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PERSONALIZED MEDICINE: A REVIEW

[1] Kelhe Kirti R. [2]Bagul Babita P. [3] Shirude Nikhil P. [4]Patil Rupeshkumar H. [5] Prof. Tufail Dana

[1] B.Pharmacy Students, S.V.S. Institute Of Pharmacy, Mungase, Malegoan, Nashik, 423201
[2] B.Pharmacy Students, S.V.S. Institute Of Pharmacy, Mungase, Malegoan, Nashik, 423201
[3] B.Pharmacy Students, S.V.S. Institute Of Pharmacy, Mungase, Malegoan, Nashik, 423201
[4] B.Pharmacy Students, S.V.S. Institute Of Pharmacy, Mungase, Malegoan, Nashik, 423201
[5] Associate Professor Of SVS Institute Of Pharmacy, Mungase, Nashik, 423201

ABSTARCT:

Maximizing treatment efficacy and reducing the risk of medication toxicity for each patient is the aim of personalized medicine. It displays the appropriate drug and dosage, the appropriate patient, and the appropriate time for medication administration. Customized medication regimens based on each patient's genetic composition and molecular diagnosis are the main emphasis of personalized medicine. The main promise of personalized medicine is that genomics can increase the target selectivity of medications, the selection of clinical trial participants and volunteers, and ultimately the likelihood that many agents will be successful in particular populations and individuals. This study's primary goal is to assess person aliased medicine's indications, advantages, problems, and implications for healthcare. Prospects for the future as well the goal of personalized medicine is to forecast, prevent and cure illnesses according to each person's needs. Research in translational genetics and genomics has produced effective tools for clinical diagnosis, high-throughput genome-wide screening for susceptibility or protection to complex medical conditions, evaluating an individual's genomic profile for disease prediction or prevention, and creating vaccines and novel medications.

KEY WORDS : - Pharmacogenomics, target therapy, screening, and personalized medicine.

INTRODUCTION:-

Patients or groups of patients may be the target of personalized medications as a treatment approach. Are frequently described as combining cutting-edge molecular identification with traditional methods to provide precise diagnosis and treatment based on patient history. The majority of the time in recent years, symptoms that could be signs of a variety of ailments were used to support illness diagnosis. Our ability to check for genes that are known to be linked to the illness has made it possible to diagnose certain illnesses more accurately these days.

Making medications in a way that is clearly customized for each patient is what it entails, but it may also entail grouping people into stratified sub populations that take. The strategy relies on scientific advancements in our understanding of how an individual's unique genetic and molecular makeup renders them susceptible to certain diseases.4. The EU Parliamentary Analysis Service (EPRS 2015) defines it as an Associate in Nursing "emerging-evolving approach to medicine" that guides alternatives in relevance to the prediction, prevention, identification, and treatment of illness by using scientific insights into the genetic and molecular basis of health and illness brought on by the sequencing of the human order. Because of this, the goal of personalized medicine sometimes presented as the "right treatment for the right person at the right time." This new approach to medicine has altered the application and, in turn, the health care system by supporting emerging technologies and sciences.[3]

The ability to anticipate and take action before harm occurs has redesigned the reactive health care system, aided in the treatment of illnesses, and brought about a dreadfully 'prospective health care' system that is centered on bar and disease treatment in relation to customized, made-to-order risk. The concepts of "Systems Medicine" and "System Biology" are actually very prevalent, according to an analysis of scholarly literature. Actually, the purported "P4 systems medicine" is the latest, highly interesting trend.[5] Personalized medicine (PM) includes a wide range of constantly changing guidelines recommended by a patient's unique information and biomarker profile (i.e., clinical, Genetic, genomic, and epigenetic/environmental. In order to provide and give patients with unique therapies that range from their molecular and specific outline, Personalized Medicine is dedicated to surveying, monitoring, and diagnosing danger. The fundamental idea of PM jargon is to approach and revamp medication by utilizing integrative biomarkers, which is short for Biological markers, to treat patients rather than diseases, even though there are several linguistic meanings of the term (such as customized, personalized, and precise).

