

The Advantages of Precision Medicine over Traditional Medicine in Improving Public Health Outcomes

Dr. Sudharani B Banappagoudar^{*1}, **Dr. Santhosh S U**²,
Dr. Mathar Mohideen Nagoor Thangam³, **Dr. Sumeet David**⁴,
Dr. G. Suja Shamili⁵

Received: 12-March-2023

Revised: 19-April-2023

Accepted: 12-May-2023

^{*1} Professor, School of Nursing Sciences, ITM University, Gwalior (MP), India

² Associate Professor, Government Paramedical Training, Institute (College of Nursing), Jhansi, Uttar Pradesh

³ Assistant Professor, Department of Nursing, Faculty of Applied Medical Sciences, University of Tabuk, Saudi Arabia

⁴ Head of Department, (Cardiology), Lifeline Heart Centre, Jalandhar, India

⁵ Principal, Dr. Mallela Ramaiah College of Nursing, Nellore, Andhra Pradesh, India

Email: ^{*} [1sudharani.sons@itmuni.ac.in](mailto:sudharani.sons@itmuni.ac.in), [2santhu.su@gmail.com](mailto:santhu.su@gmail.com),

[3mthangam@ut.edu.sa](mailto:mthangam@ut.edu.sa), [4sumeetdavid_2007@yahoo.co.in](mailto:sumeetdavid_2007@yahoo.co.in), [5shamili.suja2@gmail.com](mailto:shamili.suja2@gmail.com)

Corresponding Authors:

Dr. Sudharani B Banappagoudar

Professor, School of Nursing Sciences, ITM University, Gwalior (MP), India

Email: sudharani.sons@itmuni.ac.in

Abstract

Precision medicine can help make the prediction of whether a particular treatment will work for the individual or not. This makes it far more likely to be effective than the traditional medicine which has the same effect on everyone. There are various advantages of using precision medicine over the existing traditional medicine. The use of precision medicine can help in enhancing the health outcomes and improving patient experience. This study is aimed at evaluating the advantages of precision medicine over traditional medicine. The growing popularity of precision medicine has led to numerous researches being done on the subject and thus the past studies that have been done on the topic have been used to complete the work. A detailed investigation has been possible on the advantages of precision medicine in improving health outcomes with the help of past research.

Keywords: Precision Medicine, Traditional Medicine, Research, Treatment, Psychological thinking

1. Introduction

Personalised medical care can be considered as treatments that depend on genes proteins and other substances of a patient. Medical service providers strategise a plan that offers specific care to the patient. The most influential part of precision medicine is to increase the ability of doctors to predict treatment by understanding the mechanism of various diseases that occur in the human body. On the other hand, traditional medicine refers to the knowledgeable implication of treatment with efficient skills and practices considering theories, beliefs and experiences (Arji *et al.* 2019). In traditional medicine health care treatment undergoes prevention, diagnosis, and treatment improvement focusing on physical and mental illness. Traditional medicine also can be called alternative medicine. The study will highlight the comparison between precision medicine and traditional medicine to emphasise the positive impact of precision medicine with its advantages. The basic principle of precision medicine is to offer an approach towards disease treatment and prevention that follows a particular person's genes, environment and lifestyle.

The doctors and researchers both benefit from the implication of precision medicine in the medical field that explores the treatment and prevention of care in the early stages of diseases. Precision medicine has a wide scope to build a strong future healthcare system that impacts the socioeconomic aspects of countries. Oncology and rare and genetic disorders to some extent can cure with the effective application of precision medicine (Ciardiello *et al.* 2022). Digital combinations in precision medicine accelerate the progression of the healthcare

system considering the detection and identification of early stages of rare diseases. The implication of artificial intelligence in the diagnosis of disease with an effective computing system helps precision medicine to treat the disease with more accuracy and consistency. Considering all the consequences of precision medicine positive insight will be prioritised in this research. The study will highlight the benefits of precision medicine in treating diseases.

1.1 AIM OF THE ARTICLE

The aim of the study is to evaluate the advantages of precision medicine in the improvement of public health outcomes. The study also aims to compare the advantages of precision medicine and traditional medicine to understand a better way of treatment.

