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ORIGINAL RESEARCH

Knowledge, Attitudes, and Practices (KAP) Study on Pharmacovigilance among MBBS Students: Understanding Future Medical Professionals Role in Drug Safety

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Abstract:
Background: Pharmacovigilance plays a vital role in ensuring drug safety by monitoring and preventing adverse drug reactions (ADRs). Medical students, particularly MBBS students, form the future backbone of healthcare systems and must be well-versed in pharmacovigilance to ensure safe medication practices. However, existing literature suggests that knowledge, attitudes, and practices (KAP) regarding pharmacovigilance among medical students remain suboptimal. **Aim:** This study aims to assess the knowledge, attitudes, and practices related to pharmacovigilance among MBBS students. Specific objectives include evaluating their understanding of pharmacovigilance principles, assessing their perceptions and willingness to engage in ADR reporting, and identifying factors influencing their KAP, including age and gender. **Methodology:** A cross-sectional KAP study was conducted among MBBS students at Shimogga Institute of Medical Sciences, Shimogga. A structured questionnaire was used to collect data on demographics, knowledge, attitudes, and practices regarding pharmacovigilance. The sample size was determined using Cochran's formula, and convenient sampling was employed. Data were analyzed using SPSS, with descriptive and inferential statistical methods, including chi-square tests and ANOVA, to assess associations between variables. **Results:** The study found that while a majority of MBBS students had heard of pharmacovigilance, their detailed knowledge and practical engagement in ADR reporting were limited. Attitudinal responses indicated a positive outlook toward pharmacovigilance, but barriers such as lack of training, complex reporting procedures, and limited institutional support hindered active participation. Gender and academic year were found to have statistically significant associations with certain KAP components. **Conclusion:** Despite recognizing the importance of pharmacovigilance, MBBS students demonstrated gaps in knowledge and limited engagement in ADR reporting. The findings emphasize the need for enhanced pharmacovigilance training and curriculum integration to improve KAP levels. Implementing structured educational interventions, practical workshops, and institutional support could foster a culture of drug safety awareness among future medical professionals.

Keywords: Pharmacovigilance, Adverse Drug Reactions, Attitudes, Practices, Drug Safety, Medical Education.

Introduction:

Pharmacovigilance plays a crucial role in ensuring the safe and effective use of medicines by monitoring adverse drug reactions (ADRs) and preventing potential drug-related harms. The World Health Organization (WHO) defines pharmacovigilance as the science and activities relating to the detection, assessment, understanding, and prevention of adverse effects or any other drug-related problem(1). With the increasing complexity of modern healthcare and the rapid development of new pharmaceuticals, the importance of pharmacovigilance has become more pronounced. This system not only supports the safeguarding of public health but also fosters a culture of accountability and safety within clinical practices(2).

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Medical education serves as a vital period for instilling essential knowledge, attitudes, and practices (KAP) regarding pharmacovigilance among future healthcare professionals. MBBS students, being at the threshold of their professional careers, are pivotal to promoting safe drug use practices and reporting ADRs. However, studies have indicated that the awareness and practical involvement in pharmacovigilance activities among medical students remain suboptimal[3,4]. A robust understanding and active participation in pharmacovigilance programs are crucial for future doctors to develop an effective response to drug safety issues[5].

Pharmacovigilance education during undergraduate medical training is often limited or integrated into broader pharmacology courses, which may not sufficiently address the practical aspects of ADR reporting and monitoring[6]. As a result, the KAP regarding pharmacovigilance can vary significantly, influencing the willingness and ability of young physicians to participate in ADR reporting[7]. Lack of knowledge and understanding, coupled with a perceived complexity of reporting processes, have been highlighted as barriers to effective participation in pharmacovigilance[8].

Existing literature reveals gaps in knowledge, attitudes, and practices regarding pharmacovigilance among healthcare students. A cross-sectional study conducted in India found that although most medical students had heard of pharmacovigilance, only a fraction possessed comprehensive knowledge or participated in ADR reporting[9]. Furthermore, while students often express positive attitudes toward the importance of ADR reporting, this does not always translate into practice due to insufficient training and logistical challenges [10,11]. Enhancing pharmacovigilance education through targeted training sessions and practical experiences can bridge these gaps and promote proactive engagement[12].

