediatric APPE. It is possible that several factors contributed to neutral or negative responses regarding pharmaceutical care facilitation. In the first place, students do not have the opportunity to interact with patients in these modules. In addition, the precepted rotations included pediatric critical care, nephrology, and infectious diseases, which provided students with exposure to challenging specialties. The supplementation or refreshment of pediatric didactic curriculum also received neutral or negative responses from some students. Even though the students may not have felt the need for reinforcement, the authors believe reinforcement and repetition of these concepts in pediatrics are essential. Several students suggested extra topics that could be added to the WBT modules to enhance the experience further; however, most of these suggestions, such as sedation and pain, critical care, anti-fungal therapy and nephrology overviews, are topics that would be discussed with the pediatric specialist faculty preceptor because these are more in-depth, complex concepts in pediatric care. It is possible to incorporate more general pediatric topics with the currently offered WBT in order to enhance the APPE student or new graduate's understanding of the basic aspects of pediatric pharmacotherapy.

CONCLUSIONS

When possible, WBT modules should be implemented into the APPE as an extra learning technique to expand and develop students' understanding of care for pediatric patients. APPE education can also be delivered through WBT modules, where faculty from multiple

colleges collaborate. It is also possible for faculty to coordinate with non-faculty APPE preceptors in order to integrate WBT modules into APPE course content.

REFERENCES

1. United States Census Bureau. (2008). U.S Census American FactFinder.
2. Bloom B, Cohen RA, Freeman G. (2008). Summary of health statistics for U.S. children: National Health Interview Survey.
3. Stucky ER. (2003). American Academy of Pediatrics Committee on Drugs; American Academy of Pediatrics Committee on Hospital Care. Prevention of pediatric medication errors in the pediatric inpatient setting. *Pediatrics*, 112(2), 431–436.
4. Low JK, Baldwin JN, Greiner GE. (1999). Pediatric pharmacy education for U.S. entry-level doctor of pharmacy programs. *Am J Pharm Ed*, 63(3), 324–327.
5. Aucoin RG, Buck ML, Bupuis LL, *et al*. (2005). Pediatric pharmacotherapeutic education: current status and recommendations to fill the growing need. *Pharmacotherapy*, 25(9), 1277–1282.
6. Garnder SF. (2006). Preparing for the Nexters. *Am J Pharm Ed*, 70(4): A87.
7. Barnes K, Marateo RC, Ferris SP, *et al*. (2007). Teaching and learning with the net generation. Innovate.
8. Draugalis JR, Plaza CM. (2009). Best practice for survey research reports revisited: implications of target population, probability sampling, and response rate. *Am J Pharm Ed*, 73(8), 142.