

Knowledge, Attitudes and Perceived Barriers toward Precision Medicine among Jordanian Medical Students and Physicians

واقع مهنة الطب مهم لكل طبيب و طبيبة و فيه العديد من التطورات المتزايدة ، نبحث في هذا الجهد المشترك و بشكل محايد حسب الأصول العلمية الموثوقة جانب من مهنة الطب المتعلق بموضوع Precision Medicine .

-Information obtained from this assessment will be managed according to International Ethical Guidelines.

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-By answering this questionnaire, you are consenting to participate in this research project.

☐ I agree to participate

☐ I do not agree to participate

Demographics :

Age :	Gender :	Practitioner Type:
☐ 20-30 ☐ 30-40 ☐ 40-50 ☐ over 50	☐ Male ☐ Female	☐ Medical Student ☐ Intern ☐ General Practitioner ☐ Resident Physician ☐ Specialist

→ Medical Students :

Medical School Level:	Medical school:
☐ Fourth Year Student ☐ Fifth Year Student ☐ Sixth Year student	☐ Hashemite University ☐ University of Jordan ☐ Jordan University of Science and Technology ☐ Yarmouk University ☐ Al Balqa Applied University ☐ Mutah University

→ **Interns :**

Primary Practice Setting:
☐ Ministry of Health ☐ Royal Medical Services ☐ Private Practice and Hospitals ☐ NGOs

→ **Residents:**

Specialty:	Year of Residency:	Primary Practice Setting:
	☐ First year ☐ Second year ☐ Third Year ☐ Fourth year ☐ Fifth year	☐ Ministry of Health ☐ Royal Medical Services ☐ Private Practice and Hospitals ☐ NGOs

→ **Physicians:**

Specialty:	Primary Practice Setting:
	☐ Ministry of Health ☐ Royal Medical Services ☐ Private Practice and Hospitals ☐ NGOs

Knowledge :

Based on your previous knowledge regarding Precision Medicine, please answer the following statements.

1.Precision medicine is a method that focuses on using unique patient characteristics to tailor disease prevention, diagnosis, and management.	-True	- False	- I don't know
2.Precision medicine is only concerned with the genetic composition and genome sequencing of the individual.	-True	- False	- I don't know
3.When a patient is found to be at increased genetic risk, changes to their treatment or lifestyle would not modify their disease risk.	-True	- False	- I don't know
4.All the genetic variation in an individual can be attributed to either spontaneous (i.e., de novo) or inherited changes in the human genome.	-True	- False	- I don't know
5.Most common diseases, such as diabetes and heart disease, are caused by a single gene variant.	-True	- False	- I don't know
6.Proteomics, metabolomics, genomics, diverse cellular assays, and mobile health technology are all examples of methods used for characterization of patients, aiding the clinical application of Precision medicine.	-True	- False	- I don't know
7.Assessment of the DNA sequence or chromosomal changes (copy number variant, structural alteration) used for diagnostic (or disease characterization) purposes is called Direct-to-consumer (DTC) testing.	-True	- False	- I don't know
8.Medical School and residency training programs have a critical role in the development of a workforce of physicians with the required knowledge and skills to broadly apply precision medicine clinically.	-True	- False	- I don't know
9.Taking a full detailed family history and assessing the genetic risks of the individual is considered the main requirement of physicians for an accurate application of precision medicine.	-True	- False	- I don't know
10.Prenatal screening tests play a great role in the improvement of obstetric care. This is considered one of the applications of precision medicine clinically.	-True	- False	- I don't know
11. There is pharmacogenomic information found in some FDA drug labeling.	-True	- False	- I don't know
12.Till the time being, there is no mandatory gene tests before using any medication	-True	- False	- I don't know

Awareness:

- **Please be informed of the following:**

- **Precision medicine**

Treatments targeted to the needs of individual patients on the basis of genetic, biomarker, phenotypic, or psychosocial characteristics that distinguish a given patient from other patients with similar clinical presentations.

- **Pharmacogenomics**

Study of how genetic (genome) differences in multiple genes (complex multigene patterns) influence variability in drug response.

- **An Example of using Precision Medicine clinically:**

Several studies have demonstrated that the availability of genetic information enhances patient adherence to behavior modification and other disease prevention strategies.

