

## A STUDY ON THE AWARENESS AND ATTITUDE TOWARDS PHARMACOVIGILANCE AND ADVERSE DRUG REACTION REPORTING AMONG NURSING STUDENTS IN A PRIVATE UNIVERSITY, MALAYSIA

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### ABSTRACT

**Objective:** This study was conducted to evaluate the knowledge and attitude towards pharmacovigilance and adverse drug reactions reporting among the nursing students in a private university, Malaysia.

**Methods:** The survey was carried out using a pre-validated questionnaire that included demographics details and 29 survey items to evaluate the participant's knowledge and perception on adverse drug reactions and pharmacovigilance. The questionnaire was distributed to the participants (n=32) pre-final and final year nursing students after their informed consent.

**Results:** The study results found that, there was no significant difference noticed between the mean knowledge score on ADRs reporting and pharmacovigilance of pre-final year and final year students ( $p>0.05$ ). The overall mean score on knowledge was found to be 12.31. The study also observed that mean score on attitude in pre-final year and final year students were 13.24 and 16.00 respectively. There was no significant difference observed between the mean score on the perception of pre-final year and final year students ( $p>0.05$ ). The overall mean score for perception on ADRs reporting and pharmacovigilance was found to be 15.06.

**Conclusion:** The results show that nursing students who participated in the study were only moderately aware of pharmacovigilance and adverse drug reaction reporting. However, they had expressed the positive attitude towards pharmacovigilance and ADRs reporting. As future health care professionals, they are expected to have sound knowledge and positive attitude towards pharmacovigilance activities. Their knowledge and attitude would exert a strong influence on ADRs reporting.

**Keywords:** Knowledge, Attitude, Nursing students, Adverse drug reactions, Reporting, Pharmacovigilance.

### INTRODUCTION

Globally drugs are the most common medical interventions, widely used in clinical or hospital setting to relieve sufferings. Adverse drug reactions (ADRs) are one of the major problems associated with medicines and are recognized hazards of drug therapy. In simple definition, an ADR is any undesirable effect of a drug beyond its anticipated therapeutics occurring during clinical use [1]. According to the World Health Organization (WHO), Adverse Drug Reaction (ADR) is "any noxious, unintended and undesired effect of a drug which occurs at doses used in humans for prophylaxis, diagnosis or therapy of disease, or for the modification of physiologic function" [2]. ADRs may be categorized in five groups. The two most common are dose related effects (type A: augmented) and effects related to abnormal interaction between patient and drug (type B: bizarre). ADR can also be classified based on an onset of an event as acute, sub-acute and latent; and based on the severity of reaction as mild, moderate and severe[3].

Adverse drug reactions (ADRs) are an important cause of morbidity and mortality [4] and are responsible for a significant number of hospital admissions ranging from 0.3% to 11% [5, 6]. It is important to identify and treat ADRs early as at many instances it is reversible and preventable. Adverse reaction monitoring and reporting are very important in identifying the adverse reaction trends and to minimize or prevent harm to patients arising from their drugs[7].

The etymological roots for the word "pharmacovigilance" are: *Pharmakon* (Greek word for 'drug') and *vigilare* (Latin word for 'to keep watch') [8]. It is a growing discipline because of rise of adverse drug reactions [9, 10], which is a part of patient care and patient safety that ensures the best use of medicines for the treatment or prevention of ADRs [11]. According to the World Health Organization, Pharmacovigilance is defined as "the science and activities relating to the detection, assessment, understanding and prevention of adverse effects or any other possible drug-related problem, particularly long term and short term adverse effects of

medicines"[12]. In the recent past several countries have initiated pharmacovigilance programs to identify the drugs causing ADRs. It has been recommended for every country to set up their own pharmacovigilance programs due to the variation in drug response among individuals, various prescribing habits, drug regulatory system, availability of drugs etc[13]. Under-reporting of ADRs is a common problem in pharmacovigilance program [14, 15]. Gross under-reporting of ADRs is a cause of concern, the reason for which may be inadequate funds, lack of trained staff and lack of awareness about detection, communication and spontaneous monitoring of ADRs [16, 17]. The effectiveness and success of any pharmacovigilance system depend highly on the participation of all health care professionals and thus, nurses are also important healthcare professionals responsible for pharmacovigilance activities and ADR reporting during their practice.