Many patient ordination data can undoubtedly benefit patients in a number of ways, but this won't likely address the shortcomings in the way medications are now prescribed, used, and monitored (pharmacotherapy). Special efforts are required to ensure that the pharmaceutical approach is enhanced so that any potential reversible drawbacks do not undermine the scientific and technical advancements in the field. The main promise of personal medications is that genetic research can improve the target property of medicine, the selection of patients and participants for clinical trials, and thus the potential for the achievement of numerous agents in certain communities and individuals. It is necessary to combine personalized medications with their individual administration. As a result, the word "delivery" is used in the title of this statement in two different contexts: first, the Traditional notion of optimizing medication delivery through formulations and devices; and second, the actual delivery and administration to the patient. Customized medications must be taken in conjunction with their individual administration. Consequently, the term "delivery" is used in the title of this statement in two different contexts: first, the traditional notion of optimizing drug distribution through formulations and devices; and second, the actual delivery and administration of the medication to the patient.[6]

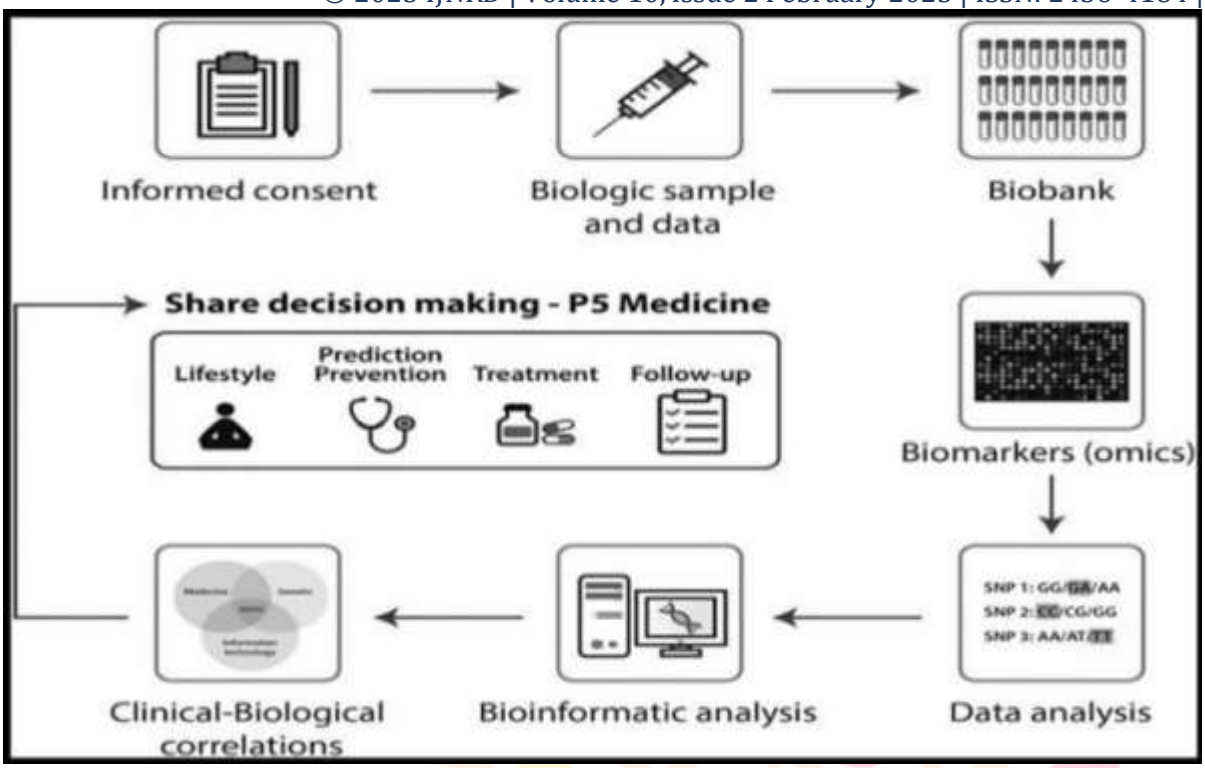

Fig.1. Steps on the road to personalized medicine[6]