The KAP approach is a well-established method to assess the knowledge, attitudes, and practices of individuals regarding specific topics, including healthcare and medical safety[13]. KAP studies provide critical insights that can guide curriculum development and policy implementation. By evaluating the current state of pharmacovigilance awareness among MBBS students, educational institutions can identify areas for improvement and tailor educational interventions accordingly[14]. Understanding the baseline KAP of medical students regarding pharmacovigilance also aids in aligning their training with global standards and practices[15].

In light of these considerations, this study aims to assess the KAP related to pharmacovigilance among MBBS students. By identifying gaps and exploring the factors influencing their knowledge and practice, this research seeks to propose strategic recommendations for enhancing pharmacovigilance education and training in medical institutions.

Pharmacovigilance is integral to maintaining patient safety and effective medication use through the monitoring and reporting of adverse drug reactions (ADRs) and other drug-related issues. The knowledge, attitude, and practices (KAP) of medical students, particularly those in their MBBS program, play a significant role in shaping future healthcare providers' proactive engagement with pharmacovigilance systems. Understanding their current KAP levels regarding pharmacovigilance is essential for designing effective educational interventions and enhancing overall ADR reporting rates, thus contributing to patient safety and public health.

The objective of this study is to evaluate the knowledge, attitude, and practices related to pharmacovigilance among MBBS students. The study aims to:

1. **Assess the knowledge** of MBBS students regarding pharmacovigilance, including their understanding of ADRs, the significance of reporting, and the functioning of pharmacovigilance systems.
2. **Investigate the attitudes** of MBBS students toward pharmacovigilance, including their perceptions of the importance of ADR reporting and the barriers they may face in reporting such incidents.
3. **Examine the practices** related to ADR reporting among MBBS students, focusing on their experiences and willingness to engage in pharmacovigilance activities.
4. Association between the Knowledge, Attitude, Practice with the Age and Gender.

Pharmacovigilance programs are critical in mitigating risks associated with drug therapies and ensuring safer medical practices. Despite the establishment of regulatory frameworks, the underreporting of ADRs remains a significant challenge, often linked to limited knowledge and a lack of supportive attitudes and practices among healthcare professionals, including future physicians[16]. Addressing these gaps through targeted education and training during medical school can foster a culture of safety and vigilance that extends into professional practice[17].

This KAP study seeks to fill existing knowledge gaps by exploring MBBS students' engagement with pharmacovigilance at various levels of their education. Understanding their baseline KAP will inform educators, policymakers, and medical institutions, facilitating the development of more robust pharmacovigilance training programs. This proactive approach could ultimately enhance ADR reporting rates and promote patient safety[18].

Methodology:

Study Design: A cross-sectional Knowledge, Attitude, and Practice (KAP) study was conducted to assess the understanding, perceptions, and behaviors related to pharmacovigilance among MBBS students.

Study Setting: The study was carried out at Shimogga Institute of Medical Sciences, a recognized institution in Shimogga, Karnataka. The target

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participants were MBBS students from various years of their medical curriculum.

Study Population: The population for this study comprised MBBS students enrolled in 1st to final year. Inclusion criteria were students who were currently attending regular academic sessions and willing to participate. Students who were absent during the data collection period or declined participation were excluded.

Sample Size Determination: The sample size was calculated using Cochran's formula for cross-sectional studies. Assuming a prevalence rate of knowledge or positive attitude toward pharmacovigilance as 66.5%, a margin of error of 0.08, and a confidence level of 95%, the final sample size was estimated to be 162 participants.

Sampling Technique: Convenient Sampling.

Data Collection Tool: A structured questionnaire was developed, comprising four main sections:

Demographics: Age, gender, academic year, and any prior training in pharmacovigilance.

Knowledge Assessment: Multiple-choice and true/false questions covering key aspects of pharmacovigilance, such as definitions, objectives, and reporting processes.

Attitude Assessment: Statements rated on a 5-point Likert scale to gauge students' perspectives on the importance and usefulness of pharmacovigilance.

Practice Assessment: Items focused on students' actual experiences or practices related to reporting adverse drug reactions (ADRs) and engaging in pharmacovigilance activities.

Questionnaire Validation: The tool underwent a pilot test with a small sample of 20 MBBS students to assess its clarity, reliability, and validity. Necessary adjustments were made based on their feedback to ensure the final instrument was both comprehensive and user-friendly. The Cronbach's alpha value for internal consistency was calculated and found to be 0.8 - 0.89, indicating good reliability.

