

# Training program of pediatric outpatient medications for medical interns: A quasi-experimental study

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## Abstract:

**Objective:** The aim of this study was to investigate the effect of selected pediatric outpatient medicine training programs on the knowledge of interns in the pediatric quarter.

**Methods:** The present study was a quasi-experimental study on all medical interns of the second semester of the 2017-2018 academic year season of pediatric who were selected by convenience sampling and divided into two groups of intervention and control. In addition to the usual training, they also received supplementary training in pediatric outpatient medications through the selected training program. All of them were given a questionnaire to assess their knowledge and awareness about pediatric outpatient medications before and after the intervention.

**Results:** Average score prior to initiation of ward session showed no significant difference between study groups ( $P=0.41$ ). In both groups, a comparable and significant improvement in scores was observed by the end of pediatric season ( $P<0.0001$ ). However, enhancement was more conspicuous in intervention group ( $P=0.023$ ).

**Conclusion:** The present study was able to confirm the effect of these pieces of training on the promotion of routine training and as an effective complementary training to increase pharmacological knowledge of medical interns.

**Keywords:** Outpatient Drugs, Pediatrics, Medical Interns, quasi-experimental

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## Introduction

Patient safety is one of the most important components of quality in health service systems (1). Medication errors are one of the most common errors in health systems that can lead to unfortunate consequences (2). There is a possibility of medical errors occurring at any time and place, and its consequences vary from minor injuries to mortality and morbidity (3,4). There a higher chance of pharmacological errors in pediatric care (5).

Therefore, reducing medical errors in prescribing medicine for children is more important (6). Improving knowledge and skills of healthcare providers can be effective in reducing errors. Utilizing different educational tools, combining education with appropriate technologies, using multiple media, reviewing, practicing and repeating enough, continuous and timely evaluation of factors, providing information and knowledge based on

similarities and differences would all contribute to more effective memorization of medication knowledges (4). The medical internship period is a total of 18 months, the medical intern or intern must dedicate three months to the children's department, which, including 4 study units for each month, is equivalent to 12 study units from the total study units of the doctorate in general medicine course (7). In various studies in Iran, medical malpractice and even malpractice leading to death have been reported to not be infrequent (8). This is despite the fact that the occurrence of unwanted medication errors in children is more than in adults (9). However, considering the above-mentioned cases and the fact that the majority of students after completing the medical training course and graduation are employed as general practitioners in all parts of the country, getting to know more correct and basic pediatric outpatient medicines is an urgent and undeniable need. In the education of outpatient pediatric drugs, special attention should be paid to issues such as common drugs used in children, drug dosage, how to use, precautions, side effects, duration of use, drug price, availability, patient ease of use, and drug interactions. Therefore, this research was conducted with the aim of investigating the usefulness of teaching pediatric outpatient drugs to students in order to increase the knowledge of interns and then reduce their medical errors.

## Methods

### Study design, settings, and ethical considerations:

This was a non-randomized quasi-experimental study that was conducted in order to investigate the effect of the selected pediatric outpatient medicine training program on the level of knowledge of interns in the three-month pediatric course at Imam Reza, Qaem and Dr. Sheikh hospitals in Mashhad.

All participants were fully informed of the purpose and nature of the study, including the fact that the control group will not receive the educational intervention. Participants' confidentiality and

privacy was protected throughout all stages of study. Participants in the control group were also informed of the study conclusion after its completion, and they were proposed to receive the educational program. The institutional review board (IRB) of Mashhad University of Medical Sciences confirmed this study protocol.

### Study population:

In this study, medical intern students of the second semester of the academic year of 2016-2017 who had the conditions to enter the study, were selected by available sampling and were divided into two intervention and control groups.

The inclusion criteria in this study included studying at the general medical practice level, internship in the pediatric department at the time of the research, and the possibility of attending all educational sessions, and the exclusion criteria were unwillingness to participate in the study, inability to attend two more educational sessions.

### Data collection:

The tool of data collection was a questionnaire, which was designed to measure the level of knowledge of students based on the studied variables. The validity of the questions was confirmed by the professors and experts and then distributed among 10 sample students in two occasions and two weeks apart. The validity of the questionnaire was checked and confirmed by designing and reviewing the questionnaire in the presence of 4 experts, and the final questionnaire containing 20 questions was compiled as follows. The questions were generally related to antifungal treatments, antibiotic treatments, analgesic and fever treatments, and antihistamine treatments, as well as the use of multivitamins and supplements, and antiparasitic and antinausea drugs. Final score was from zero to twenty.

In order to obtain the validity of the implementation of the training process, the training materials

provided and the type of evaluation carried out, two students who specialized in the field of medical education were consulted and confirmed. This training was designed in 18 sessions, which were presented in the three-month period of the pediatric department, and each session included 15 minutes of pediatric outpatient medicine training at the end of the morning report and for the intervention group with the titles of antibiotics, analgesics and antipyretics, multivitamins, anti-nausea, antihistamines, antifungals, supplements, which the contents of the training include discussing the common diseases in the clinic, after mentioning the patient's symptoms, choosing the appropriate drug form and then choosing the appropriate dose for the treatment, and after that, explaining how to take the medicine and mention the side effects Side effects of the drug were considered.