More than the Drug:-

As is well known, the drug substance is a crucial component of the only strategy for reaching desired results. If there have been any strategic errors in drug style approaches over the past ten years, it is that high throughput screening advocates and molecular biological and information processing consultants may have generally minimized the fact that a drug and its target don't appear to be close neighbors in vivo (as crucial in silica) unless the drug will reach the designated sites in depleted quantities without degradation into inactive or harmful metabolites or sequestration by unwanted sites. This has been clear for a long time, but the "drag ability" of the place active medicinal drug has typically been lacking. The primary tool for changing the medication landscape and, consequently, the pharmaceutical industry is biotechnology. Since the development of recombinant human hormones 25 years ago, biotechnology has become more popular as a catalyst for advancements in specialized medicine. Genetic and regenerative medications are two examples of cutting-edge biotechnology. Not only does biotechnology provide the newest medications, but it also propels the revolution in drug development. Patients are benefiting from customized therapeutic interventions thanks to developments in biotechnology, technology, and data technology. The thoughtful use of biotechnology products can boost non-public sector output while eventually reducing the cost of health care. Personalized medication care, however, has long been seen as a rather elusive medical specialty ideal. The main causes of this discrepancy are likely a lack of incentives, economic impediments, medical and pharmacological expertise in the area, and a lack of requisitions.[7]

Multiple influences:

There are a number of pressures that are usually competitive, as the advanced influences on personalized medicines are highlighted. Chronically ill people are more likely to have one or more chronic diseases, even though nearly all by medication candidates are tested in participants with one illness under carefully monitored trial circumstances. In addition to reducing drug-drug interactions, a compelling argument will be made for developing strategies to provide flexible drug delivery profiles that can accommodate disease-disease interactions. A mean of thirteen medications and as many as twenty-eight could be prescribed to patients who were 65 years of age or older or who lived on the far side.

The difficulty then, is for the US government to devise delivery mechanisms that will enable the de novo construction of several drugs immediately prior to usage. The drug's increased effectiveness as well as technological advancements could speed up this process.[7]

Advantages of Personalized Medicine:

1 Lower health care expenses.

2. Better targeted therapies will increase the likelihood of achieving the intended results.

3 . Put more emphasis on disease prediction and prevention than on response.

4. It is possible to lower the likelihood of adverse side effects. Compared to the past, disease intervention will occur earlier.[9]

Applications of personalized medicine:

1. Using appropriate surveillance to diagnose disease early in development, which enables more effective interventions or treatment alternatives.

2. Avoiding avoidable drug-related issues and adverse effects brought on by the prescription of generic, "one size fits all" medications.

3. Therapeutic efficacy can be improved by making sure the right medication is utilized and that the dosage schedule accounts for any genetic variations that may impact the drug's metabolism.

4. If an individual has a higher chance of contracting an illness, the available preventative measures should be promoted and complied with.[8]

Personalized Medicine's Promise and Hype:

This explanation, however, is not the main reason why the general public could assume this after hearing about "personalized medicine." Instead, the most specialized personnel in customized medicine could create an atmosphere of unavoidable promises and expectations regarding medications and treatments that are completely customized for each individual... The primary focus of the papers in this volume's first portion is the dedication of medicine everywhere in this subject. The authors, who are experts in the clinical, business, and alternative sectors,

discuss tailored medication, what promises are made, to whom they are made, whether they will be kept and what motivates people to make promises. But as an area unit, we have a tendency to evaluate whether or not Substance—if it exists—is beneficial, hazardous, or just required in order to keep the show running. These questions show that, on the one hand, there is a serious disconnect between the promise of advancement made by industry, analysts, and politicians, and on the other, the reality of biomarker-based customized medicine in terms of analysis results and clinical follow-up. This presents problems with all clinical significance, both historical and contemporary.

