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Original Article

ASSESSMENT OF KNOWLEDGE, ATTITUDE AND PRACTICE (KAP) IN PHARMACOGENOMICS AMONG MEDICAL STUDENTS IN A TEACHING HOSPITAL-A CROSS-SECTIONAL OBSERVATIONAL STUDY

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ABSTRACT

Objective: Pharmacogenomics is a field of personalized medicine where individual's genomic profile is used to guide therapeutic prescription with the goals of increasing efficacy and decreasing toxicity and progressively moving into mainstream clinical practice. Many medical students are not familiar with implications of pharmacogenomics in therapeutic effectiveness. This survey was designed and administered to assess knowledge, attitude and practices among phase 3 MBBS students (undergraduates/UGs) and postgraduates (PGs).

Methods: A Cross-sectional Observational study was conducted among Phase 3 MBBS students (n=110) and PGs (n=46). Data was collected through validated questionnaire and analyzed for their knowledge, attitudes and practices pertaining to Pharmacogenomics. SPSS version 21 and the Chi-square test was used to test the significant difference between the two groups. p value<0.05 was taken as statistically significant.

Results: From the data analyzed, about 85% of undergraduates and 89% of post-graduates have adequate knowledge on Pharmacogenomics. Both the groups had positive attitude (91% and 93%) towards Pharmacogenomics. In the cluster which evaluated the practice the positive response of agree/strongly agree were 75% and 74%, respectively. There was no significant difference between the two groups for KAP on Pharmacogenomics.

Conclusion: Awareness programmes need to be conducted to educate the undergraduates and PGs as attitude is more positive than their knowledge, and practice of pharmacogenomics. This helps to improve the choice of drug, keeping in mind the genetic profile of the patient to reduce the adverse effects, morbidity and mortality and to promote tailor-made personalized therapy.

Keywords: Knowledge, Attitude, Practice, Pharmacogenomics

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INTRODUCTION

Pharmacogenomics is the use of genomics in pharmacology to investigate and evaluate the effects of genetic variants on pharmacological reactions [1]. Pharmacogenetics is the study of genetic variation-related variability in medication reactions. medications interact with their molecular targets differently due to genetic differences, which influences the medications' effectiveness and produces undesirable side effects [2]. The use of pharmacogenomics has grown significantly in recent years along with healthcare advancements, opening the door to personalized treatment based on an individual's genetic profile [3]. The ultimate aim of precision medicine is to precisely match each treatment action to the biological profile of the patient. Modern sequencing technology have revolutionized the field of human genetics over the past 20 y, advancing our knowledge of the connection between genetic diversity and human health [4].

Still, there hasn't been much integration of pharmacogenomics into standard clinical practice. Major obstacles have been found that range from fundamental pharmacogenomics research to application. To advance pharmacogenomics knowledge, it is necessary to investigate uncommon genetic variants that have been overlooked in the past and to validate their functional and clinical impact through the creation of pre-clinical models and in silico techniques. However, continuous international coordinated efforts to remove the current obstacles to pharmacogenomics implementation will offer fresh perspectives and instruments for the clinical use of pharmacogenomics, assisting in paving the path for its general adoption [5].

The implications of pharmacogenomics for therapeutic success are not well understood by many medical students. This survey was created and distributed with the purpose of evaluating the Knowledge, Attitude, and Practices of Phase 3 Part-1 MBBS students and Postgraduates (PGs).

MATERIALS AND METHODS

Study was started after obtaining prior permission from institutional authorities (Protocol number 4-7-23) and conducted among 110 undergraduates and 46 post-graduates. The questionnaire was framed in English, and there were 25 questions. Questions were consistent across undergraduates and postgraduates.

The questions are framed under three clusters of focus; The first cluster evaluated participants awareness on pharmacogenomics. The second cluster evaluated participants attitude of pharmacogenomics; the third cluster evaluated participants ability to imply it in clinical situation and their responses were based on a five-point Likert scale i. e from Strongly Agree to Strongly Disagree. I prepared google form which is connected to my mail and collected the data by sending these forms with the help of social media platform.

A Cross-sectional Observational study was conducted among Final year Part-1 MBBS students (n=110) and PGs (n=46) of Government Medical College, Anantharaman. P. Data was collected through validated questionnaire and analyzed for their knowledge, attitudes and practices pertaining to Pharmacogenomics.

