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ANALYSING SECOND-YEAR MEDICAL STUDENTS' KNOWLEDGE, ATTITUDE, AND PRACTICE REGARDING THE "P-DRUG" CONCEPT: A KAP ANALYSIS

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ABSTRACT
P drug is the preferred or personal drug that practitioners prescribe regularly for a particular disease; of their own choice and are familiar with that drug, in a cost-effective manner. This questionnaire-based cross-sectional online study among 250 second-year medical students aims to address the knowledge, awareness, and practice of P-drug which would help them to prescribe drugs rationally. We found significant improvement in knowledge and change in attitude after sensitization towards the use of P-drugs. Attitude and awareness to practice teaching programs for the preparation of a p-drug list and cost-effective management for disease in a patient or society as a whole proved to be the engaging interest according to the responses received from the survey**.** The result emphasizes the importance of incorporating the P-Drug concept into medical curricula, ensuring that students are adequately trained and prepared to implement it effectively in their future practice. However, there is a clear need to bridge knowledge gaps and enhance practical engagement in personalized medicine. Integrating this concept into pharmacology and therapeutics courses, as well as clinical rotations, could help students understand its practical relevance and enhance their confidence in applying it in clinical settings.

KEYWORDS: p-drug, questionnaire-based, sensitization, personalized medicine.

INTRODUCTION
It was observed (worldwide) that more than 50% of all medicines are prescribed, dispensed, and sold inappropriately, and more than 50% of patients failed to take them correctly.[1] There are many other reasons which may lead to the irrational use of drugs as there is no appropriate training of medical graduates, absence of well-managed drug regulatory authorities, promotional activities, irregular facilities which do not provide proper information on currently used drugs, polypharmacy, and not giving proper time to the patients.[2]

Prescribing is always a challenging task that requires knowledge of essential medicine rational use of medicine and personal drugs (P-drug). P- drugs are one's priority choice for given medical indications and which are chosen to prescribe drugs regularly and with which one is familiar. It is not just a name of the pharmacological substance but it also includes dosage schedule, dosage forms, and duration of treatment.[3]

P drug concept and rational prescription are very useful and important in undergraduate Pharmacology practical curriculum. Therefore, the point that arises is "What is P drug." P drug is the preferred or particular or personal drug that practitioners prescribe regularly for a particular disease; of their own choice and are familiar with that drug, in a cost-effective manner.[4] The P-Drug concept refers to the practice of tailoring drug prescriptions to individual patients based on their characteristics, such as age, gender, weight, and genetic factors. The p-drug concept varies differently from one country to another and doctor to doctor due to availability, cost, essential drug list, medical culture, different national formularies, and interpretation of every individual about a drug (information).[3,5] It aims to improve therapeutic outcomes by considering individual variations in drug response and minimizing adverse effects.

Due to the fast growth of the pharmaceutical industry in India provides a large number of drugs with variability in cost so every practitioner has his own choice and the selection of P drug become a big issue.[6] According to the WHO guideline, the selection of the drug should be based on a logical, deductive process including comprehensive and objective information. To prescribe any drug to a patient for personalized prescription, the treating doctor needs to consider certain factors such as prescriber factors, drug factors, and patient factors.[7] P-

drug concept should never be indicated based on senior doctors or of course, by sales representatives.

The use of STEP criteria helps the treating doctor to develop a rational therapeutic plan for every individual patient.[7] The six steps of criteria are as follows.

- Define the diagnosis
- Specify the therapeutic objectives
- Make an inventory of the effective group of drugs
- Choose an effective group according to the criteria
- Choose a P-drug
- Determine the monitoring parameters or follow-up

The rationale behind this study is that there are very few studies of the P-drug concept focused on undergraduates, as undergraduates are the future budding practitioners. This study aims to assess the knowledge, attitudes, and practices (KAP) of medical students regarding the P-Drug concept through a questionnaire-based survey among second-year medical students.

