



Knowledge, Attitude, and Practice towards Medication Errors and Adverse Drug Reaction Reporting among Medical Students

Maryam Aghakouchakzadeh¹, Mandana Izadpanah^{2*}, Ali Yadegari³

¹ School of Pharmacy, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran.

² Department of Clinical Pharmacy, School of Pharmacy, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran.

³ Food and Drug Department, Arak University of Medical Sciences, Arak, Iran.

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ABSTRACT

Background: The most common types of medical error are medication errors (MEs) which defined as any preventable event that may be caused by an inappropriate medication usage and lead to an adverse drug reaction (ADR) event in patients. In recent years, different approaches have been proposed to reduce MEs, one of which is reported ADRs. The present study was designed to assess the Knowledge, Attitude and Practice (KAP) of medical students towards MEs and ADRs reporting.

Methods: The study population was 40 students of fourth-year of medicine. The validated 12-item questionnaire included subsequently 4 questions, 5 items and the final 3 questions related to the knowledge, attitude, and practice that was given to each participant before and after of the interactive workshop.

Results: Demographic features of the participants have no significant difference. Mean of age participants was 23.18 years and 23 of the students were female. Medicine students had a poor KAP towards MEs. Only 8% of respondents had general knowledge about MEs and 50% of students believed MEs are inevitable events, less than 20% of them were acquainted with 5 rules of prescribing. Students had good knowledge and attitude, but poor practice towards ADRs reporting. 55% of participants were aware of their responsibility of ADRs reporting, but only 5% of respondents were acquainted with ADRs the reporting method and the ADR center in the hospitals.

Conclusion: The educational intervention, alteration in medical student's curriculum, and hold the interactive clerkship for health care professionals can improve the KAP towards ADRs reporting and diminish of the preventable medication errors.

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Introduction

Medication errors are one of the most common types of medical error (1,2) which can threaten the patient's health (3,4). Medication errors are defined as any

preventable event that may cause by an inappropriate medication usage and lead to an adverse drug event in patients (4). Medication errors can occur at broadly diverse steps, including prescribing, transcribing, dispensing and administration (3-5) so medication errors were significantly decreased with computerized physician order entry (CPOE) than with hand-written prescribing (HWP) (5).

It is estimated that medication errors cost for the

* Corresponding Author: Dr Mandana Izadpanah

Address: Department of Clinical Pharmacy, School of Pharmacy, Ahvaz Jundishapur University of Medical Sciences, Golestan blvd., Ahvaz 61357-33184, Iran. Tel:+986113738378, Fax: +986113738381
Email: izadpanah.m@ajums.ac.ir

National Health Service (NHS) are about £500 million in hospitalized patients each year (3, 6).

In recent years, several approaches have been proposed to detect and reduce the incidence of medication errors that reporting of ADRs is one of them. The reporting system is a quality improvement in high-risk industries, especially in hospitals. The reporting system is not designed to determine error rates. Though it is a safety improvement method which takes advantage of the astute perceptions of workers, including the primary care clinicians and office staff during the treatment process to detect problems which may modify the systems, policies, and procedures, and consequently the safety and quality improvement methods (4, 7).

Yellow cards are one of the reporting tools in adverse drug reaction reporting systems. Investigations demonstrated an adverse drug reaction is an important clinical issue, which can be entered the high cost of NHS and serious ADRs can be a resulted in death (8, 9). According to the World Health Organization (WHO), pharmacovigilance has been defined as the science and activities relating to the detection, assessment, understanding and prevention of adverse effects or any other drug-related problem (10). Post-marketing ADRs is one of the concerns on health issues and require the cooperation of all healthcare for ADRs reporting. Spontaneous reporting of ADRs on the yellow cards is a fundamental of pharmacovigilance and important in maintaining patient safety, but reporting of serious ADRs rarely exceeds 10% (11). Based on the varied investigations, knowledge, attitude and practice (KAP) of the pharmacist, physicians and nurses are the important factors on their functions for event reporting (11-13). This function depends on the understanding the importance of their role in the emergence of ADRs and also reporting event for reduction of side effects and medication errors.

Methods

This study was a cross-sectional and Interventional, before-and-after-type survey, which held an interactive workshop for medical students of Arak University of medical sciences in April 2016. The data collection tool was a validated 12-item questionnaire that included two parts: Pharmacovigilance and medication errors. The standard questionnaire of the European Pharmacovigilance research group and the previous studies were used for Pharmacovigilance questions (13-15) and medication error questions were prepared as a valid- reliable questionnaire. After the description of the questionnaire, the validity of the questionnaire was asses by Content validity ratio (CVR) and Content validity index (CVI) using a sample consist of 10 randomly selected professors acquainted with respective issues. For measuring, CVR members of the questionnaire were asked to rate each item as “essential,” “useful, but not essential,”

or “not necessary”. Then, CVR was calculated to indicate whether the item was relevant. CVI Members of these also were asked to rate each item in terms of relevancy, clarity, and simplicity, which these were on a Likert scale from 1 to 4 (16). Test- retest reliability of questionnaire involves administering the same measures to the same groups of test-takers, including 20 students selected randomly from the fifth year, under the same conditions on two different time with two week intervals. Cronbach’s alpha was used for assessing the internal consistency reliability (17).

The validated 12-item questionnaire that distributed included 4 questions were related to knowledge, 5 items to attitude and the final 3 questions to the practice that were given to each participant before and after of the clerkship course. Interactive clerkship for the 4th academic year of medical students was compulsory and the part of the curriculum for them in Arak University of medical sciences and the certificate of this clerkship was necessary to enter the internship period for the medical students, so the presence of this group of students was indispensable in the clerkship interactive.