Data Collection Procedure: Data was collected over a period of two weeks through in-person distribution of the questionnaires. Students were briefed on the purpose of the study, and written informed consent was obtained before participation.

Ethical Considerations: Ethical clearance was obtained from Shimogga Institute of Medical Sciences, Shimogga. Participants were assured of anonymity and confidentiality, with the option to withdraw from the study at any point without any repercussions.

Data Analysis: Data was entered into MS Excel and analyzed using SPSS version 16. Descriptive statistics, such as frequencies, means, and standard deviations, were used to summarize demographic data and KAP scores. Inferential statistics, including chi-square tests and ANOVA, were applied to examine associations between demographic characteristics and KAP scores. A p-value < 0.05 was considered statistically significant.

Results:

In the age 18:8 respondents, making up 4.9% of the total, are 18 years old, indicating this age group represents a small portion of the sample. Age 19:20 respondents, or 12.3%, are 19 years old. This group contributes a modest portion to the overall age distribution. Age 20:The largest group consists of 70 respondents, which is 43.2% of the total. This suggests that most participants are 20 years old, making it the dominant age group in the data set. Age 21:45 respondents, equating to 27.8%, are 21 years old. This is the second-largest group, making up more than a quarter of the sample. Age 22:19 respondents, or 11.7%, are 22 years old, representing a smaller but notable segment of the sample (Table 1, Graph 1).

In the gender distribution data of respondents: Female:66 respondents, making up 40.7% of the total sample, are female. This indicates that a significant portion of the respondents are women, but they are not the majority.Male:96 respondents, or 59.3%, are male. This shows that the majority of the respondents are men, making up over half of the sample. Total Sample: The total number of respondents is 162, representing 100% of the sample. (Table 2, Graph 2).

The table 3 provides data on knowledge and awareness regarding Adverse Drug Reactions (ADRs) and Pharmacovigilance. Definition of Pharmacovigilance:98.1% of respondents agreed that Pharmacovigilance involves detecting, assessing, understanding, and preventing adverse effects or drug-related problems, indicating excellent knowledge in this area. Purpose of Pharmacovigilance:95.7% understood that its primary goal is to identify adverse drug reactions globally, showing strong awareness of the field's objectives. CDSCO as India's Regulatory Body:86.4% recognized that the Central Drugs Standard Control Organization (CDSCO) is responsible for monitoring ADRs in India, reflecting good knowledge of national regulations. International Center for ADR Monitoring: 59.9% correctly identified the location (Geneva Monitoring Center), but 40.1% were unaware, indicating room for improvement in international Pharmacovigilance knowledge. Awareness of Drugs Banned Due to ADRs:69.8% knew about drugs banned due to ADRs, showing fair awareness. However, 30.2% were unaware, suggesting a need for education about the consequences of ADRs. Source of Information on ADRs for New Drugs:65.4% were aware of sources to gather information, while 34.6% were not, highlighting an opportunity to improve access to reliable sources. Exposure to ADR Reporting Forms: A notable 92% had seen the ADR reporting form, indicating significant exposure to practical tools for reporting ADRs. Types of ADRs to be

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Reported:72.8% believed all types of ADRs should be reported, reflecting strong awareness of comprehensive reporting. However, 27.2% may need further clarification on the importance of reporting all ADRs. Definition of Serious Adverse Events:88.9% agreed with the definition provided, indicating good understanding, though 11.1% disagreed, pointing to a potential gap in knowledge. Importance of ADR Reporting: An overwhelming 98.8% agreed that ADR reporting is essential, demonstrating a near-unanimous understanding of its importance in healthcare.