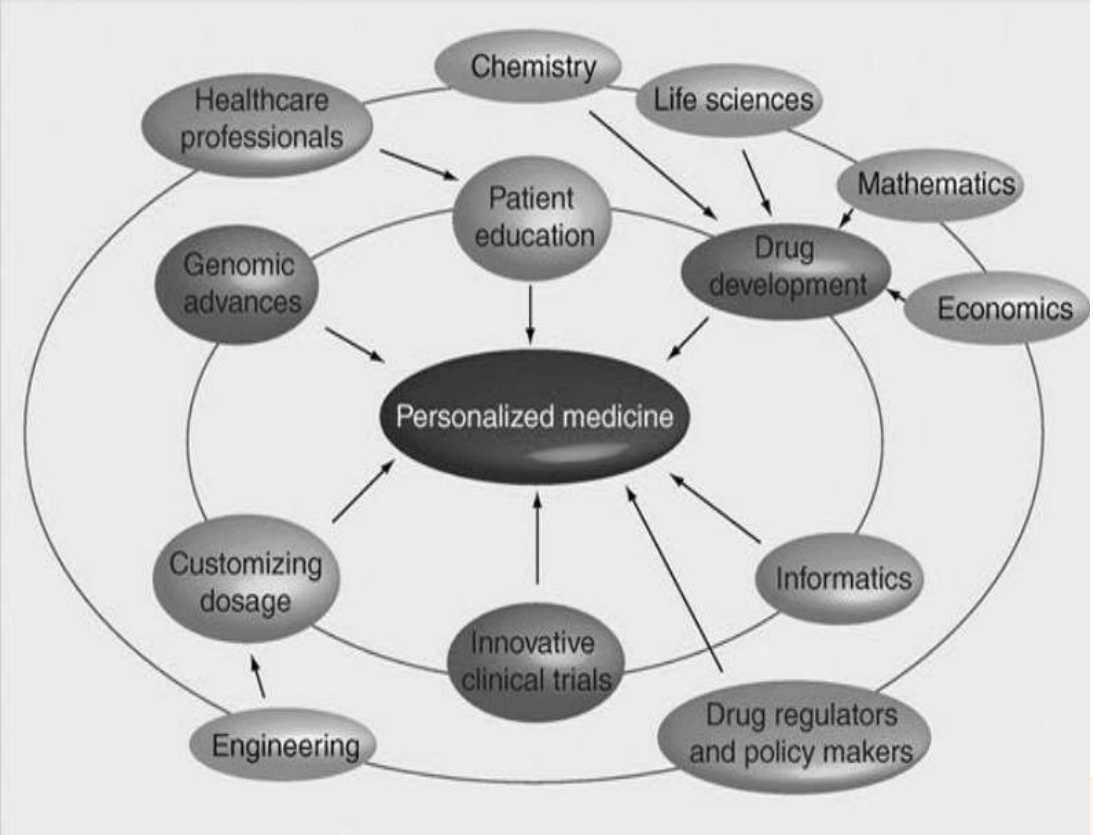

Fig.2. Factors, scientific, economics and professional, impinging

KEY FEATURES OF PERSONALIZED MEDICINE[3]:

1. In light of the aforementioned data, we describe PM as any technology that seeks to enhance disease prevention, diagnosis and treatment by utilizing patient characteristics to determine the best course of action regarding the course of treatment.
2. Diagnostic testing is used: Molecular diagnostics, gene sequencing (such as next generation sequencing), immune histology chemistry assays, and other technologies are used in diagnostic testing to gather additional information about the patient or the nature of the disease, which is necessary for personalization.
3. A variety of technologies are used: Numerous medical technologies, including small molecules, big molecules (biology), and advanced treatment medicinal products (ATMPs), can provide advantages.
4. Modified T-cell treatments and gene therapies, which are regarded as ATMPs, are examples of individualized

therapies.

5. Targeted: Individuals with the same condition are anticipated to receive different treatments.

6. Targeted therapies are area unit treatments that target particular disease-related molecular targets. These targets will either be protein-expression targets at different points in biological pathways or they may result from particular mutations associated with the illness. Targeted therapies, for example, have antitumor effects in the medical field through a variety of pathways, including immune function Control, metastasis suppression, necrosis induction, and cell proliferation inhibition.