Statistical analysis

SPSS version 21 was used. Chi-square test and Mann-Whitney test was used to test the significant difference between the two groups. p value<0.05 was taken as statistically significant.

Questionnaire

Knowledge

1. What is pharmacogenomics? [6].

- Study of genome of an individual to choose a particular drug therapy for the responders

- Study of inherited differences in drug metabolism or drug responses in humans
- Study of the use of and effect of a drug in races of population for clinical use
- Study of treatment of systemic infections with drugs that have selective toxicity for the infecting organism

2. What is Pharmacogenetics? [7]

- Study of genome of an individual to choose a particular drug therapy for the responders
- Study of inherited differences in drug metabolism or drug responses in humans
- Study of the use of and effect of a drug in races of population for clinical use
- Study of treatment of systemic infections with drugs that have selective toxicity for the infecting organism

From the 3rd question, the options were based on Likert scale.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

3. Pharmacogenomics, Pharmacogenetics is increasing in medical journals

4. The package inserts for WARFARIN include a warning about altered metabolism in individuals who have specific genetic variants

5. Genetic determinants of drug response change over a persons life time

6. Well aware of implications of pharmacogenomics in therapeutic effectiveness

Attitude [8, 9]

7. Pharmacogenomics is relevant to the current clinical practice

8. Pharmacogenomics improves the patient care.

9. Personalised medicine is preferred

10. Phamacogenomics optimize the treatment

11. Having the Pharmacogenomic profile of the patient while treating is beneficial

12. For drugs with narrow therapeutic range or serious adverse drug reaction, the only

option is Pharmacogenomic testing

13. Pharmacogenomic testing will have a wider reach if it has an insurance cover

14. Physician should have comprehensive knowledge on Pharmacogenomics

15. Pharmacogenomic testing will help to decrease the number of adverse events in patients

experienced due to the drug therapy

16. Pharmacogenomic testing results may be accessed by unauthorized persons

17. Pharmacogenomics will be more relevant in future clinical practice

18. Pharmacogenomics in current clinical practice is cost-effective

Practice [8, 9]

19. I do discuss Pharmacogenomic information with other health care providers

20. I will be able to identify the patients who will be benefited by Pharmacogenomic testing

21. I will be able to identify the medicine which require Pharmacogenomic testing

22. I will look for labelling of Pharmacogenomics regulation on drug packages

23. Counselling patients regarding Pharmacogenomic testing is to be done along with medication counselling

24. I am apprehensive about submitting a DNA sample to analyze my own genetic profile

25. Comfortable on answering questions on Pharmacogenomics

RESULTS

From the data analysed, undergraduates (85%) and Postgraduates (89%) shown adequate knowledge, both groups shown positive attitude (91% and93%), Practice of UG (75%) and PG (74%) shown respectively.

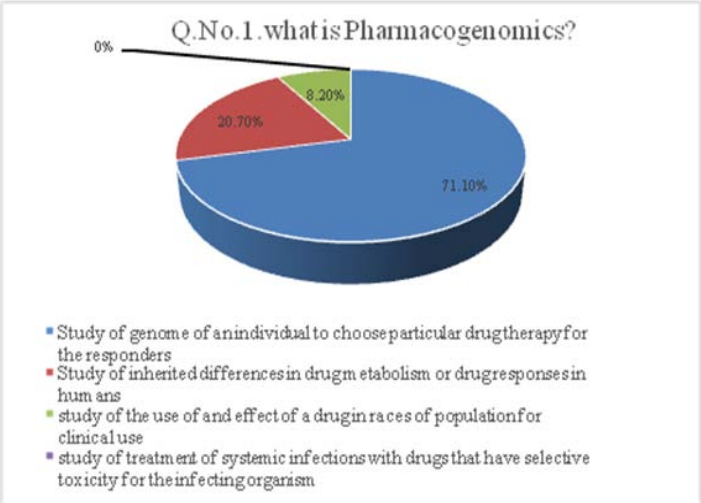

Fig. 1: Pie diagram showing knowledge on Q. No. 1 among UGs and PGs

Table 1: Shows the percentage of KAP with P values among undergraduates and postgraduates using statistical analysis

