

Knowledge, Attitude and Ethical Perception Towards Precision Medicine Among Healthcare Professionals- a Questionnaire Survey

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Abstract

Precision medicine, also known as personalized medicine, is an emerging approach in healthcare that tailors medical treatment and prevention strategies to individual patients based on their unique genetic makeup, lifestyle, and environmental factors. It represents a paradigm shift from the traditional "one size fits all" approach to a more targeted and precise form of medical care.

In precision medicine, extensive genomic analysis and other high-throughput technologies are employed to identify genetic variations and molecular markers associated with specific diseases or treatment responses. This wealth of genetic information allows healthcare professionals to make more accurate diagnoses, predict disease risks, and design personalized treatment plans.

The application of precision medicine spans various medical fields, including oncology, cardiovascular diseases, neurology, and infectious diseases. In oncology, for example, molecular profiling of tumors enables the identification of specific genetic alterations that guide the selection of targeted therapies, leading to improved patient outcomes and reduced adverse effects.

Precision medicine also holds great promise in preventive medicine. By identifying an individual's genetic predispositions to certain diseases, clinicians can recommend tailored lifestyle modifications or interventions to mitigate the risk. Additionally, the integration of electronic health records, wearable devices, and mobile health applications facilitates real-time monitoring and personalized interventions, enhancing patient engagement and overall healthcare outcomes.

Despite its potential, several challenges need to be addressed for the widespread implementation of precision medicine. These include the high cost of genomic sequencing and data analysis, ensuring data privacy and security, and the need for interdisciplinary collaboration among researchers, clinicians, and policymakers.

In conclusion, precision medicine represents a transformative approach to healthcare, enabling personalized and targeted interventions that have the potential to revolutionize patient care, improve treatment outcomes, and reduce healthcare costs. Efforts to overcome the challenges associated with precision medicine are crucial for its successful integration into routine clinical practice.

Keywords: precision medicine, healthcare, personalized care, personalized interventions, real-time monitoring

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Introduction

The term “precision medicine” which is sometimes used interchangeably as “personalized medicine” has gained a lot of popularity over the recent years owing to its applications in diagnosis, prevention and treatment in the medical field. The gist of precision medicine is that patient care and public health could be made more efficient and tailored to individual patients by integrating genomic testing concepts in diagnosis and using that molecular information for a more targeted treatment as it takes into account individual variability in genes, environment, and lifestyle for each person. The aim of precision medicine is not to replace the existing ways of diagnosing or treating diseases but to aid it. However, there seems to be some reluctance on the usage of this practice by doctors due to various reasons like cost factors, ethical concerns, accessibility, staff training and perhaps because treating physicians prefer the classical “signs and symptoms” approach for diagnosing diseases and treating them.

Aim

To determine the awareness of precision medicine among practicing doctors and their willingness to incorporate precision medicine into day-to-day practice and to determine their ethical perception towards this practice.

Objectives

1. To assess awareness and knowledge about precision medicine among practicing doctors.
2. To assess the concerns about precision medicine
3. To assess the preferable method of learning about precision medicine.

Materials and Methods

A survey tool (Google Survey Form) consisting of a questionnaire which includes 5 sections for assessing the awareness about precision medicine, knowledge about genomic testing ,attitude about genomic testing and genome guided prescribing of treatments and the preferred method of learning about precision medicine.

Section 1 contains questions about the awareness of precision medicine and where they heard it from.

Sections 2 and 3 contained questions adapted from the Evidence-based Practice Attitude Scale Adapting Genome-informed Interventions (EBPAS-GII) to assess their attitude and knowledge toward the practice of precision medicine. 2, 8 Responses were registered using a 4-point Likert scale ranging from 1: not at all; 2: to a slight extent; 3: to a moderate extent and 4: to a great extent. The section on attitude had a total of 8 questions of which the first 4 were more about how “open” doctors were to those ideas whereas the latter 4 were more “divergent”.

Section 4 assessed perception toward ethical considerations related to the issue of pharmacogenomics using the same Likert scale previously described.

Section 5 contained two questions designed to determine the interest of doctors about the preferred method of acquiring more knowledge about precision medicine.

