

Field Trips as a Novel Means of Experiential Learning in Ambulatory Pediatrics

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Abstract

Background Parents and caregivers look to pediatric health care providers for guidance on feeding, safety issues, and child-care products for children, but trainees have infrequent first-hand exposure to child products marketed to parents.

Objective To conduct a pilot study to assess an experiential field trip as a novel method of enhancing medical knowledge in ambulatory pediatric feeding and safety.

Methods Resident physicians and medical students visited a local children's store, where they took part in an interactive store tour, product discussions, and product demonstrations led by a physician educator. Participants also completed a 20-question pretest and a 20-question posttest related to common ambulatory pediatric feeding and safety issues, based on recent American Academy of Pediatrics (AAP) policy statements and practice guidelines.

Results Sixty-seven medical students and resident physicians participated in the study. Overall, participants' short-term knowledge significantly increased from 9.9 ± 2.6 to 15.4 ± 2.2 questions correct ($P = .001$), with statistically significant gains ($P < .001$) on both the feeding and safety sections of the test. There were no differences in improvement based on participant's student or resident status, residency program type, program year, sex, or parental status. Ninety-five percent of the participants believed that their knowledge was enhanced by this approach, and participants uniformly agreed that this field trip was valuable to their pediatric training and that such field trip sessions should continue.

Conclusions The inclusion of experiential learning through an interactive field trip in the curriculum of medical training was acceptable and feasible and showed short-term improvements in knowledge of AAP safety and feeding concepts.

Introduction

Parents and caregivers look to pediatric health care providers for guidance on feeding, safety issues, and child-

care products for their children¹⁻³; but trainees have infrequent first-hand exposure to child products marketed to parents.⁴ Further, pediatric providers may not have the comfort level and knowledge to provide proper information related to these common ambulatory topics.^{5,6} Consequently, parents are exposed to many product choices without proper physician counseling or guidance.

Previous studies have noted that personal experience⁵ and experiential learning⁷ are important drivers of residents' learning, long-term knowledge retention, and increased counseling of parents. Field trips and collaboration with car seat technicians,³ community lactation resources,⁸ professional agencies, and community organizations⁹⁻¹³ have all demonstrated increased knowledge and positive feedback from learners in pediatrics. Physicians benefit from both knowledge of, and comfort with, this material,^{2,5,14} and this process needs to be reinforced during training.¹⁵

The current pilot study was designed to demonstrate the feasibility of using an interactive field trip to increase medical students' and residents' short-term knowledge about child products and the American Academy of

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TABLE 1 PRETEST AND POSTTEST SCORES OF ALL 67 MEDICAL STUDENT AND RESIDENT LEARNERS

Questions	Pretest		Posttest		P
	Mean $\pm$ SD	Questions Correct, % (95% CI)	Mean $\pm$ SD	Questions Correct, % (95% CI)	
Overall, $n = 20$	9.9 $\pm$ 2.6	50 (46–53)	15.4 $\pm$ 2.2	77 (75–80)	<.001
Feeding, $n = 10$	4.1 $\pm$ 1.3	41 (38–45)	7.6 $\pm$ 1.2	76 (72–79)	<.001
Safety, $n = 10$	5.8 $\pm$ 1.8	58 (53–62)	7.8 $\pm$ 1.2	78 (72–80)	<.001

Pediatrics (AAP) feeding and safety recommendations. We hypothesized that this activity, led by a knowledgeable physician educator, would be well received by learners.

Methods

Curriculum

Fourteen references from the AAP on issues related to feeding and safety were reviewed and formed the basis of approximately 27 knowledge points to cover during the field trips. Feeding topics included indications for soy, low-iron, and hypoallergenic formulas; discussion of fluoride, water, solid foods, juices, vitamin D, and breast feeding; and prevention of food allergies. Safety topics focused on crib, pool, bath, toy, car, medications, and prevention of sudden infant death syndrome and positional plagiocephaly.

