ORIGINAL ARTICLE

Comparison of Knowledge Regarding Pharmacovigilance among Fourth and Final Year Medical Students in a medical college of Lahore

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ABSTRACT

Background: Information collected during the pre-marketing phase of drug development is incomplete with regards to possible adverse reactions because by the time of authorization, exposure of less than five thousand human subjects to the drug allows only the more common adverse drug reactions to be detected. This can be detected once the drug is in the market for wide use by the healthcare professionals, through post marketing surveillance phase IV clinical trial and pharmacovigilance practice.

Aim: To assess and compare fourth and final year medical students' knowledge and awareness with respect to Pharmacovigilance and adverse drug reaction reporting.

Methods: A cross-sectional, descriptive epidemiological, questionnaire based study was carried out at private medical college in Lahore. A total of 150 M.B., B.S students were randomly selected from both fourth and final year classes, 75 from each class.

Results: The mean knowledge score of fourth year students was calculated as 6.09 ± 2.558 and that for final year was 6.40±1.980. The p-value was 0.41. There was no significant difference in the mean score between the two groups of classes for knowledge.

Conclusion: The students were deficient in adequate knowledge towards pharmacovigilance and adverse drug reaction reporting. Efforts must be directed towards increasing the knowledge of the future practitioners.

Keywords: Pharmacovigilance, Adverse Drug Reactions Reporting, Undergrad Medical Students

INTRODUCTION

The rapid influx of new drugs in the market in the recent past has given a boost to the drug industry besides helping patients in their illness, but simultaneously imposes a problem of risk of rare adverse drug reactions**[1].** This aspect makes it very important for the healthcare professionals to be very vigilant in detecting these adverse effects (ADR) and report them to the concerned manufacturer and regulatory authority.

The umbrella term of reporting of adverse drug reactions is called pharmacovigilance, which has been defined by the World Health Organization as the "Science and activities relating to detection, assessment, understanding and prevention of adverse effects or any drug related problem" and adverse drug reaction is defined as a "response to a drug which is noxious, unintended, and which occurs at doses normally used in man for the prophylaxis, diagnosis, or therapy of disease or for modification of physiological function".

The World Health Organization program for international drug monitoring was launched in 1968 as a consequence of the thalidomide tragedy. Thalidomide was a supposedly harmless drug marketed in 1957 for pregnancy related nausea and morning sickness. It was soon associated with a congenital anomaly causing severe birth defects where infants were born without limbs. The rationale of setting up this program was to make it possible to detect rare adverse reactions that were not detected through the clinical trial process. This episode became the modern starting point of a science concentrating on patient problems initiated by the use of medicines; called Pharmacovigilance**[2]**.

There are several methods of ADR reporting and each country has its own reporting system. Spontaneous reporting is very important in the detection of unsuspected, serious and unusual ADRs which previously remained undetected during various phases of clinical trials. This helped in many drugs with potential serious harmful effects to be withdrawn from the market**[3]**.

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It is very important to consider drug related issues in the differential diagnosis in patients presenting with new symptoms, as ADRs can differ widely in their clinical presentation and severity. These can have signs and symptoms of any disease and involve any organ of the body. Although majority of ADRs are mild and do not require special therapy, there is a significant percentage that can be serious and fatal[1].

It has been observed that the risk of mortality increases in patients who experience ADRs compared to those who do not. ADRs also increase the hospital stay of patients[4]. Apart from accounting for significant health risk by increasing morbidity and mortality and prolonging hospital stay, it also leads to economic burden on the health care systems. Underreporting is another major problem and only 6-10% of all ADRs are reported[5].

Though pharmacovigilance is considered to be a very important healthcare component all over the world and is being practiced in the developed countries and also in some developing countries like India, Bangladesh, Malaysia and Nigeria, but it is unfortunately not implemented in Pakistan.

Medical students are the future healthcare givers. Educating and training them repeatedly for pharmacovigilance and adverse drug reaction reporting during their undergraduate courses can sensitize them about the importance of pharmacovigilance so resulting in better compliance in their future practice.

As Pharmacology is taught in third year medical college, fourth and final year medical students were selected with the view that they have prior knowledge on Pharmacovigilance. This study was conducted to evaluate the knowledge of Pharmacovigilance among medical students and to compare the same between the two groups on who remembers more of it especially after starting clinical rounds and having patient interaction.