Thirty five students were considered as the control group and 35 students were considered as the intervention group. A questionnaire was presented to all of them to measure the level of knowledge and awareness of students about pediatric outpatient drugs.

#### Intervention:

In addition to the usual training classes for interns, the selected educational program of pediatric outpatient drugs was considered as a supplement for the intervention group. In this way, for the control

group, only the usual trainings were provided, but for the intervention group, in addition to the usual trainings, 18 sessions of basic trainings of pediatric outpatient drugs were given at the end of the morning report for 15 minutes.

#### Measurements:

All the interns who had completed the knowledge and awareness questionnaire before the intervention started, also completed the questionnaire again after the intervention, i.e. three months after completing the first round of the questionnaire.

#### Statistical considerations:

Descriptive statistics, including mean and frequency, were used to describe the sample sociologically, and t-test was used to compare the groups and the scores obtained by general medical interns in the pre-test and post-test questionnaires. independent t-test was used to compare groups.

## Results

In this research, 51.4% of the participants were male and the rest were female, the average age of men was 24.19 years and the average age of women was 24.59 years. To ensure that the intervention and control groups are not different from each other, the independent t-test was used. Their average age was not different ( $P=0.52$ ). The average knowledge grade point before intervention did not show a significant difference between the groups ( $P=0.36$ ).

**Table 1.** Score of study groups, before and after intervention

	intervention group		control group		independent t test p value
	mean	SD	mean	SD	
pre-test	6.51	2.21	6.64	1.87	0.41
post-test	17.34	1.07	14.05	2.32	<0.0001
paired t test p value	<0.0001		<0.0001		-
score change	10.83	1.14	7.41	0.45	0.023

As shown in Table 1, mean score before the intervention was similar among the groups ( $P=0.41$ ). In both groups, there was a similar significant increase in scores at the end of the season of pediatric ( $P<0.0001$ ); while this change was more prominent in intervention group ( $P=0.023$ ).

## Discussion

In this study, 70 students of general medicine interns in the pediatrics department participated, and they were subjected to routine training and supplementary training program of pediatric outpatient medicine during three months. Prior to the intervention, the groups had a comparable mean score ( $P=0.41$ ), and both demonstrated a significant increase in scores by the end of the pediatric season ( $P<0.0001$ ). It is important to note that the intervention cohort displayed a more pronounced increase ( $P=0.023$ ).

Kazemzadeh et al. have conducted a study in 2012 with the aim of investigating the effect of the use of commonly used pharmaceutical educational pamphlets on the accuracy of interns' prescriptions. In their study, two control groups (without pamphlets) and an intervention group (with pamphlets) were used. Before and after the intervention, all the participants in the research were tested by a prescription accuracy questionnaire. The results of the study showed that education by pamphlets for training of common medical drugs to interns has an effective role in correcting their prescriptions. The results and method of this research are very similar to the method and results of the current research (4). But, we did not assessed any outcome in the interns' prescriptions that would be a better outcome in further research.

Another research was conducted with the aim of determining the effect of e-learning on the awareness, attitude and performance of nursing students regarding the prevention of medication errors in the pediatric department in 2016, which, like our research, used a researcher-made questionnaire to

measure the level of awareness, attitude and performance of students regarding the prevention of medication errors. The results showed that the educational intervention has created a significant difference in performance scores between the intervention and control groups. One of the differences between this research and the current research, in addition to the type of education and the audience group, is that the assessment of students' knowledge, attitude and performance was also considered (10).

Also, another study was conducted with the aim of investigating the effect of educational workshops on the calculation of infusion drugs on the rapid and stable learning of nursing students, and the results showed that the educational workshops improved the students' knowledge immediately after the completion of the course, but after three months, there was a significant decrease (11). This shows that a follow up questionnaire later after end of the courses is essential to ensure efficient education. Another study has been conducted with the aim of investigating the effect of e-learning on students' pharmaceutical knowledge. The results of this study showed that combined e-learning can be effective in increasing students' pharmaceutical knowledge and drug therapy. The study recommends the electronic learning method in addition to the usual teaching method (12). Another study was conducted with the aim of investigating the effectiveness of the clinical participation model in the clinical teaching. The results indicated the success of their method and the improvement of the pharmaceutical knowledge level of students (13). The main major difference of the above researches can be seen in the education of pediatric outpatient medicine, focusing on the supplementary educational program at the beginning of the main and practical program.

## Limitations:

One of the limitations of this research is that in some cases, there is interference between the control and intervention groups, where limited transfer of

information from some participants of the intervention group to the control group were possible.

## Conclusion

The results of the present research show that the educational program of pediatric outpatient medicine can improve the knowledge of general medical interns in this matter. This study confirmed the positive effect of pharmacological trainings on the promotion of routine training and as an effective complementary training to increase pediatric pharmacological knowledge of medical interns.

## Declarations:

### Funding:

Mashhad University of Medical Sciences.

### Conflicts of interest:

None.

### Authors' contributions:

AK conceived and designed study, supervised data collection, and contributed to manuscript writing. RGN and RIP were responsible for data analysis and interpretation, and contributed to manuscript writing. AT contributed to study design, data collection, and manuscript writing. All authors critically reviewed and approved final manuscript.

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None.

### Ethical considerations

The study was approved by the Institutional Review Board of Mashhad University of Medical Sciences.

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