MATERIAL AND METHOD

A questionnaire-based cross-sectional online study was conducted among 250 second-year medical students in the Department of Pharmacology, GSVM Medical College, Kanpur, UP. Consent was taken for the study. Students were sensitized about the P drug concept and rational use of the drug after recording the responses regarding the pre-test on the p drug questionnaire. We assessed the awareness and knowledge about P drug at their level by a self-designed structured questionnaire containing 13 questions. A questionnaire link was sent to the students which was prepared via Google form. 20 minutes time duration was allowed to submit their responses. Their responses were collected pre-discussion and post-discussion automatically via two different links on the requested email. We included nine questions based on the Likert scale and four questions were multiple choice questions. Submitted data was analyzed in percentages and numbers.

RESULT

Gender and Age distribution of students during the pre and post-test with 100% response rate have been shown in Figure 1 and Figure 2 respectively. During both Pre-test and Post-test, 40% of participants were female while 60% were male. During both tests, 115(46%) students belong to the age group of 21-22 years, while 75(30%) belong to 19-20 years and 60(24%) belong to the 23-24 years age group.

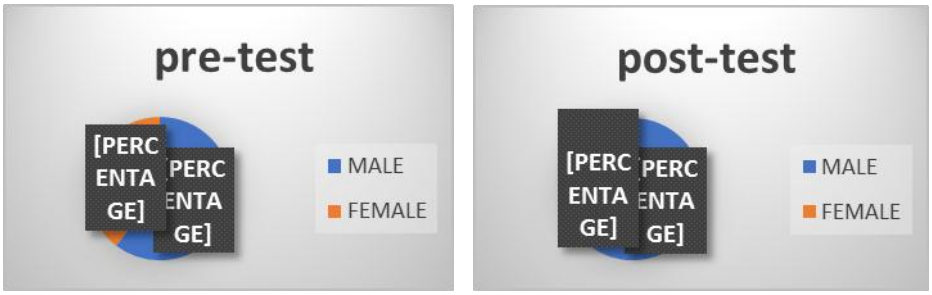


Fig. 1: Gender Distribution.

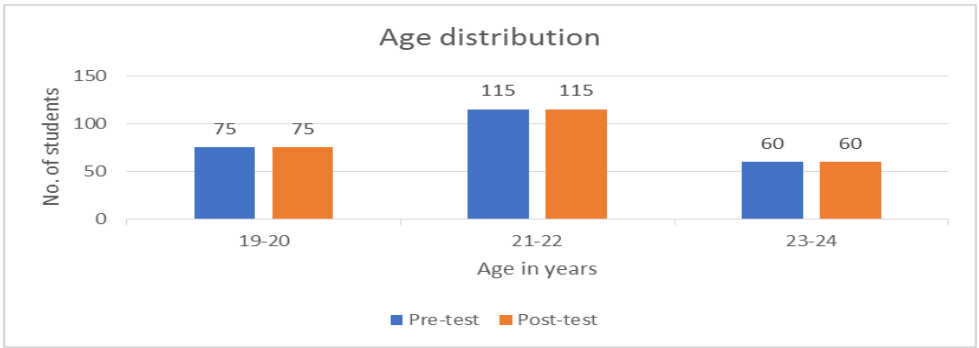
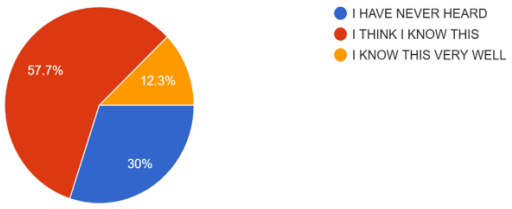


Fig. 2: Age distribution.

Among 250 students, the responses recorded the percentage of students being aware of the term p- drug included 12.3% who knew it very well in the pre-test and increased up to 58% while during the post-test and among them 98% could relate to the usefulness of p drug concept in post-test response depicted in figure 3a, 3b and 4a, 4b below respectively.