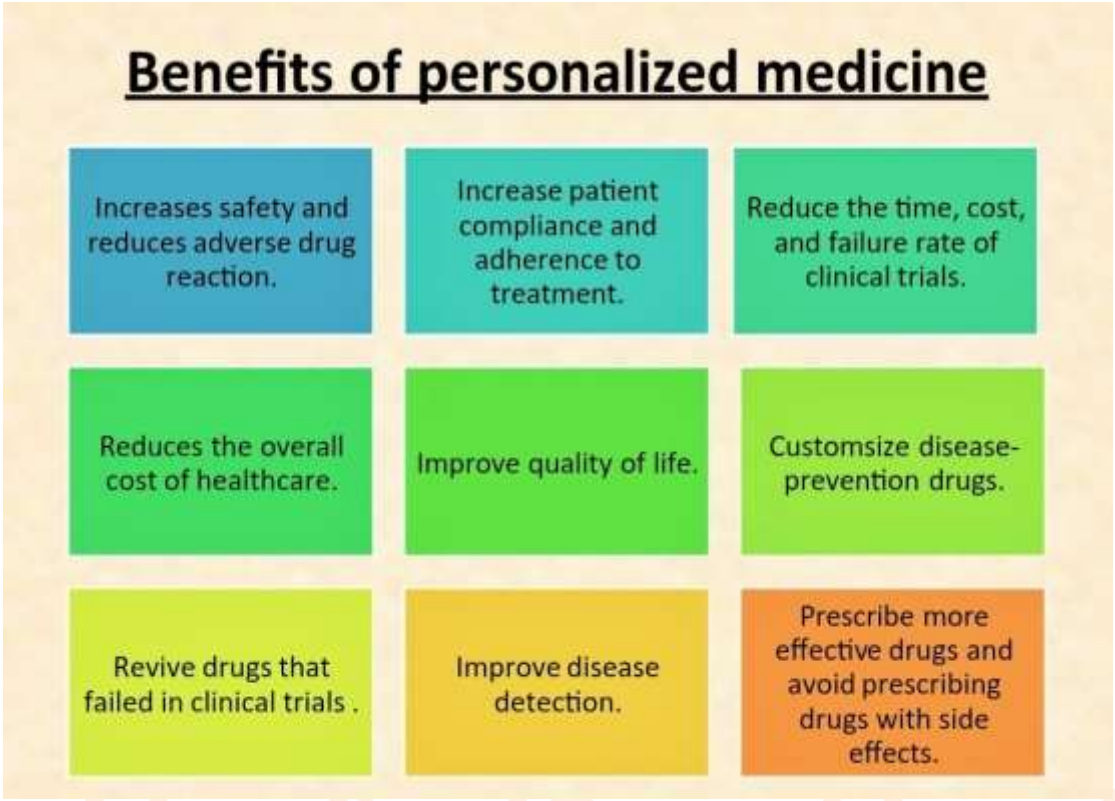

Fig.3. Benefits of personalized medicine[3]

INFORMATION REQUIREMENTS OF PERSONALIZED MEDICINES:

The phrase "personalized medicine" is imprecise. The medical field may demonstrate that it has always dealt with customized drugs. When making an identification, doctors will consider factors like age, sex, and medical history. They may also customize treatment for each patient, taking into account eco-morbidities, psycho-social factors, life style and likely family and financial circumstances. Data collection, methodology, and analysis become more methodical and usually automated. Information is also mined and extra simply massed. The dedication to evidence-based medicine (EBM) as a fundamental principle of application should be interpreted in light of this. EBM, which has become a common resource in nursing, is defined as "the conscientious, explicit, and even-handed use of current best proof in making picks regarding the care of individual patients." This evidence is contained in guidelines, standards, decision support tools and other Materials. The "gold standard" for producing the best evidence in bioscience production regarding the best course of action for the "average patient" is the randomized controlled trial (RCT). Even this, though, may be contested because it was carried out on unusual and

highly privileged people, which are mistreated in ways that are more appropriate for medical patients. Many atypically, the current focus on personalized medication is about tailoring the science of "drugs of medication" to the individual. It promises to move medicine away from "one size fits all" and toward "individualized interventions" by generating evidence of the best course of action for the "average patient" and "individual evidence" of how best to treat the specific individual based on the idea that every individual has unique features of their illness.[11]

Principle of Biotechnology Innovation Organization (BIO's)

Any regulatory approval procedures and systems for customized medication products must be risk-based, open, and predictable and they must guarantee the accuracy, efficacy, and safety of the product.