Section 1: Awareness of precision medicine

1. Do you know what precision medicine is? (Yes/No)
2. If you have heard of precision medicine, where did you hear it from? (Healthcare providers/conferences /internet/ newspaper/ peers)

Section 2: Attitude toward adoption of genome-guided prescribing and precision medicine*

1. I would be willing to use new types of therapy or interventions to help my patients.
2. I would be willing to use a patient’s genetic information to guide my decision in clinical practice.
3. I would be willing to try genome-guided prescribing tools that are created by researchers.
4. I would be willing to use genome-guided prescribing in my career.
5. I feel that clinical experience is more important than using a patient’s genetic information to make decisions.
6. I would not be willing to prescribe different medications or doses of medications based on a patient’s genetic information.
7. I feel that clinicians know better than academic researchers on how to treat patients based on a patient’s genetic information.
8. I feel that research-based genome-guided prescribing tools are not clinically useful.

Section 3: Perceived knowledge of genomic testing concepts†

1. How comfortable are you in your knowledge about basic genomic testing concepts and terminology (e.g. molecular genetic test, chromosomal genetic test, biochemical genetic test)?
2. How comfortable are you in your knowledge about pharmacogenomics (a study of how genes affect a person’s response to drug)?
3. How comfortable are you in your knowledge about genetic variation predisposing to common diseases (such as diabetes, kidney and heart disease)?
4. How comfortable are you in your knowledge about next generation sequencing (a DNA sequencing technology which can be used to capture a broad spectrum of gene mutation)?

Section 4: Perception toward ethical considerations related to precision medicine*

1. I feel that pharmacogenomics may be used to promote ethnic/racial stereotypes.
2. I feel that pharmacogenomics may broaden the healthcare gap between the rich and poor.
3. I feel that pharmacogenomics may lead to insurance discrimination.
4. I feel that pharmacogenomics may lead to employment discrimination.

Section 5: Preference for learning about precision medicine.

1. Are you interested in broadening your knowledge in precision medicine? (Yes/No)
2. If yes, what is your preferred method of learning? (online training / hands on workshop)

*Response options:

1. not at all;
2. to a slight extent;
3. to a moderate extent;
4. to a great extent

† Response options:

1. not comfortable at all;
2. not very comfortable;
3. comfortable;
4. very comfortable

Procedure, study site and sample size calculation

Questionnaire Based survey will be conducted post approval from Ethics Committee.

Study Period: One Month

Study Site: Preferably KAHER, BIMS in Belagavi and hospitals in Belagavi namely BHS Lakeview Hospital, Venugram Hospital and Vijaya Orthopaedic and Trauma center and other additional healthcare professionals in industry.

Inclusion Criteria

Health care professionals willing to fill the survey form

Exclusion Criteria

Not Applicable

Sample Size: 191 healthcare professionals

Results

Participants Details

A total of 191 participants gave the consent for the survey, from the age group of 16-70 years with more number of participants from the age group of 25-28 years and 37-40 years. The participants have various years of experience in practicing the medicine. Out of the 191 participants 67 participants have 0-5 years of experience, 32 participants have 6-10 years of experience, 33 participants have 11-15 years of experience, 15 participants have 16-20 years of experience and 35 participants have 20+ years of experience.

Section 1 Result

Out of 191 participants, 128 (67%) participants know what precision medicine is. Most of the participants heard about precision medicine from conference ie. 65 participants. 35 of them heard from the health care providers. 32 of them heard from the internet. 11 of them heard from the peers and 1 of them heard from the newspaper.

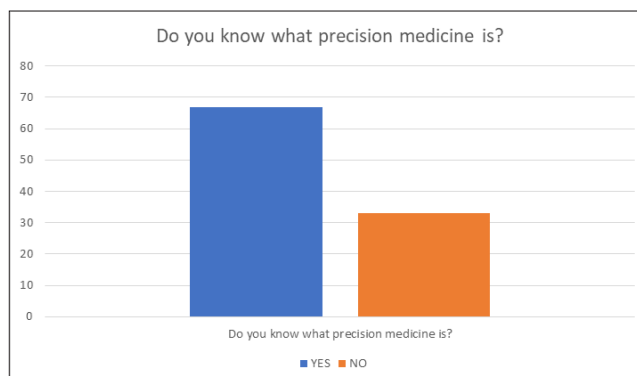


Figure 1: Do you know what precision medicine is?