Pre-test response



Post-test response

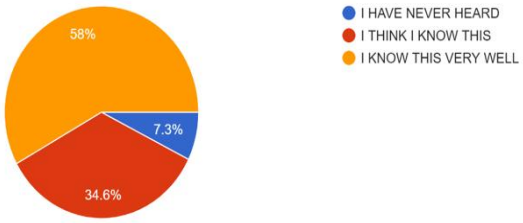
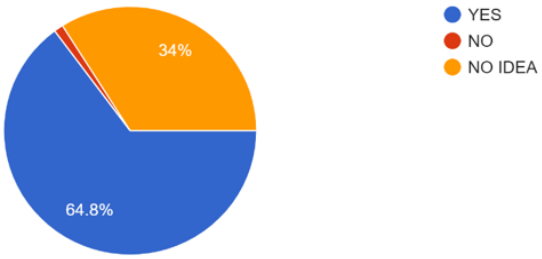


Fig. 3: responses on awareness of the term P-drug.

Pre-test response



Post-test response

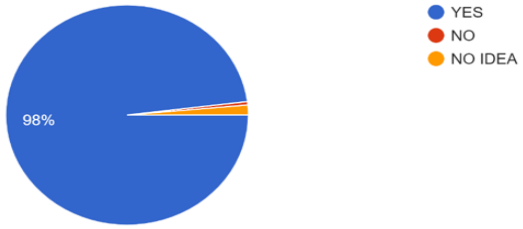
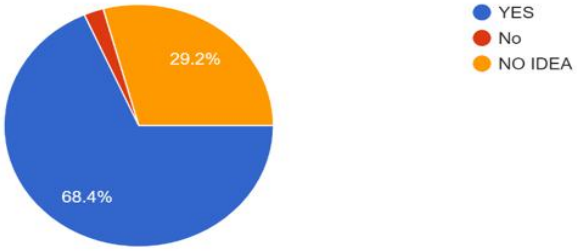


Fig. 4: responses on the usefulness of the P-drug concept.

Among 250 respondents, 94.1% were able to correlate the p-drug concept being beneficial for patients during their post-test responses compared to 68.4% during the pre-test in Figure 5a, 5b and awareness regarding STEP criteria for a p- drug selection among respondents depicted in Figure 6 below.

Pre-test response



Post-test response

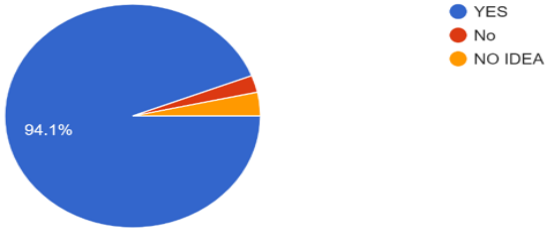


Fig. 5: responses on the P-drug concept beneficial for the patients.

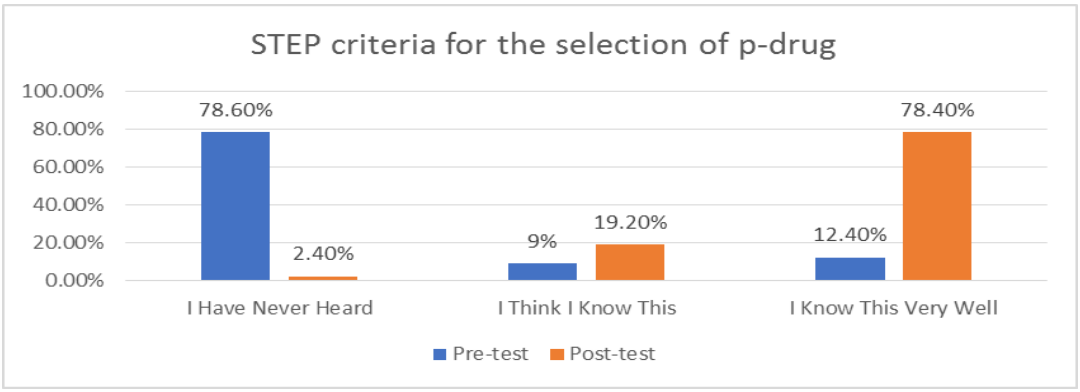


Fig. 6: responses on awareness of the STEP criteria for the selection of p-drug.

Post-questionnaire reported 89.6% could relate to safety, tolerability, efficacy, and cost together being kept in mind during the selection of p- a drug compared to pre-test responses depicted in figure 7 below.