Knowledge questions were designed as multiple choices, that 2 point considered for these questions as follows 0-point for incorrect answers and 1-point for correct answers. Knowledge questions included the general concept of pharmacovigilance, and medication errors, the cause of medication errors and the acquaintance of adverse drug reaction reporting system. Attitude questions were developed on a five-point Likert scale ranging from ‘strongly disagree’ to ‘strongly agree’. The design of practice question was included multiple choices and one of them answered by yes or no. The report of percentage or means of the answered each option was used as results. Practice question included individual approaches in hypothetical situations for reporting of ADRs and reduction of medication errors.

Data was processed by using the Statistical Package for Social Sciences (SPSS) version 11. The differences in the participants’ responses were analyzed with t-test and descriptive statistics. The 0.05 level of significance was used as a cutoff measure for statistical significance.

Results

The Cronbach’s alpha coefficient was calculated for the questionnaire 0.753 that confirmed reliability. The participants included 13 males and 27 females and had no significant difference in demographic features such as the academic levels and the mean age distribution. The percentage of answering questions was roughly equal before and after the test.

Table 1 describes the average of correct responses to the survey instrument for assessing knowledge issue before and after the clerkship course. Among the 40 participants, 8% had a general knowledge about the general concept of medication errors and the cause of medication errors,

Table 1. Student's knowledge about medication errors and ADRs.

Response (%)		Issues
Pre test	Post test	
8.11	26.47	Medication errors
55.26	58.82	ADRs

while 55% of students were aware of their responsibility of ADRs reporting and the types of ADRs which should be reported. No statistically significant differences were found between the knowledge of ADRs in pre and post samples of the clerkship course, but educational intervention significantly increased ($p < 0.01$) knowledge of medication errors. In other words, knowledge of participants about ADRs reporting and pharmacovigilance have been better.

Students were asked about their attitudes toward the importance of their presence in decreasing medication errors and their role in ADR reporting. Although several options were considered for evaluation student's attitude toward medication errors and ADRs, but due to the large number of items only of the average percent of "strongly agree" with "partially agree" were reported (Table 2). Of those responding, 78.38% felt that ADR reporting was a professional obligation for all health care professionals, and generally, the respondents had a good attitude towards ADRs reporting. While 50% of students stated that medication errors are inevitable events. Also, approximately all of the respondents believed that the medication errors would increase health system costs, before and after the clerkship course, the 78.95 % and 97.14% of student agreed with the educational intervention and an interactive clerkship to decrease the medication errors and conscious approach to adverse drug events.

The results of practice questions showed that despite the sufficient knowledge in ADRs reporting issue, only 5% of them were acquainted with ADRs reporting method and the ADR registering center in the hospitals, ultimately their approach with different cases have significant differences before and after the clerkship course ($p < 0.001$).

For evaluation of students' practice, they were asked about the 5 rules of prescribing, which may reduce the medication error events. The results of the study revealed despite the preconception, less than 20 percent of participants were familiar with the 5 rules of prescriptions. The percentage of practice issue is displayed in Table 3.

Discussion

All of the health care professionals can play an important role in the decreasing of medication errors (1, 2). Other studies described the medication errors reduced following the introduction of CPOE. Other methods such as ADRs reporting can also play an important role in the prevention of medication error occurrence (4, 5, 7, 15).

Our results show medical students had a poor KAP towards medication errors and they didn't aware about their important role in decreasing medication error events. Wendy's study showed that a patient safety and medical curriculum can affect the knowledge, attitudes, and practice of second-year medical students and proposed a necessary curriculum for medical students, including

Table 2. Student's attitude toward medication errors and ADRs reporting.

Questions	Strongly agree and partially agree (%)	
	Pre test	Post test
All of the health care have responsibility in relation to preventing the occurrence of adverse effects of drugs.	78.38	100
Most of the medication errors are inevitable and non-avoidable.	48.65	35.29
The medication errors play a critical role in increased health system costs.	94.12	94.29
Educational interventions and training courses can reduce medication errors and consciously approach to with adverse drug events.	78.95	97.14
More studies and the using of modern methods for drugs information are essential for increasing of scientific and practical skills.	81.58	97.14

Table 3. Student's attitude toward medication errors and ADRs reporting.

Questions	Pretest (%)	Posttest (%)
What is your reaction upon observation of a side effect? The best function : Report to ADR center in the hospitals	5.26	58.82
Do you attend in correct and complete prescription? The best function : Yes	91.18	94.74
Do you assist 5 rules of prescriptions? The best function : Yes (They wrote correct and complete)	18.42	44.12

patient safety overview, error reporting, system vs. human approach, safety tools, and ethics/disclosure, that several them held based on lecture or interactive clerkship (18). Other studies confirm the importance of awareness of patient safety and medical error by using an experiential curriculum (19, 20).

On the other hand, our findings described medicine students were conscious of their responsibility of ADRs reporting and the proper attitude towards it while acquainting of ADRs reporting method and the ADR center in the hospitals were at the lowest level. Palaian and colleagues illustrated the healthcare professionals had a poor KAP towards ADRs and pharmacovigilance and among of participants had not reported even a single ADR to the pharmacovigilance center (21). Enwere et al. described despite the better knowledge of ADR among doctors, the rate of reporting was low (22). Other studies emphasized education and training are the most recognized means of improving ADR reporting (23, 24).

Therefore, our advice is the alternation in the medicine student's curriculum and appropriate training can improve the KAP of ADRs reporting and medication errors. This leads to the identification of ADRs and the causing of medication errors.

In conclusion, educational intervention and presentation the interactive workshop for health care professionals to report ADRs can be a critical factor for the improvement of health care practice and diminish of the preventable medication errors.

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