It includes elements such as

★In order for personalized medical products to be adopted, refund procedures must be commensurate with the value that patients receive from them.

★Prioritizing healthcare personnel' education and training can help ensure that advancements in personalized medicine are frequently incorporated into clinical practice.

★Updated procedures for the development and approval of novel personalized medical technology.

★To facilitate future advancements in customized medicine, the federal government should continue to provide substantial support for scientific research projects.

★Enhancements to the healthcare information infrastructure are necessary to facilitate the successful use of customized medicine.

Personalized medicine in drug development

Critics contend that personalized medications, and thus biomarkers, don't appear to be the foundation or catalyst for the subsequent development of new drugs, and that the phrase is just a wholly original term for fundamental instruments to study biology. It has been shown that biomarkers, such as serum cholesterol and vital signs, are possible risk factors for cardiovascular illnesses and have long been a part of effective clinical diagnostic and clinical practice. The application and notion of biomarkers have recently seen some success in terms of regulatory clearances, notwithstanding the difficulties in precisely defining and gaining access to pertinent developing technologies and biomarker science. When it seems that the process of reconstructing individualized therapeutics involves patients and researchers working together, biomarkers are critical for producing safe and effective medications as well as for determining which patients should receive which treatments[20].

The potential and limitations of personalized medicine in primary healthcare[14]

Medical care is significantly impacted, particularly in the areas of screening for sex organ risk, detecting malignancies of the breast, sex glands, and body parts, and preventing Anemia and cardiovascular disease. There are many

astounding implications, including the dedication to a personalized drug strategy that uses DNA to modify medicines for each patient. Genetics is the study of how genetic differences create individual differences in medication responses. The subject has been around for many decades due to the observation of phenotypes or biological traits that are manifested, such as the sluggish acylation of certain antihypertensive and the varying reactions to anti-tubercular drugs.

Drugs work by interacting with receptors and enzymes, which are proteins that are deoxyribonucleic acid-recoded. Before the patient has taken the medication,

Deoxyribonucleic acid molecular analysis should provide patient-specific information about the enzymes and receptors for a particular drug and, in turn, the effect of that drug on the individual patient. The forecast of treatment response and personalized advice on lifestyle and disease prevention: the right medication, for the right patients, at the right Dosage. The propensity to follow genetic results may not be limited to HIV and complex cancer. According to variations in initial wall thickness, up to 35% of the population with anemia cardiovascular disease may not respond to statins, according to the United Nations organization. It's unclear why people would accept the designation of non- Responder without trying the medication, especially if there are no other options available that are tailored to their needs. For individuals with anemia cardiovascular disease, the National Health Service (NHS) would voluntarily pay for statins if a United Nations agency determines they are non-responders. A cost-effectiveness modeling analysis that Contrasts the tailored medicine strategy with general public health is most likely to advance the approach.[14]

CONCLUSION:

PM is seen as an advancement in the medical field[15]. Following the completion of human and other genomes, medical and health practices are fast evolving, and this is the extent of evidence-based medicine. The diagnostic field could undergo a revolution thanks to the emerging genome-based technologies and bioinformatics tools[25]. Clinicians and other Medical professionals can receive genome-based information that is reliable, accurate, and tailored to small patient population teams. Future medical professionals and doctors will need to apply a wide range of genomic-based diagnostic and treatment technologies with knowledge and abilities[16]. A relatively recent medical paradigm for categorizing, comprehending, treating, and preventing disease based on data and information on Individual biological and environmental variances is called personalized medicine (PM) [17]. Therefore, social comparison is where the true game of customized medicine is played, with proposals for equality and resource distribution that require careful consideration. PM education is essential. Therefore, the challenge will be crucial to developing initiatives and plans that are in line with public opinion and patient demands. It is a difficult task that is necessary for the best possible treatment outcome: doctors and patients must show each other affection and listen to each other's perspectives.[5]

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