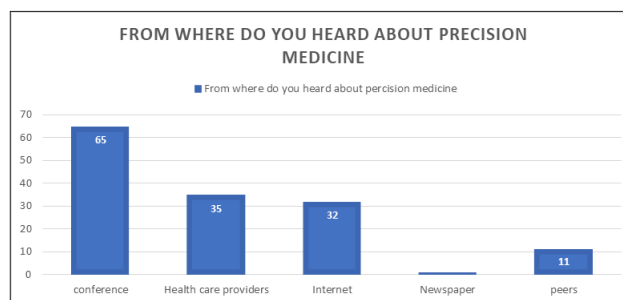


Figure 2: From where do you heard about precision medicine

Section 2 Result

There was a varied level of acceptance for the willingness to use new type of therapy or intervention to help the patient, but most of the participants agreed to the great extent for willingness of the new therapy. 79 participants agreed to a great extent. 79 participants agreed to a moderate extent. 27 agreed to a slight extent and 3 did not agree at all. Out of the three participants two have 0-5 years of experience and one participant have 20+ year of medical experience.

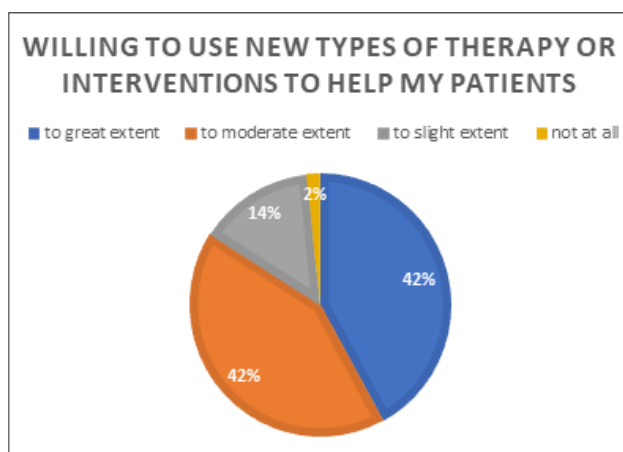


Figure 3: willing to use new types of therapy or interventions to help my patients.

The acceptance for willingness to use patient's genetic information to guide the clinical decision is almost similar to the willingness to use new therapy for the treatment. 72 participants agreed to a greater extent. 77 participants agreed to a moderate extent. 38 participants to a slight extent and 4 did not agree at all.

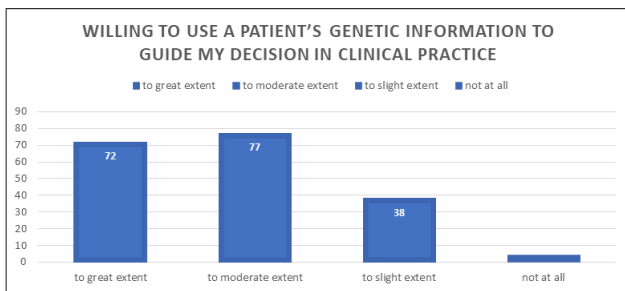


Figure 4: Willing to use a patient's genetic information to guide my decision in clinical practice.

There was a decrease in the willingness to try genome-guided prescribing tools that are created by the researchers as compared to the willingness to use the genetic information for clinical decision making, this shows the fear to use new prescribing tools by the practitioner. 58 participants agreed to a great extent to try genome-guided prescribing tool. 82 participants agreed to a moderate extent. 42 to a slight extent and 9 not at all.

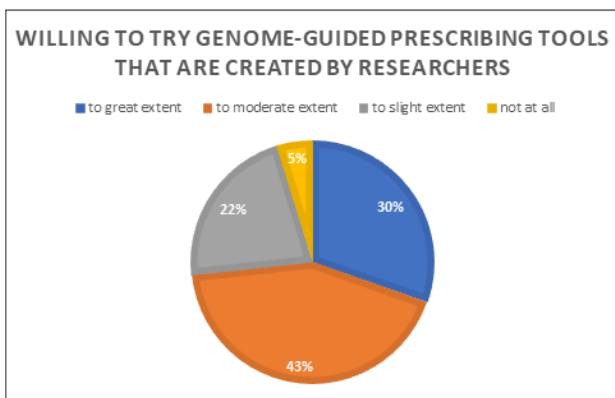


Figure 5: Willing to try genome-guided prescribing tools that are created by researchers.