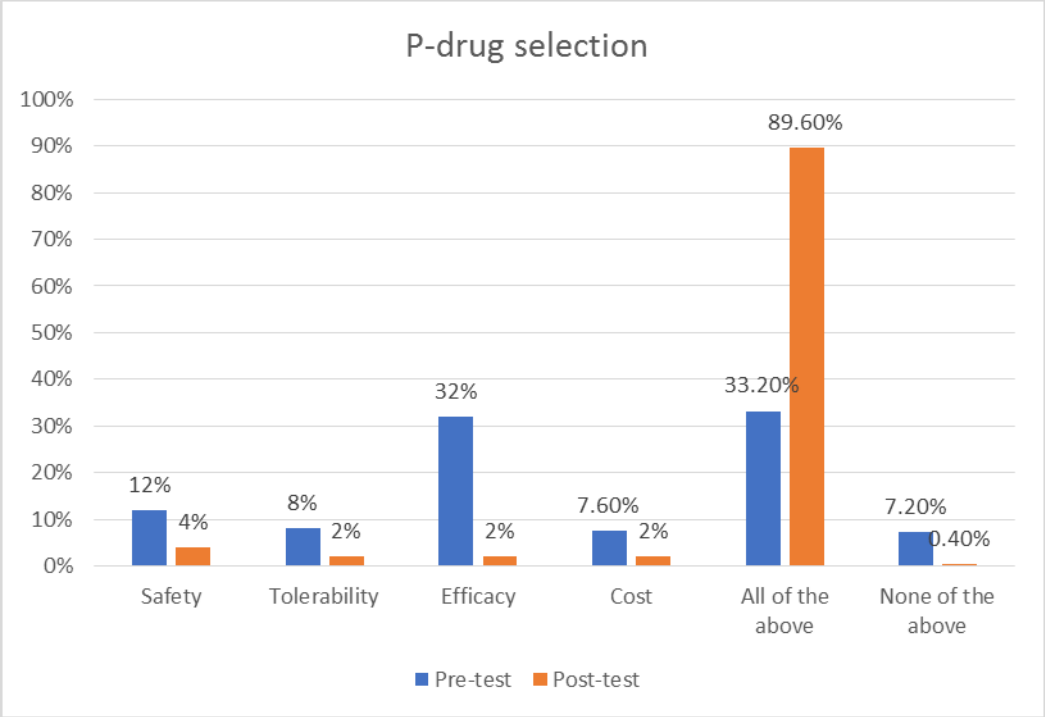
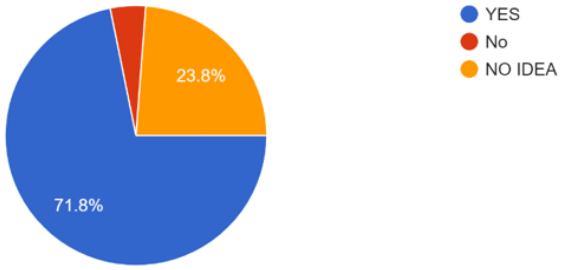


Fig. 7: Points to be kept in mind during the selection of p-drug.

Knowledge about the necessity for detailed history taking and making the differential diagnosis for the p-drug selection increased to 94% compared to 71.8% during the pre-test session ultimately depicting increased awareness regarding the concept shown in Figure 8 below.

Pre-test response



Post-test response

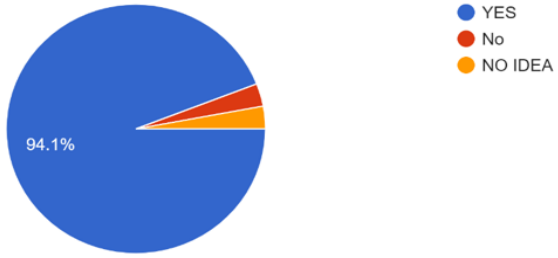
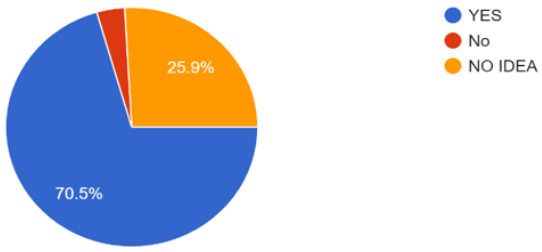


Fig. 8: The necessity of detailed history taking and making the differential diagnosis for the p-drug selection.