Malaysia also has a national centre of pharmacovigilance, namely the 'National Adverse Drug Reaction Monitoring Centre', which was initiated in 1987 and was accepted as the 30th member of the World Health Organization (WHO) Programme for International Drug Monitoring in 1990 [18]. Under this programme, all ADR reports that have been received and screened by the MADRAC (Malaysian Adverse Drug Reactions Advisory Committee) are submitted to the Uppsala Monitoring Centre in Sweden for inclusion in the WHO database[19]. Several hospitals and pharmaceutical companies operate ADR monitoring systems, however all reports are consolidated by the national centre [11]. Under-reporting of ADR is a global issue of major concern. Malaysian pharmacovigilance also experiences the problem of ADR under-reporting [20] where the major limitation of the programme is lack of awareness among health professionals regarding pharmacovigilance. Other reasons for under-reporting include ambiguity regarding the types of reactions to report, and a lack of awareness about the existence, function and purpose of the national ADR reporting scheme [11].

Several studies have been conducted to evaluate the knowledge, attitude and practice (KAP) towards pharmacovigilance activity

among doctors, pharmacists or nurses in various countries [21, 22]. Further, Rehan, et al. [22] concluded in their study that resident doctors and nurses had good knowledge and awareness on ADR reporting; however there is need of improvement in their practices. Amrita and Singh, [23] concluded in their study that the rate of reporting to ADR monitoring centres (AMC) by doctors was low despite having good observation and knowledge of ADR. Subish, et al. [24] conferred in their study that majority of the health care professionals felt ADR monitoring to be important, but only a few had ever reported an ADR to the pharmacovigilance centre. The authors have reported that, the reasons for under-reporting were either they did not come across an ADR or a few were unaware of the existence of a pharmacovigilance centre at the hospital. Hajebi, et al. [25] concluded that, it is necessary to offer continuous ADR related educational programs until reach the point that voluntary reporting of adverse drug reactions become conventional and habitual among the nursing staff.

Similar studies have been also conducted among medical or pharmacy students in different countries [26-28]. Gavaza and Bui, [26] reported that pharmacy students had strong intentions and favourable attitudes toward ADE reporting but they had inadequate knowledge of how to report serious ADEs. Upadhyaya, et al. [27] concluded that the knowledge of first-year doctors regarding ADR reporting is quite poor. Hence there is a need to incorporate an adverse drug reaction (ADR) reporting into undergraduate teaching. Elkalmi, et al. [28] concluded in their study that the majority of final-year pharmacy students in Malaysian public universities have insufficient knowledge about pharmacovigilance and ADR reporting. Sivadasan et al [29] evaluated the knowledge and attitude among the medical and pharmacy students in a private university in Malaysia and reported that pharmacy students have better knowledge, awareness and understanding towards pharmacovigilance and ADR reporting compared to medicine students.

In spite of studies conducted among different health care professionals and students, there is a lack of information in nursing students and nurses in Malaysia on KAP towards pharmacovigilance and ADR reporting. So there is a need to study the awareness among the nurses and nursing students as they are also part of the health care team who are responsible to report ADR during their practice if any. Hence this study was designed to examine the knowledge among nursing students at a private university in Malaysia. The study also evaluated the knowledge and perception among pre-final and final year nursing students towards pharmacovigilance and ADR reporting.

## Methods

This pilot study was carried out using a pre-validated survey questionnaire among the pre-final and final year nursing students in a private university, Malaysia after getting the prior permission from the dean of the faculty. This study was approved by the faculty ethical committee. The questionnaire was adapted from the previously published paper [29] and modified according to the need of the present study. The questionnaire was evaluated by the experts from faculty of pharmacy and medicine, AIMST University who have sound knowledge on the topic and their suggestions regarding the relevance, clarity, and appropriateness of the items was considered for inclusion in the questionnaire. In order to test the validity and reliability of the survey form, the revised questionnaire was tested by administering it to a sample of 20 final year pharmacy students who have been taught about the topic during their study. The overall Cronbach's alpha value was 0.73.

The questionnaire was distributed to the pre-final and final year nursing students (n=32) in their respective classrooms after their class. The study objectives were briefed to the participants and their informed consent was obtained. The confidentiality of their response was ensured.

The pre-validated questionnaire included the demographics and a total of 29 survey items organized into two sections. The first section included elements to evaluate the participants' knowledge and the second section included elements to study the attitude and perception of the participants. Knowledge based items were mainly focused on the general questions of pharmacovigilance and adverse

drug reactions reporting. From the students' response, a score of 1 and 0 was given for each correct and wrong answer respectively. The mean score was calculated.