The acceptance for the willingness to use genome-guided prescribing in the career was as follows: 54 participants agreed to a great extent for the use of genome-guided prescribing in the career. 87 participants agreed to a moderate extent. 41 to slight extent and 9 not at all.

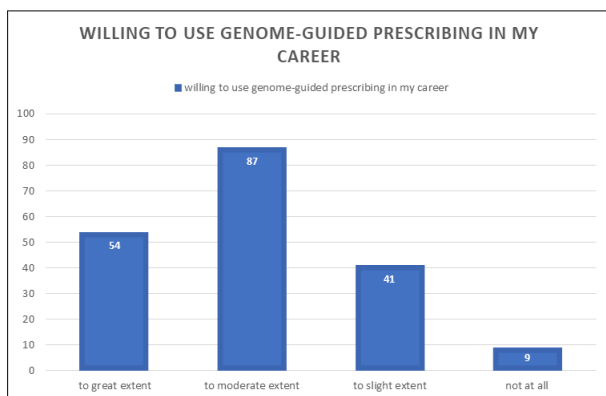


Figure 6: Willing to use genome-guided prescribing in my career.

There was a huge acceptance towards the thought that the patient's genetic information is more important than the clinical experience in decision making. Only 55 participants agreed to great extent that clinical experience is more important than the using a patient's genetic information for decision making. 78 participants agreed to the moderate extent that clinical experience is more important, 44 agreed to a slight extent that clinical experience is more important and 11 did not agree at all that clinical experience is more important than the genetic information of the patient.

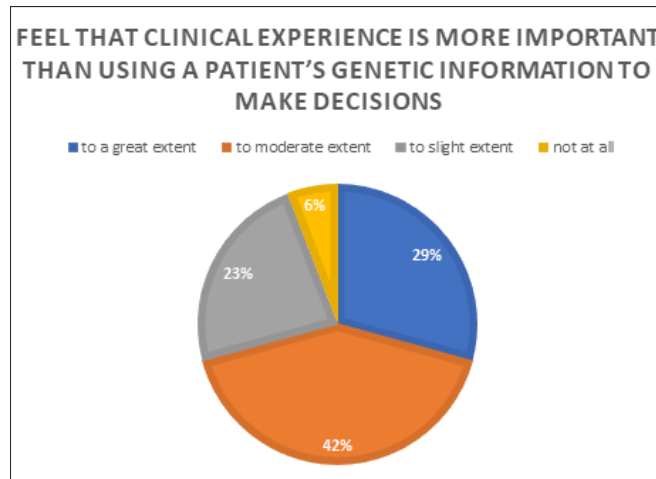


Figure 7: Feel that clinical experience is more important than using a patient's genetic information to make decisions.

The participants feel that academic researchers know better than the clinicians on how to treat patients on basis of patient's genetic information. Only 38 participants agreed to a great extent that the clinicians are better than the academic researchers on treating patients based on their genetic information. 75 participants agreed to a moderate extent that clinicians are better on treating the patients compared to the academic researchers on the basis of the genetic information. 49 agreed to only slight extent that the clinicians are better and 30 did not agree at all that the clinicians are better than the academic researchers.

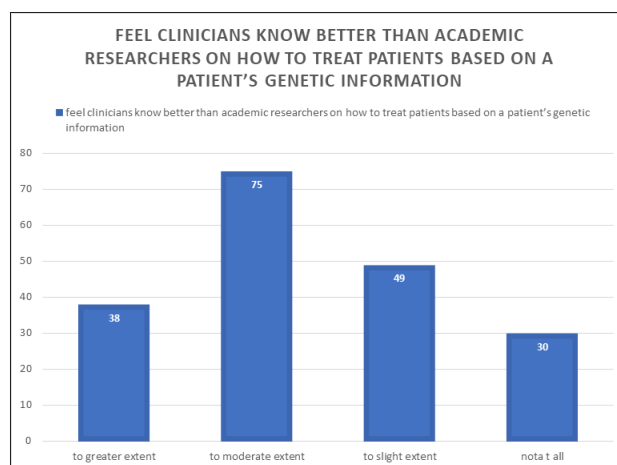


Figure 8: Feel clinicians know better than academic researchers on how to treat patients based on a patient's genetic information.