2. Materials And Methods

Materials and methods of a study indicate the steps of execution of a study following the requirements of the research. The research has been followed by the interpretivism research philosophy that allows the collection of multiple subjective perspectives of the research depending on the realistic observation of the researcher. A cross-sectional research design has been chosen by the researcher that indicted the general justification of the subject of the study. Different variables can be considered at the same time in a cross-sectional research design. The research approach also has played a vital role in the study to evaluate the strength of the research.

In this particular research inductive research approach has been chosen by the researcher to meet the study goal with informative justification. The inductive research approach helps to draw general conclusions derive from a specific realistic observation that determines the effective significance of the study (Walter & Ophir, 2019). Following the inductive research approach, a secondary data collection procedure has been chosen by the researcher to meet the aim of the study.

Peer-reviewed journals are used as the data source for the secondary data collection procedure. Already existing information relevant to the subject of the study is the resource of peer-reviewed journals and in the secondary data collection procedure the peer-reviewed journals are enacted as the informative evidence. The cost-effective and time-saving approach of the secondary data collection procedure accelerates the process of study completion in a short period of time. The data interpretation considering secondary data has the independence and flexibility that helps to increase the quality of the study. The evidential approach of secondary data interpretation-oriented results helps to meet the study goal with informative justification.

3. Result

3.1 Evaluation of beneficial aspects of precision medicine

Precision medicine helps to improve care quality by reducing unnecessary diagnosis procedures including testing and therapies. Depending on the genes and proteins along with other substitute precision medicine helps to derive insights into the disease that accelerates the discovery of accurate treatment. Big data, AI, environmental and social factors along with various omics and pharmaco-omics are the main components of precision medicine that integrated the procedure of prevention and population medicine (Naithani *et al.* 2021). Traditional medicine's limitations can be overcome with the implication of precision medicine in the healthcare system. Prediction of susceptibility to diseases has been driven by precision medicine. Integration of electronic health records also has been determined by precision medicine that helps the researcher and doctors to access the patient's records easily. Precision medicine also helps to increase the ability of doctors to retrieve patients' genetic and molecular information to better the way to treat the disease and maintain the regular medical care of the patients.

Effective approaches also have been offered by prevention medicine for the prevention, diagnosis and treatment of a wide range of diseases. Research development in the healthcare department also has been influenced by precision medicine that integrated the research process for the exploration of treatments. The potential benefit of precision medicine is to design new tools to gather, analyse and share medical data. Patients' privacy records also have been maintained by the application of precision medicine (MacEachern & Forkert, 2021). Innovation

medical products considering the technologies, FDA oversights of tests and drugs have been influenced by precision medicine considering the safe and effective products. Privacy and confidentiality of patient's medical history have been secured by the effective approach of precision medicine. Advancement of scientific research including a large number of people's contributions also has been considered in precision medicine. Patients' advocacy community, universities, and pharmaceutical companies are involved in precision medicine that wider the scope to achieve a higher and more advanced medical treatment in the health care system.

3.2 Comparison between precision and traditional medicine

Traditional medicine is a process that depends on the therapies, experiences and beliefs along with highlighting the ability of skills, knowledge and practices to treat the disease. Lack of specification can create disadvantages for traditional medicine such as the risk of over dosage. Another risk factor of traditional medicine is the quick contamination of drugs that can harm patients' health (Chen *et al.* 2019). The oral dosage approach of traditional medicine is not accepted by all patients which can be considered as the major disadvantage of traditional medicine. Accessibility and availability of traditional medicine are not easy which obstructed the way of health improvement. After the consumption of traditional medicine side effects can negatively impact the patient's health which can be a negative consequence of traditional medicine.