Graduation	Knowledge			Attitude			Practice		
	Total students	Well aware	p-value	Positive attitude	Negative attitude	p-value	Good practice	Bad practice	p-value
Under-graduate	110	94 (85%)	0.787; NS	100 (91%)	10 (9%)	0.597; NS	83 (75%)	27 (25%)	0.839; NS
Post-graduate	46	41 (89%)	0.049#;	43 (93%)	3 (7%)	0.089#; NS	34 (74%)	12 (26%)	0.832#;
Total	156	135 (86%)	NS	143 (92%)	13 (8%)		117 (75%)	39 (25%)	NS

NS = Not Significant; IQR = Inter-quartile range; # = Mann-Whitney U test p-value

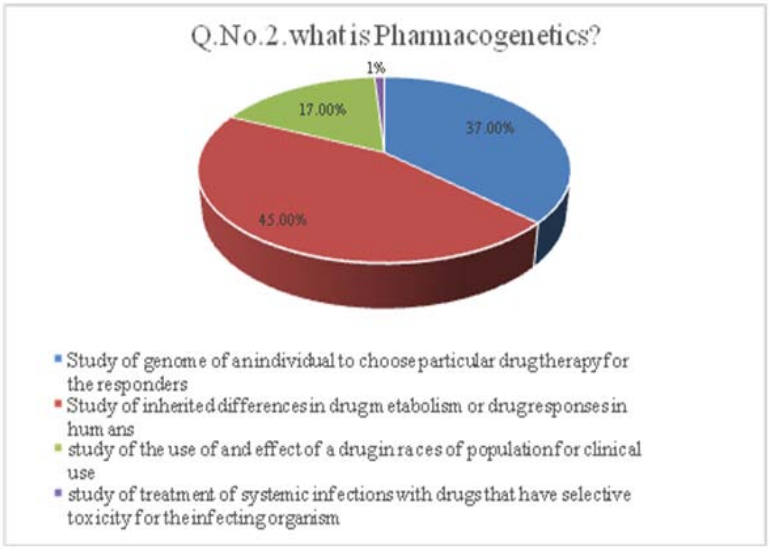

Fig. 2: Pie diagram showing knowledge on Q. No.2 among UGs and PGs

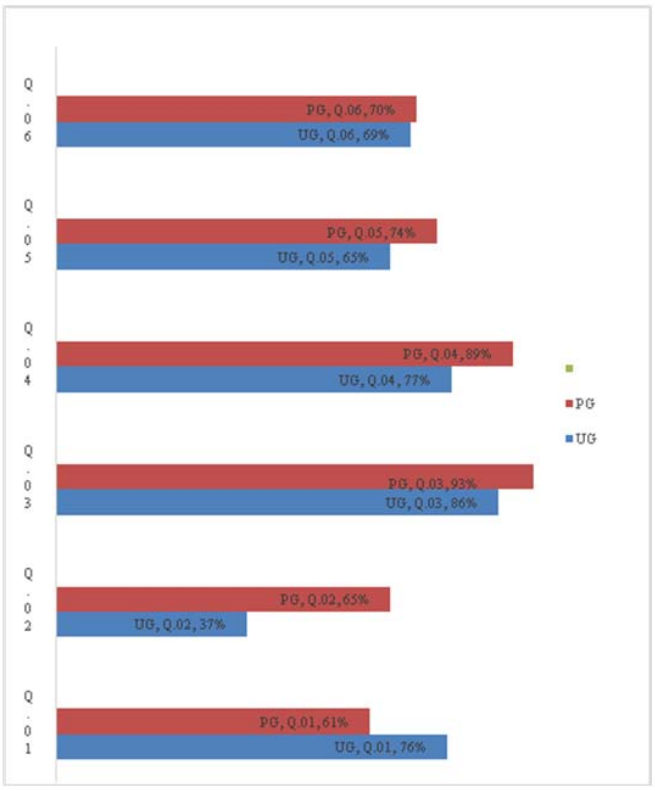

Fig. 3: Bar diagram knowledge of both UGs and PGs

Fig. 4: Bar diagram showing attitude of both UGs and PGs

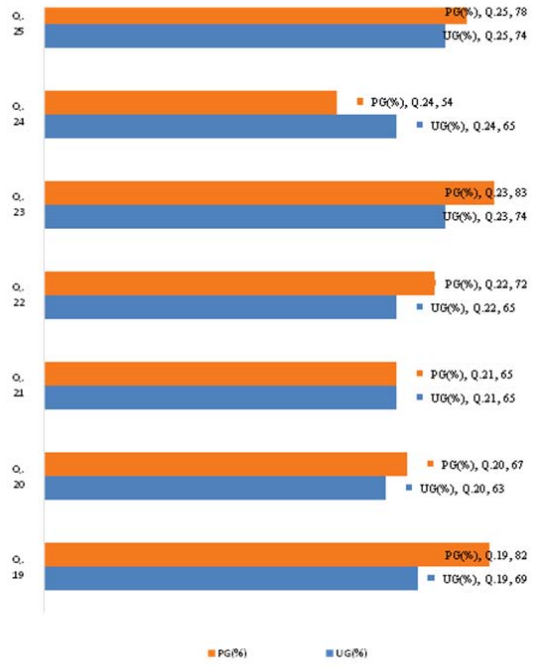

Fig. 5: Bar diagram showing practice of both UGs and PGs

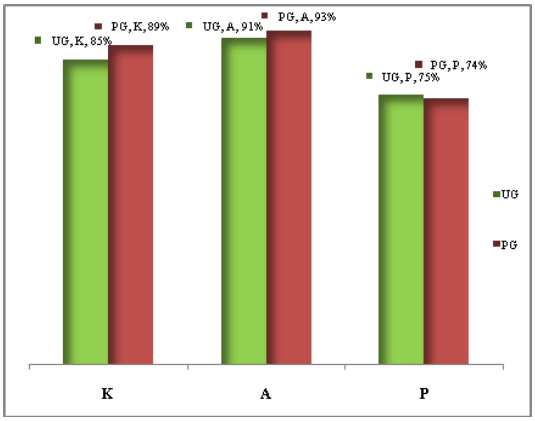

Fig. 6: Bar diagram showing KAP of pharmacogenomics among under graduates and post graduates

DISCUSSION

Nowadays, Pharmacogenomics can influence the practice of medicine. Selection of drugs based on genetic information has potential to facilitate selection of most efficacious drugs. it has become increasingly clear that pharmacogenomics information facilitates the selection of most efficacious drug at optimal dose and to reduce the adverse drug reactions. Developed countries like North America and Europe are having well-established Bio Banks, while developing countries like India, still struggling with impact of disease on massive scale. BioBanks for cancer, liver, rare diseases which provide genomic information are increasingly growing in India. As health care providers, it is very essential to study the patient phenotype and genotype and response to drug treatment [10].