The participants do not feel that the research-based genome guided prescribing tools are not clinically useful. 87 of the participants did not agreed at all that the genome guided prescribing tools are not clinically useful. 54 of the participants agreed to a slight extent. 37 agreed to a moderate extent. 13 agreed to a great extent.

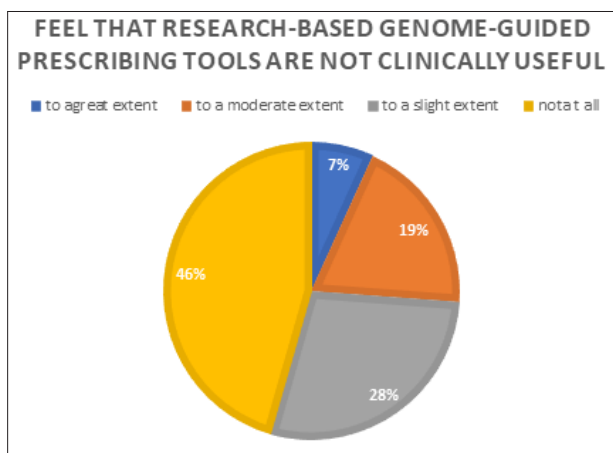


Figure 9: Feel that research-based genome-guided prescribing tools are not clinically useful.

Section 3 Result

The result about how much the participants is comfortable in the knowledge about basic genomic testing concepts and terminology. 18 participants were not comfortable at all about the basic genomic testing concepts and terminology. 70 participants were not very comfortable about the topic. 85 participants were comfortable about the topic genomic testing concepts and terminology and 20 participants were very comfortable about the topic.

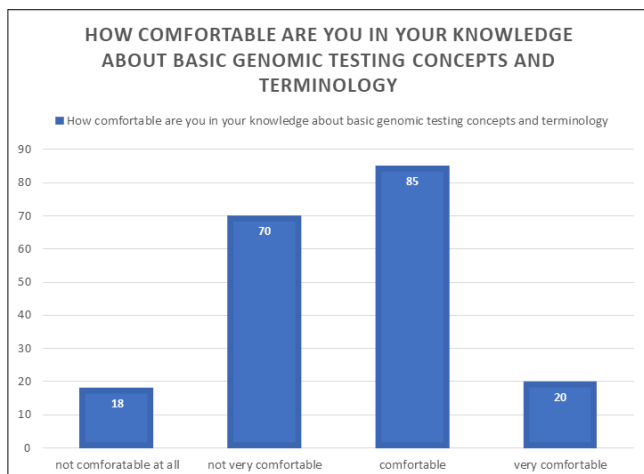


Figure 10: How comfortable are you in your knowledge about basic genomic testing concepts and terminology.

The majority of participants were comfortable with the knowledge about pharmacogenomics. 18 of the participants were very comfortable with the knowledge about pharmacogenomics. 80 were comfortable about the knowledge of pharmacogenomics. 74 were not very comfortable about the knowledge of pharmacogenomics and 21 were not comfortable at all about the knowledge of pharmacogenomics.

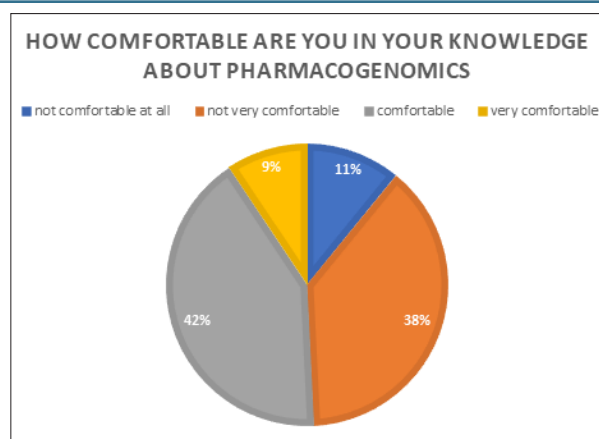


Figure 11: How comfortable are you in your knowledge about pharmacogenomics.

Most of the participants were comfortable or very comfortable regarding the knowledge about the genetic variation predisposing to common diseases. 29 participants were very comfortable about the genetic variation predisposing common diseases. 89 participants were comfortable in the knowledge about the genetic variation predisposing to common diseases. 64 participants were not very comfortable in the knowledge about the genetic variation predisposing to common diseases and 13 participants were not comfortable at all in the knowledge about the genetic variation predisposing to common diseases.