The potential problem of traditional medicine is the lack of scientific data that can verify the efficacy and reliability of traditional medicine considering patients' health safety. The wastage of resources due to the negative impact of traditional medicine has disrupted environmental sustainability. In traditional medicine delay in the detection of disease has affected the patients' health which can lead to dangerous results of disease outcomes. On the contrary, precision medicine offers more advanced and effective treatment that helps to develop the healthcare system. Presumption of precision medicine the strength of the effectiveness of the treatment has worked better to cure a disease rather than the application of an average prescription (Doboreanu & Oprea, 2019). Precision medicine also has lower chances of side effects that ensure efficient health treatment for people. Medical decision-making in favour of the health improvement of a patient has been driven by precision medicine.

Optimisation of treatment choice and implementation of disease prevention strategies has been offered by precision medicine that ensures quick remedy for treatment. Large data sets and implications of artificial intelligence have impacted the health system considering precision medicine (Schork, 2019). Early detection of rare diseases and also measuring the severity of the disease in precision medicine has been helped to strategise plans for further treatment of the disease. Therefore, considering the digital era, precision medicine is far better than traditional medicine and highly accepted by the health system for the further development of the treatments associated with rare and chronic diseases.

3.3 Personalisation of medicine considering precision public health

Precision medicine has an effective characteristic that indicates the personalisation of the treatment according to the consistency of a disease of a patient. Precision public health is associated with precision medicine that ensures the further betterment of the health care system (Bilkey *et al.* 2019). PPH helps to develop precision medicine utilising new technologies with effective big data and a big part of the public health population. Precision public health includes precision medicine along with involving disease prevention and health promotion activities. This approach indulges the individual initiatives of the public regarding their own health which also helps to develop public health. Precision public health helps to optimise the treatment process of precision medicine focusing on the family health history.

Digital implications in the development of PPH consider the personal devices that help to track health information. Smart devices are capable to monitor and observe health activities such as blood pressure, physical activities and nutrition that ensure the retrieval of real-time data for further precision medicine-based treatment. Genome sequencing is part of precision medicine that helps to identify the cause of infectious diseases and doctors can start treatment depending on the result (Hasanzad *et al.* 2019). Public health workers also can apply this method to identify the disease in the public community to stop the spread of the disease, in a social perspective precision medicine is indulging the development of the public health system with the identification

of the treatment considering big data sets. Newborn screening is another way to complement precision medicine through PPH development.

It is precisely identified the earlier medical conditions of the newborns to prevent further complications. Inherited medical conditions of people also can be detected through precision medicine that helps to develop precision public health. The BRCA1 or BRCA2 gene mutation in women can consider the probability of breast and ovarian cancer along with the same gene mutation observation in males can also indicate the future chance of Cancer (Mahdavi *et al.* 2019). Precision medicine helps to detect the gene mutation pattern in the human body by emerging advanced digital implications. The perspectives of PPH and precision medicine have emphasised the correlation between them that accelerates the development process of the healthcare system.

3.4 Digital complements in precision medicine

The efficacy of precision medicine to some extent depends on digital proficiency which is implicated in the detection analysis and prevention method of disease. Genomics, transcriptomics and proteomics are the most effective detection procedure of precision medicine under digital interpretation. Transcriptomics helps to reveal the condition of cells that provides information to the researcher and doctors regarding the integration of gene mutation (Jiang *et al.* 2022). Detection of earlier stages of cancer or prevention from cancer can be identified by the pattern of gene mutation in the human body through transcriptomics. The relationship of genes in the human body considering a map has been evaluated through genomics. Proteomics helps to indicate the type of quantity of proteins in the human body. Health digital twin is another way to represent the physical evidence of patients considering multimodal patient data, population and real-time updating data including environmental variables.

The virtual pattern of the digital twin also called the physical twin of patients ensures the accurate treatment procedure for the disease. Next-generation sequencing (NGS) is another effective gene detection apparatus that identifies the disease-associated variants to ensure accurate therapies for the patient along with measuring the disease risk and cutting down the cost of therapy care (Pereira, Oliveira & Sousa, 2020). Genomic data and electronic health records are the basic digital implication in the process of precision medicine. The cost-effective approach of genomic and molecular biology tests enhances the detection ability of precision medicine to reduce the risk of Cancer and rare diseases considering big data sets. The trend of precision medicine is to increase the market growth along with providing health care services among all income groups of people. Health digital twins are also enacted as a tool that helps with the computation of data appropriately implicating the data in medical treatment along with maintaining the regulation of data.