Responses on therapeutic objective being necessary, points to be considered and platforms to be considered for creating an inventory of effective groups while preparing a p-drugs list depicted in Figures 9a, 9b, and 10 respectively.

Pre-test response



Post-test response

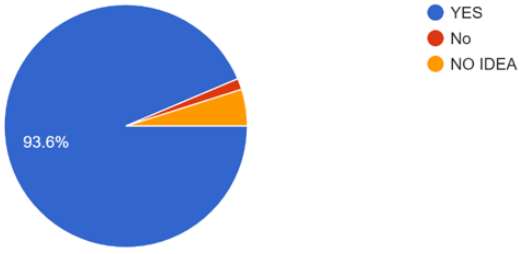
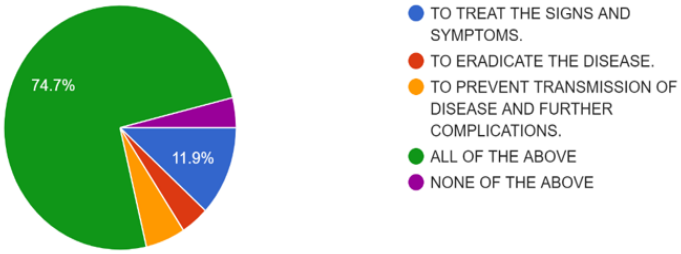


Fig. 9a: Need for therapeutic objectives for the selection of p-drugs.

Pre-test response



Post-test response

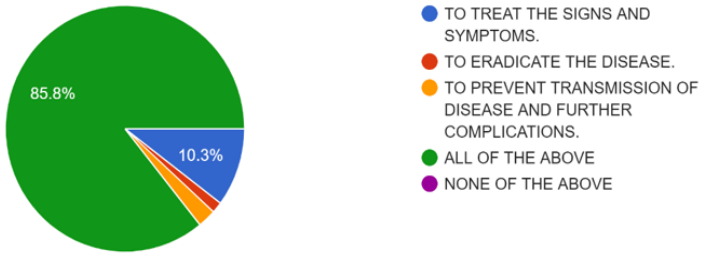
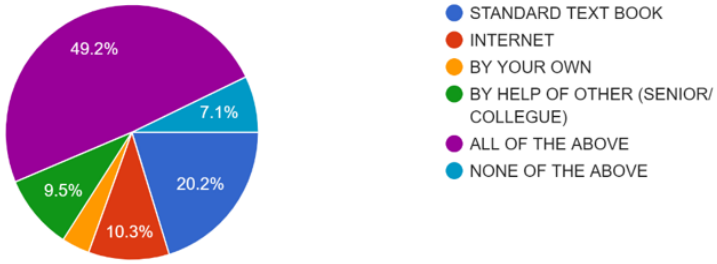


Fig. 9b: Therapeutic objectives to be considered while preparing a p-drug list.

Pre-test response



Post-test response

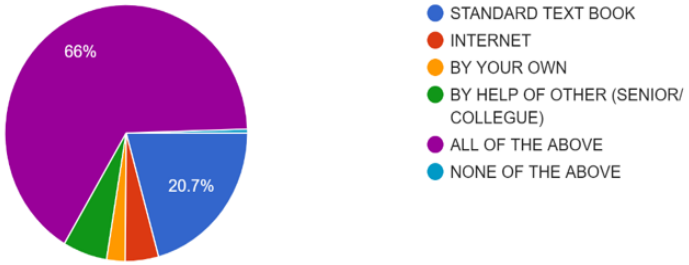
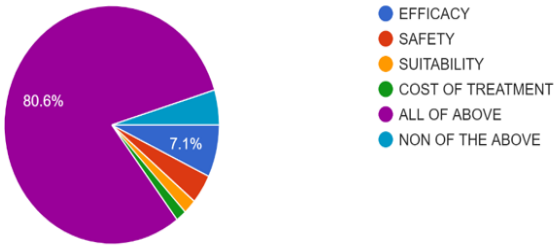


Fig. 10: platforms for making an inventory of effective groups of drugs.