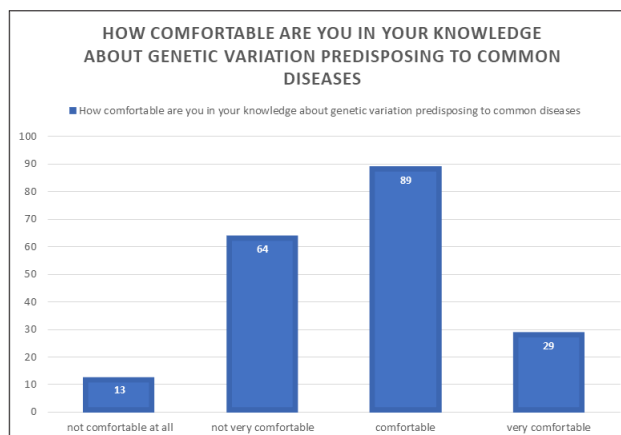


Figure 12: How comfortable are you in your knowledge about genetic variation predisposing to common diseases.

The participants are almost equally distributed on the basis of how comfortable and not comfortable they are with their knowledge about next generation sequencing. 27 participants are not comfortable at all in the knowledge about the next generation sequencing. 67 participants are not very comfortable in the knowledge about the next generation sequencing. 69 participants are comfortable in the knowledge about the next generation sequencing and 30 participants are very comfortable in the knowledge about the next generation sequencing.

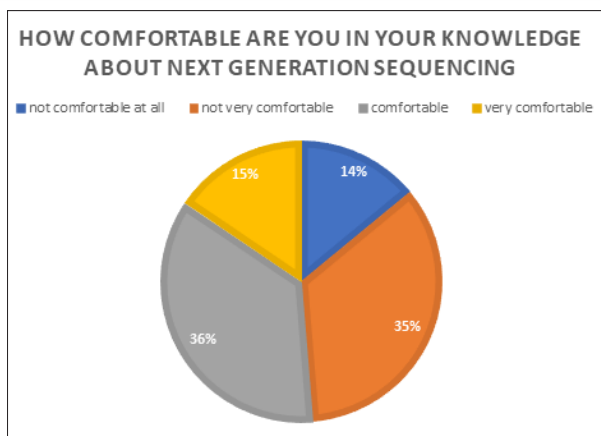


Figure 13: How comfortable are you in your knowledge about next generation sequencing.

Section 4: Result

There was a mixed response recorded regarding the feeling that pharmacogenomics may be used to promote ethnic/racial stereotypes. 30 participants agreed to a great extent that pharmacogenomics may be used to promote ethnic/racial stereotypes. 69 participants agreed to a moderate extent that pharmacogenomics may be used to promote ethnic/racial stereotypes. 67 participants agreed to a slight extent that pharmacogenomics may be used to promote ethnic/racial stereotypes. 24 participants did not agree at all.

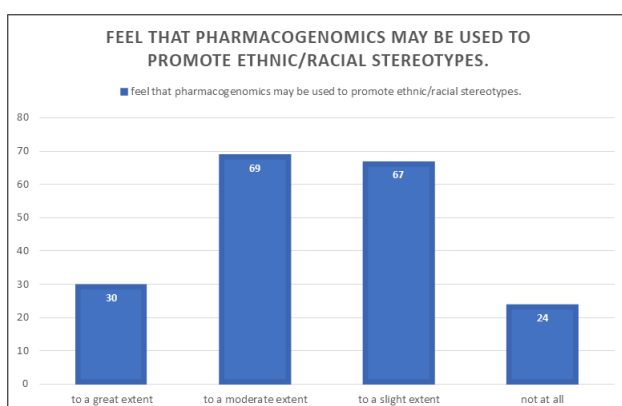


Figure 14: Feel that pharmacogenomics may be used to promote ethnic/racial stereotypes.

There was a moderate to strong feeling in the participants that pharmacogenomics may broaden the healthcare gap between rich and poor. 34 participants agreed to a great extent that pharmacogenomics may broaden the healthcare gap between rich and poor. 69 participants agreed to a moderate extent that pharmacogenomics may broaden the healthcare gap between rich and poor. 56 participants agreed to a slight extent that pharmacogenomics may broaden the healthcare gap between rich and poor and 30 did not agree at all.