The second section included 14 items to study the attitude and perception of the nursing students towards pharmacovigilance activities and ADR reporting. Attitude and perception questions were focused on the student's view, awareness and thoughts regarding ADR reporting and their readiness for ADR reporting respectively. Five levels likert scaling (1 = strongly agree, 2 = agree, 3 = neutral, 4 = disagree, and 5 = strongly disagree) was used to analyze the perception of the respondents.

The data was analyzed using SPSS version 20 program. Descriptive statistical analyses such as frequencies and percentages were used to represent the respondents' demographic information. The relationship between the categorical data was examined with the chi-square test. The mean knowledge score on pharmacovigilance and ADR reporting of pre-final and final year nursing students was analyzed using independent sample t test. To analyze the data

## RESULTS

The questionnaire was administered to 32 participants of whom 11 were pre-final year and 21 were final year nursing students and all the questionnaires were received back giving a response rate of 100%. All the questionnaires were duly filled, of which all the participants were females. The average time taken to complete the questionnaire was 15 min.

### Knowledge analysis and comparison on knowledge of pre-final and final year nursing students

The results for knowledge on pharmacovigilance and ADRs reporting based questions are presented in table 1. Out of the 32 participants, about 50% of participants answered correctly for the definition of pharmacovigilance and found that 18.2% of participants among the pre-final year and 66.7% of participants among the final year answered correctly. For the question on the important purpose of pharmacovigilance, it was found that 18.8% of participants answered correctly and among the pre-final year and final year students 18.2% and 19.0% respectively answered correctly. However, 37.5% of participants answered correctly for the definition of an adverse drug reaction and found that 42.9% of participants among the final year and 27.3% of participants among the pre-final year answered correctly.

The next question was on which of the phase in clinical trial, the rare ADRs can be identified and was found that only 3.1% of the respondents answered correctly of which only the pre-final (9.1%) answered correctly. None of the students answered correctly for the question on the location of the international centre for adverse drug reaction monitoring. However, it was found that 53.1% of students answered correctly on the 'WHO online database' for reporting ADR. Among those who answered correctly, it was observed that 54.5% of participants were among pre-final year and 52.4% of participants were among final year students. It was found that 43.8% of the respondents answered correctly for the method employed by pharmaceutical companies to monitor ADR of new drugs after launching them into the market. Among the pre-final and final year students, 63.6% and 33.3% respectively answered correctly.

About 31.3% of students only knew regarding the most commonly used scales to establish the causality of an ADR and it was found that 45.5% of participants among the pre-final year answered correctly whereas only 23.8% among the final year students answered correctly. For the question of the factor which will cause ADR under-reporting, it was found that 37.5% answered correctly and among the pre-final year and final year students, it was found that 36.4% and 38.1% respectively answered correctly. The next question was on the regulatory body in Malaysia regulating ADR reporting, for which 9.4% of the respondents answered correctly. It was found that among the pre-final year and final year students, 9.1% and 9.5% respectively answered correctly. Among the participants, 62.5% knew that the pharmacovigilance centre in Malaysia was established under the Drug Control Authority (DCA). For this question, among the pre-final year and final year students, it was found that 45.5% and 71.4% respectively answered correctly.

**Table 1: Knowledge assessment on pharmacovigilance and ADRs reporting among pre-final and final year nursing students**

Questions	Correct response			
	Pre-final year	Final year	Overall	P-Value
Pharmacovigilance is	2 (18.2%)	14 (66.7%)	16(50.0%)	0.023
The important purpose of Pharmacovigilance is	2 (18.2%)	4 (19.0%)	6(18.8%)	1.000
Which one of the following best describes the 'Adverse drug reaction'?	3 (27.3%)	9(42.9%)	12(37.5%)	0.465
Rare ADRs can be identified during which of the following phase of a clinical trial	1 (9.1%)	0(0%)	1(3.1%)	0.344
The international centre for adverse drug reaction monitoring is located in	0 (0%)	0(0%)	0(0%)	-
Which one of the following is the "WHO online database" for reporting adverse drug reaction?	6 (54.5%)	11(52.4%)	17(53.1%)	1.000
Which of the following methods is commonly employed by the pharmaceutical companies to monitor adverse drug reactions of new drugs once they are launched into the market?	7 (63.6%)	7(33.3%)	14(43.8%)	0.142
Which of the following scales is most commonly used to establish the causality of an ADR?	5 (45.5%)	5(23.8%)	10(31.3%)	0.252
Which factor will be the cause of ADR under-reporting?	4 (36.4%)	8(38.1%)	12(37.5%)	1.000
Which of the following regulatory body in Malaysia regulates ADR reporting?	1 (9.1%)	2(9.5%)	3(9.4%)	1.000
Pharmacovigilance centre in Malaysia was established under	5 (45.5%)	15(71.4%)	20(62.5%)	0.250
Which of the following ADR reporting system is used in Malaysia?	1 (9.1%)	1(4.8%)	2(6.3%)	1.000
A serious adverse event is	2 (18.2%)	3(14.3%)	5(15.6%)	1.000
A serious adverse event in Malaysia should be reported to the Regulatory body within	0 (0%)	2(9.5%)	2(6.3%)	0.534
The most important healthcare professional(s) responsible for reporting ADR in a hospital is/are (Can choose more than one option)	2 (18.2%)	1(4.8%)	3(9.4%)	0.266