Points that must be kept in mind while selecting p-drug from the effective group (figure 11) and awareness of fixed-dose combinations inclusion increased from 59.9% to 86.6%, depicted in Figure 12 below.

Pre-test response



Post-test response

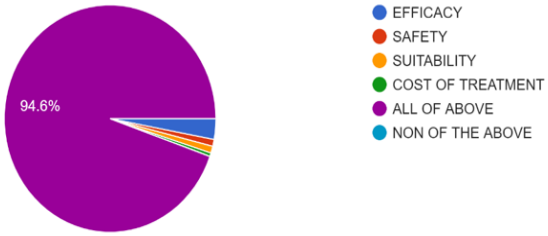
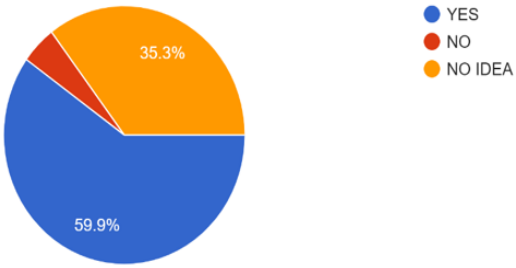


Fig. 11: Selection of p-drug from the effective group.

Pre-test response



Post-test response

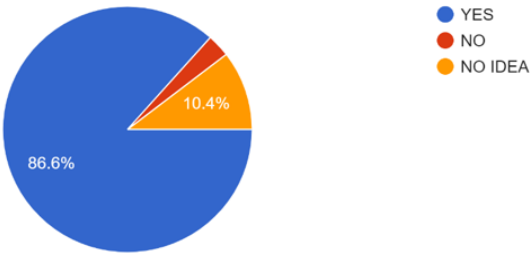
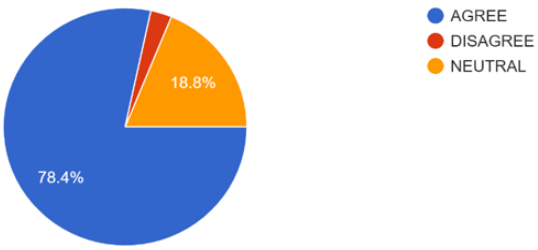


Fig. 12: Inclusion of fixed-dose combination in the p-drug list.

Attitude and awareness to practice teaching programs for the preparation of a p-drug list and cost-effective management for disease in a patient or society as a whole proved to be the engaging interest according to the responses received from the survey and are depicted in Figures 13 and 14 respectively**.**

Pre-test response



Post-test response

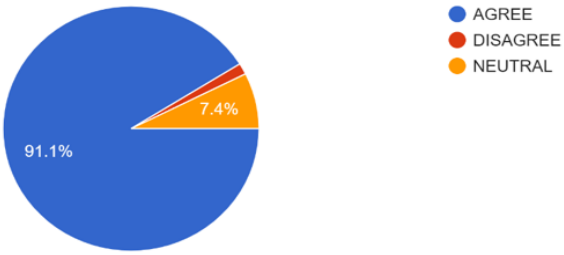
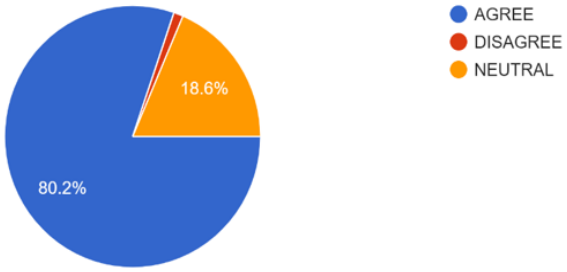


Fig. 13: Need for teaching programs regarding the preparation of a p-drug list.

Pre-test response



Post-test response

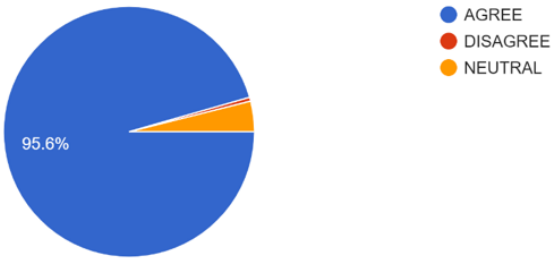


Fig. 14: P- drug concept being beneficial in the cost-effective management of disease in a patient or society as a whole.