Table 4 provides information about necessity of ADR Reporting: 98.8% of respondents believe ADR reporting is necessary, indicating a strong consensus on its importance in healthcare safety. Complexity of Filling the ADR Form:66.7% did not find the ADR form complex, suggesting that the majority find it manageable. However, 33.3% found it complex, highlighting a significant portion of respondents who may need more training or simplified forms to ensure efficient reporting. Pharmacovigilance Education: 96.9% agreed that Pharmacovigilance should be taught in detail to healthcare professionals, showcasing a clear recognition of the value of in-depth education in enhancing drug safety practices. ADR Reporting and Patient Safety:98.8% believed that ADR reporting ensures patient safety, demonstrating a strong understanding of the role ADR reporting plays in protecting patients and improving drug safety protocols. Importance of Keeping ADR Records:98.1% felt that maintaining ADR records is essential, showing an overwhelming agreement on the importance of proper documentation for effective Pharmacovigilance. Need for ADR Monitoring Centers:92% supported the establishment of ADR monitoring centers in every hospital, indicating broad recognition of the need for dedicated infrastructure to manage ADRs effectively. Providing Instructions on ADRs to Patients:94.4% believed that instructions should be given regarding ADRs when prescribing medications, emphasizing the value respondents place on patient education and informed consent. ADR Reporting as a Professional Obligation:75.3% saw ADR reporting as a professional obligation, while 24.7% did not, suggesting that while the majority feel responsible for ADR reporting, there is still a significant minority who may need further encouragement or understanding of their role in this aspect of patient care.

Table 5 data gives information about involvement in ADR Reporting: 27.2% of respondents reported playing a role in ADR reporting from their hospital, while 72.8% had not, indicating limited hands-on experience in ADR reporting. Encountering ADRs in Practice: Only 30.9% reported coming across ADRs during their practice, whereas 69.1% had not, suggesting that many respondents may not have frequent exposure to ADRs or may not recognize them effectively. Knowledge of Methods to Send ADR Information: 57.4% knew the method to send ADR information to a reporting center, but 42.6% did not, highlighting a knowledge gap that could affect timely and proper reporting. Sharing Information about ADRs:59.3% shared information about ADRs with others, while 40.7% did not, showing that sharing knowledge and insights on ADRs is somewhat common but could be improved. Frequency of Reporting ADRs: Only 37% often reported ADRs from their hospital, compared to 63% who did not, indicating a low frequency of active reporting in practice. Willingness to Implement ADR Reporting: A strong 92.6% expressed willingness to implement ADR reporting in their practice, showing a positive attitude and openness to adopt this practice if given the opportunity or support. Training in ADR Reporting:76.5% of respondents had received training in ADR reporting, suggesting a majority have some formal education or experience, though 23.5% lacked training, indicating a need for more widespread training programs. Knowledge of Drugs Causing ADRs:66.7% knew the common drugs that cause ADRs, while 33.3% did not, indicating a fair level of awareness but with room for improvement in this area. Repeated Involvement in ADR Reporting:29% had reported ADRs more than once, while 71% had not, reinforcing the finding that active involvement in ADR reporting is limited among respondents. Requirement for Expedited Reporting:87% believed that expedited reporting of serious and unexpected ADRs is necessary, showing a strong understanding of the importance of timely reporting for serious cases.

For knowledge, the highest proportion of individuals with above-average scores is seen in the age group 18.0 (87.5%), followed by age 20.0 (72.85%) and age 22.0 (68.42%). The age groups 19.0 and 21.0 show above-average scores of 65% and 64.44%, respectively. The p-value for knowledge is 0.673, indicating no statistically significant difference across age groups. In terms of attitude, the age group 22.0 has the highest percentage of individuals with above-average scores at 84.21%, followed by age 20.0 at 77.14% and age 21.0 at 68.88%. The age groups 19.0 and 18.0 show above-average scores of 70% and 62.5%, respectively. The p-value for attitude is 0.606, suggesting no statistically significant difference among the age groups. For practice, age 18.0 shows the highest proportion of above-average scores at 75%, followed by age 22.0 (42.10%), age 21.0 (42.22%), and age 20.0 (41.42%). The age group 19.0 has the lowest proportion of above-average scores at 45%. The p-value for practice is 0.473, indicating that there is no statistically significant difference in practice scores across the different age groups (Table 6).

Overall, the data suggests that while variations exist in knowledge, attitude, and practice scores across age groups, none of these differences are statistically significant as indicated by the p-values for each category.