For the question on the ADR reporting system used in Malaysia only 6.3% of students answered correctly and among the pre-final year and final year students, it was found that pre-final year (9.1%) students answered correctly than pre-final year (4.8%) students. The next question was on what a serious event is, for which 15.6% students answered correctly. The results show that among the pre-final year and final year students, 18.2% and 14.3% respectively answered correctly. For the question on within how many days a serious adverse event should be reported to the regulatory body in Malaysia, it was found that only 6.3% answered correctly. Among the pre-final year none of them answered correctly. However, 9.5%

among the final year students answered correctly. For the last question on the most important health care professions for reporting ADR, about 9.4% of students answered correctly for which 18.2% participants among the pre-final year and 4.8% of participants among the final year answered correctly.

The mean score for knowledge based questions among pre-final year and final year students was 13.95 and 11.43 respectively. There was no significant difference between the mean knowledge score of pre-final year and final year students ( $p > 0.05$ ). The overall mean score for knowledge based questions was found to be 12.31.

**Table 2: Attitude towards pharmacovigilance and adverse drug reaction reporting among pre-final year nursing students**

Questions	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Do you think adverse drug reaction reporting is necessary?	3(27.3%)	8 (72.7%)	0(0%)	0(0%)	0(0%)
Do you think reporting adverse drug reaction is a professional obligation?	3 (27.3%)	8 (72.7%)	0(0%)	0(0%)	0(0%)
Do you think it is necessary to confirm that an ADR is related to a particular drug before reporting it?	2(18.2%)	6 (54.5%)	3(27.3%)	0(0%)	0(0%)
Do you think pharmacovigilance reporting should be voluntary?	1(9.1%)	7(63.6%)	3(27.3%)	0(0%)	0(0%)
Do you think pharmacovigilance reporting should be compulsory?	1(9.1%)	4(36.4%)	6(54.5%)	0(0%)	0(0%)
Do you think that it is necessary to report only serious and unexpected reactions?	1(9.1%)	7(63.6%)	2(18.2%)	1(9.1%)	0(0%)
Pharmacovigilance should be taught to all health care students during their curriculum.	1(9.1%)	6 (54.5%)	2 (18.2%)	2(18.2%)	0(0%)
I believe that the topic of pharmacovigilance is well covered in my curriculum.	1(9.1%)	8 (72.7%)	2(18.2%)	0(0%)	0(0%)
I do not have any idea on how to report ADRs to the relevant authorities in Malaysia.	0(0%)	1(9.1%)	4(36.4%)	3(27.3%)	3(27.3%)
Information on reporting ADRs should be taught to all health care students in their curriculum.	1(9.1%)	7 (63.6%)	3 (27.3%)	0(0%)	0(0%)
Information on reporting ADRs shall be better learnt during the internship /training/clinical posting.	1(9.1%)	4 (36.4%)	5 (45.5%)	1(9.1%)	0(0%)
A pharmacist is one of the most important health care professional to report ADRs.	3(27.3%)	6 (54.5%)	2 (18.2%)	0(0%)	0(0%)
In my opinion, reporting of known ADRs will make no significant contribution to the reporting system.	3(27.3%)	4(36.4%)	4(36.4%)	0(0%)	0(0%)
With my present knowledge, I am very well prepared to report any ADRs notice in my future practice.	3(27.3%)	6 (54.5%)	2 (18.2%)	0(0%)	0(0%)

### Perception analysis towards pharmacovigilance and adverse drug reaction reporting

The results on the attitude and perception towards pharmacovigilance and adverse drug reaction reporting among the pre-final and final year students are presented in table 2 and table 3,

respectively. For the question on the necessity of ADR reporting, 84.4% had positive attitude. Among the pre-final and final year students, 100% and 76.2% had positive attitude respectively. For the attitude towards reporting adverse drug reaction as a professional obligation, 71.9% of the students had positive attitude. Among the pre-final and final year students, 100% and 71.4% had

positive attitude respectively. For the necessity of confirming ADR is related to a particular drug before reporting it, only 53.2% had positive attitude. Among the pre-final and final year students, 72.7% and 42.8% had positive attitude respectively.