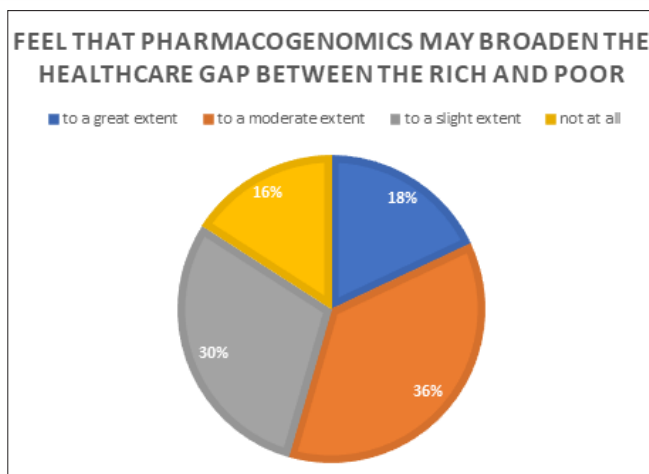


Figure 15: Feel that pharmacogenomics may broaden the healthcare gap between the rich and poor.

The result regarding the feeling of the participants that pharmacogenomics may lead to insurance discrimination are as follows. 28 participants agreed to a great extent that pharmacogenomics may lead to insurance discrimination. 57 participants agreed to a moderate extent that pharmacogenomics may lead to insurance discrimination. 70 participants agreed to a slight extent that pharmacogenomics may lead to insurance discrimination, and 35 participants do not agree at all.

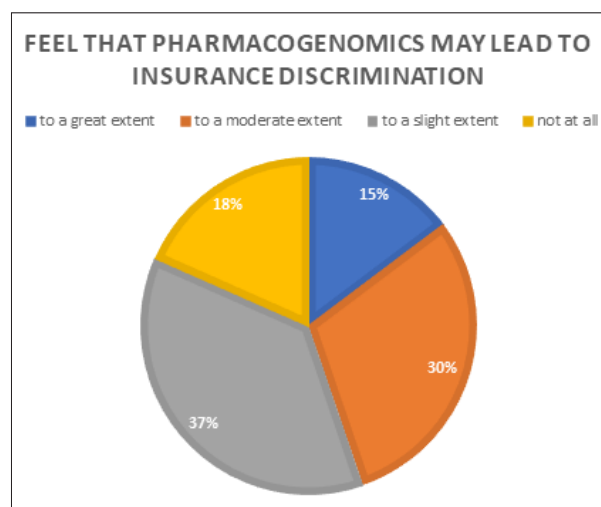


Figure 16: Feel that pharmacogenomics may lead to insurance discrimination.

The participants do not feel that pharmacogenomics may lead to employment discrimination. Only 21 participants agreed to a great extent that pharmacogenomics may lead to employment discrimination. 46 participants agreed to a moderate extent that pharmacogenomics may lead to employment discrimination. 68 participants agreed to a slight extent that pharmacogenomics may lead to employment discrimination and 53 did not agree at all.

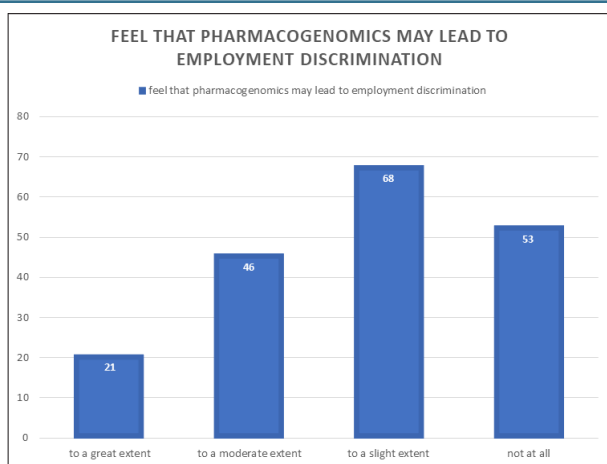


Figure 17: Feel that pharmacogenomics may lead to employment discrimination.

Section 5: Result

Out of 191 participants, 183 participants are interested in broadening the knowledge in precision medicine out of which 98 participants prefer the online training method of learning and 85 participants prefer the hands on workshop method of learning. 8 participants are not interested in broadening the knowledge in precision medicine.

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