Patient history privacy maintenance also has been driven by the implication of AI considering precision medicine. Easy retrieval of patients' health records according to the needs of treatment has been controlled by the advanced application of precision medicine including digital devices. The health research department also gets benefited from the easy accessibility and availability of public health data information that accelerates the chances of innovation of curable treatment and drugs for severe diseases along with rare disorders. The health digital twin is also an example of an advanced application of precision medicine that can create a replica of body parts and transplant it into the human body by eliminating the damaged body part (Hassani, Huang & MacFeely, 2022). The technological efficiency in precision medicine has indicated the future achievement of precision medicine in the healthcare system along with improvement of the health also benefited the public in a cost-effective manner.

4. Discussion

The findings of the research have highlighted the beneficial aspect of precision medicine that helps to develop the healthcare system. A brief overview of the advantages of precision medicine has been discussed in this study. The most effective benefit of precision medicine is to improve care quality and reduce the cost of testing. Pre-detection of rare and severe diseases also has been driven by precision medicine. Genetic-based molecular information also has been considered in precision medicine which increases the ability of doctors to treat a disease along with the researchers also get the scope to find out ways to recover the disease with an effective treatment. The use of AI and various omics in precision medicine has accelerated the process of detection and

prevention considering treatment. The potential advantage of precision medicine is the collection of medical data for analysing and utilising the data.

An effective evaluation of traditional medicine and precision medicine has been highlighted in this study that ensures more capability of precision medicine in health system development. Precision medicine has the capability to presume the effectiveness of treatment considering the gene mutation pattern of human bodies. On the other hand, traditional medicine offers an average prescription depending on the skills, practices and knowledge. Another major factor of traditional medicine is the side effects due to the consumption of drugs that can harm the patient's health. However, precision medicine does not have such a crucial health impact as the patient's health records already have been analysed before the treatment. The medical decision-making ability of precision medicine is much better than traditional medicine as the detection potentiality of precision medicine is good enough to treat the disease.

The availability of optimisation has enhanced the quality of precision medicine whereas traditional medicines are depending on theories, beliefs and experiences. The correlation between precision public health and precision medicine also has been prioritised in this research indicating the importance of precision medicine in public health development. The role of digital devices in tracking and gathering data information regarding public health focusing on precision medicine has been depicted in this study. Public health awareness associated with precision medicine also has highlighted the progression of the health system. The implication of precision medicine in retrieving the inherited information of the public helps to prevent severe diseases such as breast cancer, and ovarian cancer. PPH also passively has been helped the research department of the health industry to utilise the data set for the discovery of remedies for severe and rare diseases.

Digital complementation in precision medicine also has been focused on in this research. The implication of digital twins and its impacts on the health system has been evaluated in this research. Genomics, transcriptomics and proteomics are also prioritised in this research to highlight the advantages of precision medicine in the healthcare industry. Next-generation sequencing (NGS) is another appreciable digital effort of precision medicine that ensures the development of the health system. The cost-effective approaches of digital applications in precision medicine have indicated a positive acceleration rate of development in the public healthcare system. Genomic data and electronic health records regarding the patients' health are also an example of integrated precision medicine applications in public healthcare development. Enhanced quality of treatment and care procedures has been driven by digitised precision medicine.

5. Conclusion

The entire study has indicated the impact of precision medicine in the healthcare industry. Traditional medicine has some limitations such as a lack of assumption of the effectiveness of treatment that can be overcome by precision medicine. In this research, the concepts of precision medicine and traditional medicine have been briefly explained. The interpretivism research philosophy has been selected by the researcher to execute the research followed by the cross-sectional research design. An inductive research approach has been conducted in this research to justify the subject of the study. A secondary data collection procedure has been used in this research depending on the existing information from peer-reviewed journals. The data interpretation has developed findings that highlight the beneficial perspectives of precision medicine. The importance of precision medicine in the development of the public health system considering the advantages of precision medicine has been focused on in this report.