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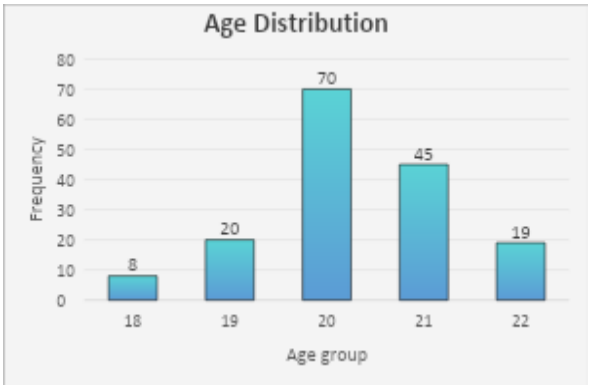
For knowledge, 70.83% of males scored above average compared to 46.48% of females. Conversely, 29.16% of males scored below average, while only 10.12% of females did. The total number of participants was 96 for males and 66 for females. The p-value for knowledge is 0.718, indicating no statistically significant difference between males and females in terms of knowledge scores. Regarding attitude, 80.30% of females had above-average scores, higher than the 69.79% of males. The below-average scores were 19.69% for females and 30.20% for males. The total number of participants was consistent, with 96 males and 66 females. The p-value for attitude is 0.134, showing no statistically significant difference in attitude scores between genders. In terms of practice, 50% of males scored above average, compared to 34.84% of females. The proportion of below-average scores was 50% for males and 65.15% for females. The p-value for practice is 0.056, indicating that there is no significant difference at the conventional 0.05 level, though it is close to significance, suggesting a potential gender-based variation in practice scores (Table7).

AGE		
	Frequency	Percent
18	8	4.9
19	20	12.3
20	70	43.2
21	45	27.8
22	19	11.7
Total	162	100

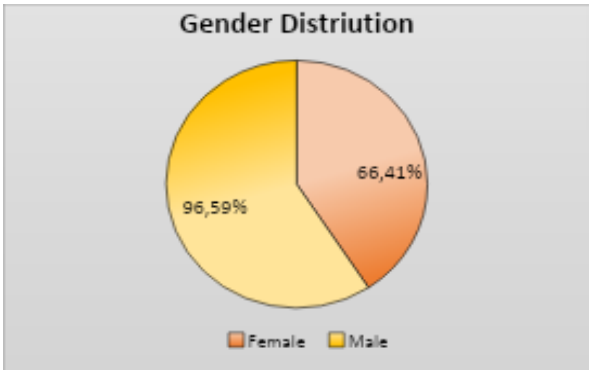
Table 1: Age Distribution



Graph 1: Age Distribution

GENDER		
	Frequency	Percent
Female	66	40.7
Male	96	59.3
Total	162	100

Table 2: Gender Distributions



Graph 2: Gender Distributions

Table 3: Knowledge about Pharmacovigilance among MBBS Students

Knowledge	Response	Frequency	Percentage
1. It is the science and activities relating to detection, assessment, understanding and prevention of adverse effects or any other drug related problem.	Disagree	3	1.9
	Agree	159	98.1
2.The most important purpose of Pharmacovigilance is? To identify adverse drug reactions across the globe	Disagree	7	4.3
	Agree	155	95.7
3.CDSCO, in India is the regulatory body responsible for Monitoring ADRs?	Disagree	22	13.6
	Agree	140	86.4
4.Where is the international center for adverse drug reaction Monitoring located? GENEVA monitoring center .	Disagree	65	40.1
	Agree	97	59.9
5.Are you aware of any drug that has been banned	No	49	30.2

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due to the ADRs?	Yes	113	69.8
6.Do you have information on sources to gather information about ADRs to new drugs?	No	56	34.6
	Yes	106	65.4
7.Have you ever seen the ADR reporting form?	No	13	8
	Yes	149	92
8.In your view what type of ADRs should be reported?	No	44	27.2
	Yes	118	72.8
9.What is a serious adverse event or any untoward medical occurrence that at any doses results in death,life threatening , requires inpatient hospitalization, significant disability.	Disagree	18	11.1
	Agree	144	88.9
10.Do you think reporting of adverse drug reactions is necessary?	No	2	1.2
	Yes	160	98.8