MATERIALS AND METHODS

A descriptive cross-sectional questionnaire based study was done. It was conducted on fourth and final year medical students of Avicenna Medical College, Lahore. Permission from the institutional ethics committee was taken before collecting data. Data collection was done through a pre-validated questionnaire which was filled by the students after obtaining their informed consent. The questionnaire was in English. A total of 212 students participated in the study. Sample size was determined after applying the formula for previous prevalence/proportion, as 150. Simple random sampling was done and seventy five students from each class were selected. Data was collected according to the different variables stated in the questionnaire. Demographic data about the sex, age, internet usage, parents' education and geographical background was taken, as well as data on knowledge about adverse drug reactions reporting and Pharmacovigilance. A total of 16 multiple choice questions were given each having four options with one correct option. The correct answers were scored as one point and the wrong responses were given a zero .The results were evaluated graphically using Microsoft excel sheet. SPSS version 22 was then used to tabulate the data. Percentages were calculated for qualitative data and represented in the form of bar charts. Mean and standard deviation was used to assess the quantitative variables like age. Percentages and frequencies were used for reporting the qualitative variables like gender. Comparison of the relationship of proportions was done by chi square test.

RESULTS

Fig. 1: Question 1: The healthcare professionals whose responsibility is to report Adverse Drug Reactions in a hospital

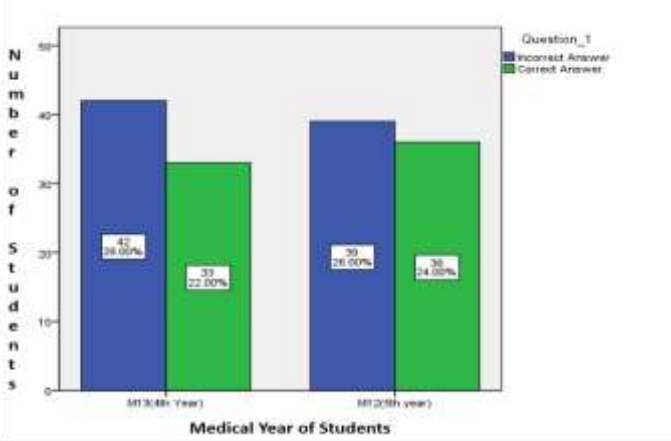


Fig. 2: Question 2 - Define Pharmacovigilance?

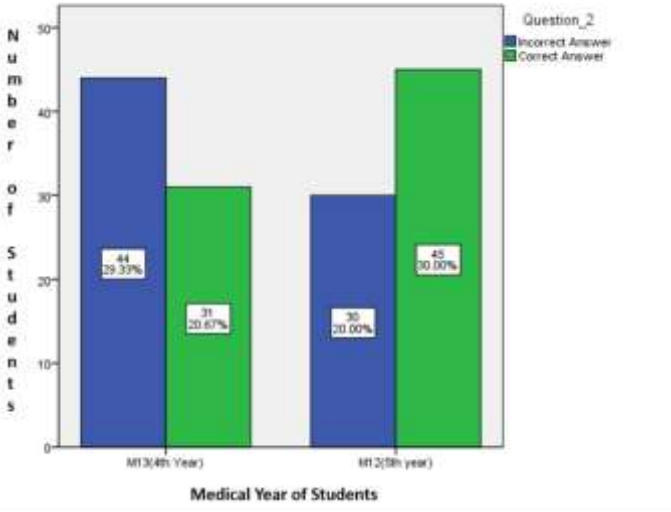
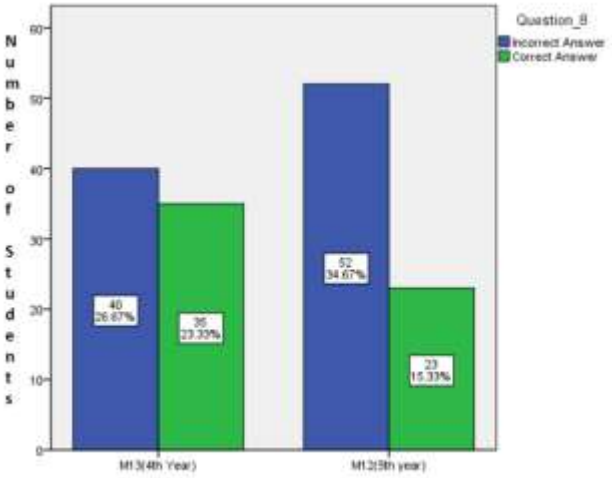