Participants and Setting

From 2007 to 2009, 18 small groups of third- and fourth-year medical students and residents (medicine-pediatrics, family medicine, pediatrics) participated in field trips to a nearby children's store during their inpatient community pediatrics or outpatient acute care pediatrics rotation. Dates and times were scheduled in advance of each block rotation to minimize scheduling conflicts. Faculty and participants carpooled to the store when possible.

Intervention

A pediatrician educator (A.R.F.) led groups of 1 to 6 learners through the same 1-hour interactive discussion and demonstration, with stops in 5 areas of the store:

1. Infant formulas, foods, drinks (20 minutes).
2. Car seats, walkers, strollers (25 minutes).
3. Medications, toothpaste, thermometers (5 minutes).
4. Safety gates, baths, sleep aids, cribs (5 minutes).
5. Breast feeding devices (5 minutes).

Learners were encouraged to ask questions and to examine products. Most groups were asked to attempt installing a car seat in a demonstration model.

Pretest and Posttest Development

A 20-question pretest (16 multiple-choice, 1 free-response, and 3 true/false items) divided into 2 sections (10 feeding and 10 safety questions) was administered to each participant at the store. Questions were developed using the current AAP evidence at the time, and content validity of the test was developed using 3 pediatric faculty members and 1 resident. A posttest, with the same knowledge questions as the pretest but with additional demographic and attitudinal questions, was administered to each learner immediately after the field trip. Each test took approximately 10 minutes to complete. All tests were graded by one physician (H.C.R.-Q.) who did not participate in teaching. Statistical analysis of the responses included χ^2 test and Student paired t tests.

The study was approved by Christiana Care Health System's Institutional Review Board.

Results

The 67 study participants included 51 residents (76%) (medicine-pediatrics [$n = 21$; 41%], family medicine [$n = 26$; 51%], pediatrics [$n = 4$; 8%]) and 16 medical students (24%). Most participants were women (61%; 41/67) and most (88%; 59/67) were not parents.

Participants showed an improvement ($P < .001$) in overall scores from an average of 50% (95% confidence interval [CI] 46%–53%) of pretest questions correct to an average of 77% (95% CI 75%–80%) of posttest questions correct (TABLE 1). Participants improved their knowledge in both feeding ($P < .001$) and safety ($P < .001$) content (TABLE 1). Overall, 13 of 20 questions (65%) showed significant improvement (TABLE 2), as did results based on type of learner (TABLE 3).

Analysis across varied residency classes, residency types, student status, sex, and parental status did not reveal differences among the groups in either pretest or posttest scores. However, all groups except postgraduate year-4 (PGY-4) residents had significant improvements in posttest scores. Sixty-five of 67 learners (97%) showed significant improvement in their individual scores. Not all knowledge areas had improvement as a result of this intervention, which may be due to the large number of topics covered in

TABLE 2 | PERCENTAGE OF PARTICIPANTS WITH CORRECT ANSWERS (BASED ON QUESTION TYPE)^a

Test Question Type	Pretest Correct, No. (%)	Posttest Correct, No. (%)	P Value
Feeding			
Soy formula indications	32 (48)	52 (78)	.028
Low-iron formula indications	27 (40)	63 (94)	.001
Hypoallergenic formula, indication (a)	27 (40)	52 (78)	.001
Hypoallergenic formula, indication (b)	2 (3)	21 (31)	.001
Fluoride supplementation	16 (24)	17 (26)	.80
Solid food initiation	17 (25)	40 (60)	.001
Food allergy prevention	34 (50)	56 (83)	.001
Juice quantity	26 (39)	44 (66)	.002
Vitamin D introduction	57 (85)	61 (91)	.30
Peanut butter introduction	17 (25)	39 (58)	.001
Water introduction	23 (34)	59 (88)	.001
Safety			
Toy size safety	19 (28)	46 (69)	.001
Sudden infant death syndrome prevention	57 (85)	63 (94)	.06
Crib safety	60 (90)	66 (98)	.21
Water temperature	29 (43)	36 (54)	.21
Ibuprofen usage	30 (45)	62 (92)	.001
Poison control number	20 (30)	42 (62)	.001
Pool safety	36 (54)	55 (82)	.001
Car seat recommendations	24 (36)	35 (52)	.07
Cold medication usage	53 (79)	65 (97)	.002
Plagiocephaly prevention	63 (94)	66 (98)	.25

^a N = 67.