Table 4: Attitude about Pharmacovigilance among MBBS Students

Attitude	Responses	Frequency	Percentage
1.Whether ADR reporting is necessary?	No	2	1.2
	Yes	160	98.8
2.Whether filling the ADR FORM is complex?	No	108	66.7
	Yes	54	33.3
3.In your opinion pharmacovigilance should be taught in detail to healthcare professionals?	No	5	3.1
	Yes	157	96.9
4.Whether ADR reporting will ensure patient safety?	No	2	1.2
	Yes	160	98.8
5.Whether keeping ADR records is necessary ?	No	3	1.9
	Yes	159	98.1
6.Is there a need to establish ADR MONITOR CENTRE in every hospital?	No	13	8
	Yes	149	92
7.Whether instructions should be given regarding ADR to the patient / patients party when prescribing medicine?	No	9	5.6
	Yes	153	94.4
8. What do you think ADR Reporting is a professional obligation to you?	No	40	24.7
	Yes	122	75.3

Table 5: Practice about Pharmacovigilance among MBBS Students

Practice	Responses	Frequency	Percentage
1.Did you ever play any role in reporting ADR from your Hospital?	No	118	72.8
	Yes	44	27.2
2.Have you come across ADR in your patient during your practice ?	No	112	69.1
	Yes	50	30.9
3.Do you know which method to send ADR Information to an ADR reporting centre .	No	69	42.6
	Yes	93	57.4
4.Do you ever share information about ADRS with anyone?	No	66	40.7
	Yes	96	59.3
5.DO you often come across reporting the ADR from your hospital ?	No	102	63
	Yes	60	37
6.Are you willing to implement ADR reporting in your practice?	No	12	7.4
	Yes	150	92.6
7.Did you ever been trained in ADR reporting ?	No	38	23.5
	Yes	124	76.5
8.DO you know which common drugs cause ADR?	No	54	33.3
	Yes	108	66.7
9.Have you ever played any role in reporting the ADR from your Hospital?	No	115	71
	Yes	47	29
10.whether Expedited reporting of serious and unexpected ADR is required ?	No	21	13
	Yes	141	87

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Table 6: Association between Knowledge, Attitude and Practice with the age group.					
		Above average	Below Average	Total	P value
knowledge	18.0	7(87.5%)	1(12.5%)	8(100%)	0.673
	19.0	13(65%)	7(35%)	20(100%)	
	20.0	51(72.85%)	19(27.14%)	70(100%)	
	21.0	29(64.44%)	16(35.55%)	45(100%)	
	22.0	13(68.42%)	6(31.57%)	19(100%)	
Attitude	18.0	5(62.5%)	3(37.5%)	8(100%)	0.606
	19.0	14(70%)	6(30%)	20(100%)	
	20.0	54(77.14%)	16(22.85%)	70(100%)	
	21.0	31(68.88%)	14(31.11%)	45(100%)	
	22.0	16(84.21%)	3(15.78%)	19(100%)	
Practice	18.0	6(75%)	2(25%)	8(100%)	0.473
	19.0	9(45%)	11(55%)	20(100%)	
	20.0	29(41.42%)	41(58.57%)	70(100%)	
	21.0	19(42.22%)	26(57.77%)	45(100%)	
	22.0	8(42.10%)	11(57.89%)	19(100%)	

Table 7: Association between Knowledge, Attitude and Practice with gender					
	Gender	Above average	Below Average	Total	P value
Knowledge	Female	45(46.48%)	21(10.12%)	66(100%)	0.718
	Male	68(70.83%)	28(29.16%)	96(100%)	
Attitude	Female	53(80.30%)	13(19.69%)	66(100%)	0.134
	Male	67(69.79%)	29(30.20%)	96(100%)	
Practice	Female	23(34.84%)	43(65.15%)	66(100%)	0.056
	Male	48(50%)	48(50%)	96(100%)	

Discussion:

Pharmacovigilance (PV) is essential in ensuring the safety and efficacy of medicinal products. It involves detecting, assessing, understanding, and preventing adverse effects or any other drug-related problems. Medical students, particularly those pursuing an MBBS degree, represent a critical group in PV, as they are future prescribers. Understanding their knowledge, attitudes, and practices (KAP) regarding PV is crucial for reinforcing drug safety measures. This literature review synthesizes recent studies on KAP concerning pharmacovigilance among MBBS students.