Fig. 3: Question-8 - Select the correct (adverse drug reaction and its causative drug) option:



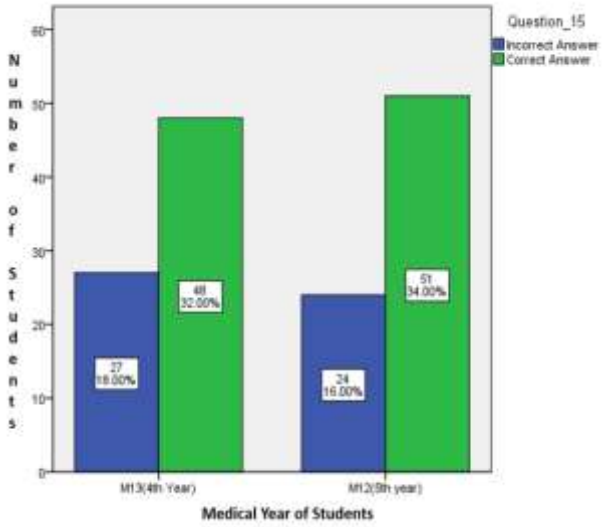


Fig. 4: Question-15 - Is adverse drug reaction reporting a Professional obligation?

Table 1: Detail of the results for knowledge

No	Question	Class	Incorrect Answer	Correct Answer	P-value
1	HCPs responsible for reporting	4th year	42 (28.00%)	33 (22.00%)	**0.62**
		5th year	39 (26.00%)	36 (24.00%)	
2	Definition of pharmacovigilance	4th year	44 (29.33%)	31 (20.67%)	**0.02**
		5th year	30 (20.00%)	45 (30.00%)	
3	Importance of pharmacovigilance	4th year	38 (25.33%)	37 (24.67%)	**1.00**
		5th year	38 (25.33%)	37 (24.67%)	
4	The location of the center responsible for international monitoring of adverse drugs reaction	4th year	70 (46.67%)	5 (3.33%)	**1.00**
		5th year	70 (46.67%)	5 (3.33%)	
5	Scale commonly used for assessing causality of an adverse drug reaction	4th year	63 (42.00%)	12 (18.00%)	**0.30**
		5th year	58 (38.67%)	17 (11.33%)	
6	World Health Organization online database for reporting adverse drug reactions	4th year	61 (40.67%)	14 (9.33%)	**0.68**
		5th year	59 (39.33%)	16 (10.67%)	
7	Which phase of clinical trials can identify rare adverse drug reactions	4th year	63 (42.00%)	12 (8.00%)	**0.82**
		5th year	64 (42.67%)	11 (7.33%)	
8	Selection of correct causative drug to its known reaction	4th year	40 (26.67%)	35 (23.33%)	**0.044**
		5th year	52 (34.67%)	23 (15.33%)	
9	Correct option of the classification of adverse drug reaction	4th year	35 (23.00%)	40 (26.67%)	**0.19**
		5th year	43 (28.67%)	32 (21.33%)	
10	Which adverse drug reaction are the important ones to be reported	4th year	30 (20.00%)	45 (30.00%)	**0.40**
		5th year	25 (16.67%)	50 (33.33%)	
11	Which regulatory body in Pakistan is responsible for monitoring of adverse drug reactions	4th year	36 (24.00%)	39 (26.00%)	**0.33**
		5th year	42 (28.00%)	33 (22.00%)	
12	Method used by healthcare professionals to monitor adverse drug reactions of newly marketed drug	4th year	42 (28.00%)	33 (22.00%)	**0.41**
		5th year	47 (31.33%)	28 (18.67%)	
13	Tabulated in the demographic section				
14	What types of adverse drug reactions are to be reported	4th year	39 (26.00%)	36 (24.00%)	**0.10**
		5th year	29 (19.33%)	46 (30.67%)	
15	Is adverse drug reaction reporting a professional obligation	4th year	27 (18.00%)	48 (32.00%)	**0.60**
		5th year	24 (16.00%)	51 (34.00%)	
16	Measures to be taken when adverse drug reaction is suspected	4th year	38 (25.33%)	37 (24.67%)	**0.032**
		5th year	25 (16.67%)	50 (33.33%)	

Table-2: Comparison of knowledge between (M13) and (M12) classes.