Cancer detection — The concept of a biomarker test to detect cancer in asymptomatic individuals is especially appealing because it could lead to early diagnosis; reduce the use of more aggressive, more toxic, more costly therapy; and potentially result in a greater number of individuals being cured of their disease.

CancerSEEK is a multi-analyte blood test that detects common, cancer-associated DNA variants using a panel of 61 amplicons for cancer "driver" mutations (for which only one abnormal copy would be sufficient to cause cancer) as well as 41 protein biomarkers associated with common cancers

☐ I am aware of the terminology.

Attitude:

- Please indicate the extent to which you agree with each item :

1.I am willing to use genome guided prescribing tools even if more senior physicians are not	-Strongly Disagree	- Disagree	- Neutral	- Agree	-Strongly Agree
2.I would be willing to use genome-guided prescribing tools that are developed by researchers	-Strongly Disagree	- Disagree	- Neutral	- Agree	-Strongly Agree
3.I would be willing to use a patient's genetic information to guide decisions in clinical practice	-Strongly Disagree	- Disagree	- Neutral	- Agree	-Strongly Agree
4.I would be willing to use new types of therapies or interventions to help patients	-Strongly Disagree	- Disagree	- Neutral	- Agree	-Strongly Agree
5.Research-based genome-guided prescribing tools are not clinically useful	-Strongly Disagree	- Disagree	- Neutral	- Agree	-Strongly Agree
6.Clinicians know better than academic researchers how to treat patients	-Strongly Disagree	- Disagree	- Neutral	- Agree	-Strongly Agree
7.I would not be willing to prescribe different medications or doses based on genetic information	-Strongly Disagree	- Disagree	- Neutral	- Agree	-Strongly Agree
8.Clinical experience is more important than genetic information to make decisions	-Strongly Disagree	- Disagree	- Neutral	- Agree	-Strongly Agree
9.I am concerned about the confidentiality of the precision medicine test results.	-Strongly Disagree	- Disagree	- Neutral	- Agree	-Strongly Agree
10.I am concerned about the anxiety patients might feel because of the precision medicine test results.	-Strongly Disagree	- Disagree	- Neutral	- Agree	-Strongly Agree

Barriers :

- Please indicate the extent to which you agree with each item :

1 There is not enough scientific evidence to support the use of precision medicine tests in current medical practice	-Strongly Disagree	- Disagree	- Neutral	- Agree	-Strongly Agree
2 It is difficult to implement precision medicine tests due to the lack of guidelines	-Strongly Disagree	- Disagree	- Neutral	- Agree	-Strongly Agree
3.It is difficult to implement precision medicine tests due to their limited accessibility	-Strongly Disagree	- Disagree	- Neutral	- Agree	-Strongly Agree
4. It is difficult to implement precision medicine tests due to their cost					

-Strongly Disagree	- Disagree	- Neutral	- Agree	-Strongly Agree
5.Such tests can never be done without clear regulation and official authority clarification of their application				
-Strongly Disagree	- Disagree	- Neutral	- Agree	-Strongly Agree

Confidence in ability to practice precision medicine:

- How comfortable are you in your ability to :

1 Recommend genomic testing options to patients	-Very Uncomfortable	- Somewhat Uncomfortable	- Neutral
	- Somewhat Comfortable	-Very Comfortable	
2 Understand genomic test results	-Very Uncomfortable	- Somewhat Uncomfortable	- Neutral
	- Somewhat Comfortable	-Very Comfortable	
3 Explain genomic test results to patients	-Very Uncomfortable	- Somewhat Uncomfortable	- Neutral
	- Somewhat Comfortable	-Very Comfortable	
4.Make treatment recommendations based on genomic test results	-Very Uncomfortable	- Somewhat Uncomfortable	- Neutral
	- Somewhat Comfortable	-Very Comfortable	

Continuing Education:

- Would you consider expanding your knowledge about the topic:

- ☐ Yes
☐ No

- How would you prefer to acquire it :

- ☐ Extracurricular Workshops
☐ Integrating the Material as Part of the Curriculum
☐ Online Webinar / Course
☐ Extra Distributed Reading Material

Thank you so much for participating in our study .