Recently, in India National Cancer Institute, launched the cancer–in situ for the effectiveness of treating adults and children with new drug combinations in target-specific tumors (Combo MATCH). In NCI match people were assigned based on genetic changes in their tumors rather than type of cancer [11]. FDA approval of using Dabrafenib and Trametinib in treating Non–Small Cell Carcinoma with BRAFV600E mutation [12]. Lung cancer patients with ROS1 gene responded well with Crizotinib [13].

Our study shows that participants attitude (91% UGs and 93%PGs) regarding pharmacogenomics is more positive than the knowledge (85% UGs and 89%PGs) and practice (75% UGs and 74%PGs), so there is gap between knowledge, attitude and practice.

This study showed that there is no statistically significant difference between the two groups knowledge, attitudes, or practices; nonetheless, the groups perceptions of pharmacogenomics attitudes are more favorable than their awareness and application. Thus, there is a discrepancy between these factors. Since many participants had neutral answers, raising awareness is even more important.

CONCLUSION

Precision medicine's future lies on pharmacogenomics, which is a burgeoning field of study in therapeutics and theranostics. It raises the standard, efficacy, and safety of prescription drugs. Knowledge of pharmacogenomics lowers drug compound attrition. As there is gap between knowledge, attitude and practice to put it into practice in their daily lives, they need to be trained. This aids in better medication selection by taking the patient's genetic profile into consideration to lower side effects, morbidity, and death while fostering individualized, tailored treatment.

The necessity for pharmacogenomics in the medical curriculum was brought to light by this work, and it needs to be addressed in our syllabus. With this intelligence, a medication optimization platform for the prevention, management, and treatment of many diseases as well as the promotion of individualized, custom therapy can be developed.

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AUTHORS CONTRIBUTIONS

All authors have contributed equally.

CONFLICT OF INTERESTS

Declared none

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