	Class	N	Mean	Std. Deviation	P-value
Overall score	M13(4th Year)	75	6.09	2.558	0.41
	M12(5th year)	75	6.40	1.980	

Table- 3: Comparison of knowledge between (M13) and (M12) classes.

	Class	N	Mean	Std. Deviation	P-value
Overall score	M13(4th Year)	75	6.09	2.558	0.41
	M12(5th year)	75	6.40	1.980	

A total of 150 students, 75 from each class were selected. 22% of 4th years and 24% of final years knew which healthcare professional was responsible for reporting ADRs in a hospital results shown in figure 1. Only 20.67 % of fourth years and 30% of final year students knew the definition of pharmacovigilance shown in Fig. 2. For the question about which drug causes it's specific ADR only 23.33% of fourth years and 15.33% of final years answered correctly shown in Fig. 3. 32% of fourth years and 34% of final years thought that ADR reporting is a professional obligation shown in Fig. 4. Table 1 gives the results in detail.

The overall comparison of knowledge between the two classes showed a mean of 6.09 and SD of 2.558 for fourth year and mean of 6.40 and SD of 1.980 for final year. The p-value was 0.41 which is non-significant given in Table-2.

DISCUSSION

Pharmacovigilance and adverse drug reaction reporting systems is an important and relatively economical means of compiling information on the safety of medicinal products. The capability of this system to continuously and spontaneously collect all such undesired reactions occurring throughout the products life cycle is very important for public health and safety. Amongst the healthcare professionals, doctors are best placed to understand and run the program. Pharmacology students doing further studies in pharmacology are also suited to run these programs purposefully[6].

A proper coordination among the health care professionals and other stake holders like the medical institutions and regulatory bodies is the basis for an efficacious pharmacovigilance program. The biggest hindrance in a successful program is the under reporting of adverse drug reactions.

When doctors prescribe medicines to their patients for relief of their symptoms they are also responsible for ensuring the safety of these products. This can be done by reporting adverse reactions following the established pharmacovigilance system. To do this they should (along with other healthcare professionals) have the knowhow of procedures to be taken. Medical students as future professionals should be trained properly on all the aspects of this vital program of detection, assessment, understanding and preventing adverse drug reactions. This can be ensured during their undergraduate studies and later on by refreshing them through continuous medical education and sessions[7-11].

Some studies conducted in Pakistan like the one in Abbottabad, KPK, in which knowledge, attitude and practice on pharmacovigilance and adverse drug reaction reporting was measured amongst pharmacy and medical students in 2015 demonstrated low knowledge, attitude and practice scores, thus signifying a compelling need to educate and regularly train both these professional students regarding the subject[12]. In this study the knowledge score for medical students was a mean of 27.97 as compared to our study where it was 6.40 (for final year class) which is even lower.

Another survey based descriptive study on the awareness of knowledge of pharmacovigilance / adverse drug reaction reporting among doctors in a public hospital of Hyderabad, Pakistan showed that only 22.22% respondents knew the word pharmacovigilance, 35.55% knew how to report adverse drug reactions, 73.33% never asked their patients about adverse drug reactions and 64.4% did not know about reporting of adverse drug reactions to the concerned authority. This is similar to our study where only around 30% knew the definition of pharmacovigilance and only around 25% knew about the regulatory body responsible for monitoring of adverse drug reactions. Suggestions were given that refreshers and CME programs should be conducted on an urgent basis to improve the knowledge[13].