The participants were asked about their opinion on whether ADR reporting should be voluntary and also on whether it should be compulsory and found that about 53.1% and 68.7% had positive

attitude respectively. It was found that among the pre-final year students, 72.7% and 68.7% had positive attitude respectively whereas among the final year students 57.2% and 66.6% had positive attitude respectively. For the question on whether it is necessary to report serious and unexpected reactions, only 56.3% of students had positive attitude. However 72.2% of participants among the pre-final year and 52.4% of participants among the final year had positive attitude.

**Table 3: Attitude towards pharmacovigilance and adverse drug reaction reporting among final year nursing students**

Questions	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Do you think adverse drug reaction reporting is necessary?	9(42.9%)	7(33.3%)	5(23.8%)	0(0%)	0(0%)
Do you think reporting adverse drug reaction is a professional obligation?	4(19.0%)	11 (52.4%)	5(23.8%)	1(4.8%)	0(0%)
Do you think it is necessary to confirm that an ADR is related to a particular drug before reporting it?	2(9.5%)	7(33.3%)	11 (52.4%)	1(4.8%)	0(0%)
Do you think pharmacovigilance reporting should be voluntary?	3(14.3%)	9(42.9%)	8(38.1%)	1(4.8%)	0(0%)
Do you think pharmacovigilance reporting should be compulsory?	4(19.0%)	10 (47.6%)	4 (19.0%)	2(9.5%)	1(4.8%)
Do you think that it is necessary to report only serious and unexpected reactions?	5(23.8%)	6(28.6%)	6 (28.6%)	4(19.0%)	0(0%)
Pharmacovigilance should be taught to all health care students during their curriculum.	5(23.8%)	9 (42.9%)	7(33.3%)	0(0%)	0(0%)
I believe that the topic of pharmacovigilance is well covered in my curriculum.	1(4.8%)	13 (61.9%)	3 (14.3%)	4(19.0%)	0(0%)
I do not have any idea on how to report ADRs to the relevant authorities in Malaysia.	1(4.8%)	9(42.9%)	11 (52.4%)	0(0%)	0(0%)
Information on reporting ADRs should be taught to all health care students in their curriculum.	2(9.5%)	13 (61.9%)	6 (28.6%)	0(0%)	0(0%)
Information on reporting ADRs shall be better learnt during the internship /training/clinical posting.	2(9.5%)	14 (66.7%)	5(23.8%)	0(0%)	0(0%)
A pharmacist is one of the most important health care professional to report ADRs.	2(9.5%)	8(38.1%)	10(47.6%)	1(4.8%)	0(0%)
In my opinion, reporting of known ADRs will make no significant contribution to the reporting system.	1(4.8%)	11 (52.4%)	3(14.3%)	2(9.5%)	4(19.0%)
With my present knowledge, I am very well prepared to report any ADRs notice in my future practice.	1(4.8%)	10 (47.6%)	6(28.6%)	4(19.0%)	0(0%)

About 71.9% of students had positive perception that pharmacovigilance should be taught to all health care students during their curriculum. Among the pre-final and final year students, 63.6% and 66.7% had positive perception respectively. About 46.9% of students agreed that the topic on pharmacovigilance is well covered in their curriculum. Of which it was 81.8% and 66.7% among the pre-final and final year students respectively. The results found that 56.3% of students do not have idea on how to report ADRs to the relevant authorities in Malaysia. Among the pre-final and final year students, 9.1% and 47.7% had positive perception respectively. About 62.5% of students insisted that information on reporting of ADRs should be taught to all health care students during their curriculum. Among the pre-final (72.7%) and final year (71.4 %) of the students had reported that information on reporting of ADRs should be taught to all health care students.