DISCUSSION

The present study evaluates the knowledge, awareness, and practice of P-drug among undergraduates where understanding of a given subject is knowledge. Attitude is feelings toward this subject and any preconceived ideas. Combining and applying both actions constitute a practice.

Knowledge: The survey revealed an increased level of awareness during post-questionnaire sessions among medical students regarding the P-Drug concept. More than 80% of respondents correctly defined personalized medicine and identified its main applications, including points to be kept in mind while preparing p- a drug list, and beneficial aspects for disease prevention. However, some knowledge gaps were still observed, particularly regarding the implementation of P-Drug strategies in clinical practice with STEP criteria and the potential impact on healthcare outcomes.

Attitudes: The majority of medical students expressed positive attitudes towards the P-Drug concept. More than 80% of respondents believed that personalized medicine has the potential to improve patient outcomes and enhance the efficacy of treatments. They acknowledged the importance of considering individual variations in drug response and tailoring therapies accordingly. A notable proportion of students also expressed concerns about the cost-effectiveness, and accessibility of personalized medicine.

In our study, only 12.3% of students were very well aware and 57.7% had some idea of the term p-drug. The finding was similar to the previous study conducted by Bajait et al., where 35% were aware of the term P-drug and in the study conducted by Dakhale et al., 32% were aware of the term P-drug, whereas in Tanuja et al., 63% were aware of term P-drug.[8] Coming to knowledge in this study about the advantages of using P-drug, almost 65% knew about this during the pre-test, whereas in studies conducted by Dakhale et al. and Hooli et al., 15%

knew the benefits of using P-drug[8,9] and in Bajait et al., 9% knew the advantages of using P-drug.[10] Coming to the inclusion of fixed-dose combination (FDC) in the P-drug list in our study, 59.9% answered supporting inclusion, whereas in Hooli et al., only 6% agree it.[9]

Practices: Regarding the incorporation of the P-Drug concept into clinical practice, the survey revealed a limited level of engagement among medical students. Only a moderate percentage reported actively seeking information or participating in educational activities related to personalized medicine. The main barriers identified were a lack of exposure to P-Drug concepts during their curriculum, limited availability of relevant resources, and insufficient training opportunities.

In our study attitude and awareness to practice teaching programs for the preparation of a p-drug list and cost-effective management for disease in a patient or society came out to be 95.6% during the post-test, similar findings were also found in Hooli et al. study.[8]

The results emphasize the importance of incorporating the P-Drug concept into medical curricula, ensuring that students are adequately trained and prepared to implement it effectively in their future practice. To address the identified gaps in knowledge, medical educators can consider revising the curriculum to include specific examples and case studies illustrating the application of the P- Drug concept. Integrating this concept into pharmacology and therapeutics courses, as well as clinical rotations, could help students understand its practical relevance and enhance their confidence in applying it in clinical settings.

Moreover, addressing the concerns expressed by some participants regarding the feasibility of implementing the P-Drug concept is crucial. Efforts should be made to familiarize students with existing tools and resources that support individualized treatment decision-making, such as pharmacogenomic databases and clinical decision support systems. Collaborative discussions and workshops involving clinicians, pharmacists, and educators can provide a platform for students to engage in practical exercises and gain hands-on experience.

Limitations of this study include the reliance on self-reported data and the limited generalizability of the findings to other medical student populations. Future research could explore the KAP of practicing physicians and healthcare professionals to obtain a broader perspective on the implementation of the P-Drug concept in real-world clinical settings.

CONCLUSION

The survey among medical students revealed a moderate level of knowledge and positive attitudes toward the P-Drug concept. However, there is a clear need to bridge knowledge gaps and enhance practical engagement in personalized medicine. By addressing these areas, medical education can better prepare students for the future of healthcare, enabling them to leverage the potential benefits of personalized medicine in improving patient outcomes and delivering more precise and tailored therapies.

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