In an another comparative study between fourth and final year medical students of Malaysia and Nigeria done to compare knowledge, attitude and practice with respect to adverse drug reactions reporting and pharmacovigilance, a statistically significant difference was seen with Nigerian students having better knowledge, attitude and practice (p-value <0.00). The Malaysian students had unsatisfactory knowledge and practice scores similar to our study. The better knowledge and practice of Nigerian students was seen to be due to the training they receive in every medical school and their understanding that this is a professional obligation. 88% of Malaysian students and 82% of Nigerian students felt that this was a professional obligation as compared to our study where it was around 50% for both classes. Comparison of fourth and final year students of Malaysian school showed no statistical significant difference in the mean knowledge score. Similarly Nigerian medical students and our students

did not have a statistical difference in the mean knowledge score amongst the classes[14].

30% of students knew the term pharmacovigilance in our study compared to 55% of medical and dental students studied by Wajiha et al., in medical universities of Karachi[15]. Less than 10% of the students knew where and how to report the adverse drug reactions in both the studies. They also recommended improving the syllabus for the students and adoption by Drug Regulatory Authority of Pakistan of a structured program to improve pharmacovigilance and adverse drug reaction reporting in the country. By doing this the future generations of Health Care Professionals shall be conscientiously involved in implementing pharmacovigilance program in its true spirit.

In our study knowledge of pharmacovigilance was assessed among two groups of respondents. The mean knowledge score attained by fourth year students was 6.09 being lower than the final year students having a mean score of 6.40 given in table 3.

The results in our study on knowledge of pharmacovigilance and adverse drug reaction reporting if compared with other published studies is very poor. Some of the questions are compared here. About which Health Care Professionals are responsible for reporting the adverse drug reactions only 24% of the students in our study knew the correct answer as compared to 48.48% in the study by Manjunath et.al[16]. For knowledge about the WHO online database for adverse reaction monitoring reporting, only 10.67%% knew about vigibase compared to 31.81% in the study by Manjunath et.al.[16].

For the regulatory body responsible for monitoring adverse drug reactions in Pakistan 22% were aware of Drug Regulatory Authority of Pakistan as compared to 48,8% reported by Manjunath et al[16], 79% by Deepak P, et al[17] and 84% reported by Radhakrishnan, et al[18] knowing CDSCO being the body.

Regarding the action to be adopted when suspecting an adverse drug reaction, 33.3% knew the correct answer as compared to 91% in the study by Manjunath et.al[16]. With regards to the severity of types of adverse drug reactions reporting in our study 33.33% knew the answer as compared to 66.66% reported by Manjunath et al[16] 65% by Rehan et.al[19]**.** and 84% by Deepak et al[17]. Adverse drug reaction reporting being a professional obligation 34% in our study thought it was so, as compared to 47% of students in the study by Deepak et al.[17] and 61% in the study by Manjunath et al[16].

In our study 33.33% knew about the measures to be taken when suspecting an adverse drug reaction as compared to 91% in the study by Manjunath et al.[16] and 93% by Deepak et. al.[17]. Recent studies also highlighted the low knowledge score leading to under reporting[20-21].

CONCLUSION

The results obtained were not satisfactory, less than 50% of students from each class gave the right answer. An element of bias could be present in the result as the questions were of multiple choice type. The general observation was that the knowledge of pharmacovigilance was poor in both classes with no difference in the mean knowledge score. The realization that an efficient pharmacovigilance system is the need of the hour is now widely recognized. It is crucial in order to secure the safe use of medicinal products. The medical students who are aware of pharmacovigilance should expect that all medicines can cause adverse drug reactions. This will also contribute effectively in decreasing the irrational use of medicines and thereby reducing morbidity and mortality rates in hospitals. By practicing pharmacovigilance and adverse drug reaction reporting they are likely to ensure safety of their patients and public health at large.

RECOMMENDATIONS

- Pharmacovigilance should be taught in the undergraduate and postgraduate medical courses.
- Nurses and pharmacists should also be taught pharmacovigilance during their studies and they should increasingly be involved in the reporting process.
- The process of reporting should be made easy, convenient and less time consuming as possible.
- Pharmacovigilance should be made compulsory as a professional obligation for healthcare professionals and pharmaceutical companies. This should be done in collaboration with Drug Regulatory Authority of Pakistan, multinational and national pharmaceutical companies.
- There is a need for strong teamwork between the regulatory authorities, academic circles, teaching institutions and hospitals with regard to drug safety issues.

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