About 78.1% of students have agreed that the information on ADR reporting shall be better learnt during internships. Among the pre-final, 45.4% of participants and among the final year, 76.2 % of the participants agreed to the same. It was found that only 53.1% of students admitted that pharmacist is one of the most important health care personnel to report ADR. Among the pre-final, 81.8% of the participants and among the final year, 47.6 % of the participants have the same perception. For the students' perception on whether reporting of known ADRs will make any significant contribution to the reporting system, about 65.6% of participants agreed that it does not cause any significant contribution. Among the pre-final, 63.7% of participants and in final year 57.2% of the participants had the same perception. Only 50% of students have agreed that with their present knowledge, they are very well prepared to report any ADRs in their future practice. Among the pre-final, 81.8% of the participants and in final year 52.4 % of the participants have highlighted the same perception.

The study also found that mean score on attitude and perception in pre-final year and final year students were 13.24 and 16.00 respectively. The overall mean score for attitude and perception on ADRs and pharmacovigilance found to be 15.06. There was no significant difference between the mean score for attitude and perception on ADRs and pharmacovigilance observed between pre-final year and final year students ( $p>0.05$ ).

## DISCUSSION

The present study was conducted among the pre-final and final year nursing students and an overall response rate was 100%. From the results, it was noticed that knowledge on the definition of pharmacovigilance was low; however a higher percentage of students knew the purpose of pharmacovigilance and the definition of adverse drug reaction. The student's knowledge on the location of the international centre for adverse drug reaction monitoring was very poor and only few students were aware about the 'WHO online database' for reporting ADR and the most commonly used scales to establish the causality of an ADR. Majority of the students chose that lack of time as the main cause of under-reporting of adverse drug reactions.

The present study result concurs with earlier reports[28, 30-31]. Chatterjee et. Al [33] also stated in their study that a main reason for under reporting of ADRs was the clinical negligibility of the adverse reaction due to lack of time and little knowledge about the types of reactions to be preferentially reported. One quarter of the students was aware that the pharmacovigilance centre in Malaysia was established under the Drug Control Authority (DCA). However, only few students were aware on the ADR reporting system used in Malaysia. Similarly the knowledge among students on what a serious event is was very poor. Unfortunately, only a few students were also aware of the time period within which a serious adverse event

should be reported to the regulatory body in Malaysia. Only few students were aware that nurses are also important health care professionals to report ADR. This suggests that pharmacovigilance topic is either not incorporated sufficiently or not incorporated in the curriculum and there is need of information regarding the topic among these students. Educational training programs on the topic can enhance their knowledge and perception as recommended by different researchers[25, 34].

The results of the present study showed that most of the students had the positive perception towards ADR reporting. About three fourth of the student agreed that ADR reporting is a professional obligation. Previous studies have also identified ADR reporting as a professional obligation[34-36]. ADR reporting as a professional obligation will have moral binding to healthcare professionals and ethical issues.

About 18.8% of students disagree that only serious and unexpected ADRs must be reported. Similar attitude was also been reported in another study[26] and the study findings are also consistent with Malaysian guidelines for reporting ADRs. More than half of the students' perception was that ADR reporting should be compulsory. However, 53.1% of the nursing students in the study also thought that ADR reporting should be voluntary. About more than half of the students (62.5%) in the present study agreed that the topic on pharmacovigilance should be taught to all health care students during their curriculum. This indicated their positive perception for an importance of pharmacovigilance. This finding is similar to that of previous report involving healthcare professionals [25, 34, 35]. Three fourth of the students also agreed that the information on ADR reporting shall be better learnt during internships. But only one- half of the participants perception was that pharmacist is one of the most important health care personnel to report ADR. These findings are similar to the results of healthcare professionals in other studies [13, 27, 37-39].

## CONCLUSION

Pharmacovigilance plays a vital role in meeting the challenges posed by the ever increasing range and potency of medicines, all of which carry an inevitable and sometimes unpredictable potential for harm. When adverse effects and toxicity do appear, especially when previously unknown, it is essential that these are reported, analyzed and their significance is communicated effectively to the audience having knowledge to interpret the information. Knowledge and attitudes exert a strong influence on ADR reporting. The lack of knowledge and negative perceptions about pharmacovigilance and ADR reporting would lead to ADR under-reporting. Fortunately, in the present study, the attitude of the students were mostly positive, however their knowledge has to be increased as their practice also has a large impact on ADRs reporting being a part of health care team. An educational intervention on the topic should be incorporated and the gained knowledge would thereby help the students during their everyday clinical practice in future. This survey will also serve as a preparative measures among these students if they have realized that they are unaware of the answers.

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## CONFLICT OF INTERESTS

The authors declare that they have no conflict of interests

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