The study "Knowledge, attitude and awareness of pharmacovigilance among medical students in a tertiary care centre" by Yatish Byndoor, Tamilisetti Vidya Sagar, and Anupam Das investigates the understanding and perceptions of pharmacovigilance among medical students. Conducted at a tertiary care teaching hospital, the research emphasizes the importance of integrating pharmacovigilance education into medical curricula to improve adverse drug reaction (ADR) reporting practices. It highlights gaps in knowledge and awareness about the Pharmacovigilance Programme of India (PvPI) and underscores the need for targeted educational interventions to enhance reporting compliance and patient safety. The study advocates for structured pharmacovigilance training to better prepare future healthcare professionals for active participation in pharmacovigilance activities[19]. The cross-sectional study evaluated the knowledge, attitudes, and perceptions of pharmacovigilance (PV) and adverse drug reaction (ADR) reporting among 710 healthcare students from Saudi universities. It found that while 60.8% of students correctly defined PV, only 40% understood ADRs. Pharmacy students demonstrated significantly better knowledge, attitudes, and perceptions compared to students in medicine, dentistry, and nursing. However, only 39% of all participants had received formal PV education, and 49% felt it was adequately covered in their curriculum. The study highlights the need to integrate PV education into healthcare programs to better prepare students for real-world practices[20].The study by Meher et al. (2015) aimed to evaluate the knowledge, attitude, and practice (KAP) of pharmacovigilance among undergraduate medical students at a tertiary care teaching hospital in South India. The results showed that while students had a moderate understanding of key concepts like adverse drug reactions (ADRs) and pharmacovigilance processes, their practical exposure was minimal. About 97% agreed on the necessity of ADR reporting, and 81% recognized its benefits for both patients and doctors. However, only a small percentage (12%) had formal training in ADR reporting, and practical involvement was negligible, with just 2% participating in ADR reporting. The study highlighted the need for integrating pharmacovigilance education into the curriculum to bridge the gap between theoretical knowledge and practical implementation[21]. The study titled "Nursing Professionals' Awareness of Adverse Drug Reactions

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and Pharmacovigilance in an Institute of National Importance in India: A Cross-Sectional Study" by Bankar et al. (2023) assessed the knowledge, attitude, and practices of 275 nursing professionals regarding adverse drug reaction (ADR) reporting and pharmacovigilance. Most participants were females (74%) with a Bachelor of Science in Nursing degree (87%), and their mean working experience was two years. While 75% had managed patients with ADRs, a significant majority (96%) had never received formal training on ADR reporting. Knowledge scores varied, with only 4.4% achieving a good score (>80%). Common barriers included a lack of awareness of ADR monitoring centers and reporting procedures. The study emphasizes the need for targeted educational programs to enhance the role of nursing professionals in pharmacovigilance systems[22].The study by Bepari et al. (2019) evaluates and compares the knowledge, attitude, and practice (KAP) of healthcare professionals regarding India's pharmacovigilance system. This cross-sectional study involved doctors, pharmacists, and nurses, focusing on their understanding of adverse drug reaction (ADR) reporting and its importance. Results indicated significant gaps in knowledge and practical application across all groups, though doctors demonstrated relatively better awareness compared to pharmacists and nurses. The study emphasized the need for structured training programs and institutional support to enhance ADR reporting and integrate pharmacovigilance into routine healthcare practices effectively[23].The study by Khardali (2024) explored the knowledge, perceptions, and practices of community pharmacists in Saudi Arabia regarding pharmacovigilance and adverse drug reaction (ADR) reporting. Conducted as a nationwide survey, it revealed that most community pharmacists were familiar with the Saudi National Pharmacovigilance and Drug Safety Center and its ADR reporting protocols. The findings showed a high awareness (over 86%) and positive attitudes toward the importance of ADR reporting for patient safety and public health. However, practical implementation faced challenges, with pharmacists highlighting the need for more comprehensive training programs by the Saudi Food and Drug Authority to enhance ADR detection and reporting. The study emphasized that despite general knowledge, ongoing education and system improvements are necessary to bridge the gap between awareness and effective pharmacovigilance practices[24].

Conclusion:

In conclusion, the findings suggest that while MBBS students generally possess adequate knowledge and positive attitudes towards pharmacovigilance, practical application appears less robust, particularly among females. The lack of statistically significant differences across age and gender indicates that targeted educational initiatives might be beneficial in enhancing practical skills uniformly across demographics. Strengthening training programs and practical exposure could better prepare future medical professionals to actively participate in pharmacovigilance, ultimately contributing to improved drug safety and patient care.

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