1 hour or that some topics did not receive enough emphasis during the field trip.

Overall, 65 of 67 learners (97%) agreed or strongly agreed that their knowledge was enhanced in all content areas. All participants (100%) agreed or strongly agreed that this session was valuable to their pediatric training, and all (100%) reported that this type of training session should be continued.

Discussion

This pilot study demonstrated feasibility of, and students' and residents' increased short-term knowledge after, a pediatrician-led, participatory field trip to a children's store.

Our literature review revealed only one previous study of a field trip to a children's store.⁴ Residents were given a shopping list to learn cost, accessibility, and convenience of

child-care items.⁴ Residents preferred that method rather than lecture, but, in contrast to our study, they did not have specific store locations, evidence-based recommendations, or a knowledgeable guide.

Our study shows that the AAP's feeding and safety evidence is not well known by medical students and residents but can be successfully introduced and reinforced using a physician-educator guide. This activity would also fulfill recommendations for residents to have more community-based experiences and incorporate evidence-based pediatrics.¹⁶ Baseline knowledge and improvement were similar across sex, education status, and parental status although there were a small number of parents and PGY-4 learners; this suggests that there is not enough previous exposure to accurate information and/or that pervasive misinformation also affects our learners.

TABLE 3 NUMBER OF QUESTIONS CORRECT BASED ON POSTGRADUATE YEAR (PGY), PROGRAM TYPE, AND PARENTAL STATUS

PGY Level or Program Type	Pretest, Mean $\pm$ SD	Posttest, Mean $\pm$ SD	P Value
PGY-1, n = 22	9.6 $\pm$ 2.8	15.3 $\pm$ 2.8	.001
PGY-2, n = 18	10.1 $\pm$ 2.5	15.8 $\pm$ 1.8	.001
PGY-3, n = 8	11.0 $\pm$ 2.3	15.6 $\pm$ 2.9	.05
PGY-4, n = 3	12.5 $\pm$ 0.7	14.5 $\pm$ 0.7	.11
Medical student, n = 16	9.4 $\pm$ 2.4	15.6 $\pm$ 1.2	.001
Internal medicine-pediatrics, n = 21	11.5 $\pm$ 2.4	16.6 $\pm$ 1.7	.001
Pediatrics, n = 4	12.5 $\pm$ 2.1	17.5 $\pm$ 1.7	.01
Family medicine, n = 26	8.6 $\pm$ 1.9	14.3 $\pm$ 2.4	.001
Parent, n = 8	9.7 $\pm$ 2.5	15.4 $\pm$ 2.1	.001
Nonparent, n = 59	11.2 $\pm$ 2.5	16.3 $\pm$ 2.4	.001

Our study has several limitations. We did not have a control group, we could not evaluate the counseling habits of medical students and resident physicians after intervention, we did not measure long-term retention of knowledge, and there were no questions that specifically evaluated knowledge about cost, accessibility, and convenience of items for sale. It also is possible that the pretest allowed participants to focus on certain elements of the field trip, making it easier to attain higher posttest scores. Finally, participants represented diverse training levels, but categoric pediatric residents and PGY-4 medicine-pediatrics residents were underrepresented in our study sample.

Our pilot study provides important information for both hypothesis generation and design of future experiential studies. Knowledge potentially may be enhanced by a field trip, including a handout designed to reinforce learning and links to the AAP recommendations for self-directed reading.

Conclusions

We demonstrated the self-reported value from using a field trip to teach medical students and residents AAP safety and feeding content in a pediatric ambulatory setting. The inclusion of experiential learning through an interactive field trip in the curriculum of medical training was feasible and showed significant improvement in short-term knowledge. Future research should include a lecture-only control group and assessment of long-term retention of knowledge. In addition, improved resident counseling and anticipatory guidance with parents could be evaluated through structured observation or parental perceptions.

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