A precise comparison between precision medicine and traditional medicine has been determined in this research to derive insights into the significance of the study. The contribution of precision public health in the development of precision medicine has been discussed here. Simultaneously the positive impact of precision medicine on PPH including the activities for health awareness has been considered in this assignment. The digital implication in precision medicine also has been prioritised in this research that analyses the efficiency of digital applications such as digital twin, genomics, transcriptomics and proteomics. Big data sets considering genomic data and electronic data also have contributed to the development of precision medicine that helps to improve the healthcare system.

6. Acknowledgement

I desire to show my special gratitude to my friends and family who provides me a chance of conducting a study on “**THE ADVANTAGES OF PRECISION MEDICINE OVER TRADITIONAL MEDICINE IN IMPROVING PUBLIC HEALTH OUTCOMES**” I would also like to extend my regards to my senior and research fellow who have aided me throughout this article.

References

1. Arji, G., Safdari, R., Rezaeizadeh, H., Abbassian, A., Mokhtaran, M., & Ayati, M. H. (2019). A systematic literature review and classification of knowledge discovery in traditional medicine. *Computer methods and programs in biomedicine*, 168, 39-57. Retrieved from: https://www.researchgate.net/profile/Goli-Arji/publication/329170340_A_systematic_literature_review_and_classification_of_knowledge_discovery_in_traditional_medicine/links/5c024315299bf1a3c159a97d/A-systematic-literature-review-and-classification-of-knowledge-discovery-in-traditional-medicine.pdf
2. Bilkey, G. A., Burns, B. L., Coles, E. P., Mahede, T., Baynam, G., & Nowak, K. J. (2019). Optimizing precision medicine for public health. *Frontiers in public health*, 7, 42. Retrieved from: <https://www.frontiersin.org/articles/10.3389/fpubh.2019.00042/full>
3. Chen, L., Shi, G. R., Huang, D. D., Li, Y., Ma, C. C., Shi, M., ... & Shi, G. J. (2019). Male sexual dysfunction: A review of literature on its pathological mechanisms, potential risk factors, and herbal drug intervention. *Biomedicine & pharmacotherapy*, 112, 108585. Retrieved from: <https://www.sciencedirect.com/science/article/pii/S0753332218353289>
4. Ciardiello, F., Ciardiello, D., Martini, G., Napolitano, S., Taberner, J., & Cervantes, A. (2022). Clinical management of metastatic colorectal cancer in the era of precision medicine. *CA: a cancer journal for clinicians*, 72(4), 372-401. Retrieved from: https://scholar.google.com/scholar?output=instlink&q=info:ezAZMuEN5nUJ:scholar.google.com/&hl=en&as_sdt=0_5&as_ylo=2019&scillfp=9036391318079413506&oi=ile
5. Dobreanu, M., & Oprea, O. R. (2019). Laboratory medicine in the era of precision medicine—dream or reality?. *Revista Română de Medicină de Laborator Vol*, 27(2). Retrieved from: <https://sciendo.com/downloadpdf/journals/rrlm/27/2/article-p115.xml>
6. Hasanazad, M., Sarhangi, N., Meybodi, H. R. A., Nikfar, S., Khatami, F., & Larijani, B. (2019). Precision medicine in non communicable diseases. *International Journal of Molecular and Cellular Medicine*, 8(Suppl1), 1. Retrieved from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7175610/>
7. Hassani, H., Huang, X., & MacFeely, S. (2022). Impactful Digital Twin in the Healthcare Revolution. *Big Data and Cognitive Computing*, 6(3), 83. Retrieved from: <https://www.mdpi.com/2504-2289/6/3/83/pdf>
8. Jiang, P., Sinha, S., Aldape, K., Hannehalli, S., Sahinalp, C., & Ruppin, E. (2022). Big data in basic and translational cancer research. *Nature Reviews Cancer*, 22(11), 625-639. Retrieved from: <https://www.nature.com/articles/s41568-022-00502-0>
9. MacEachern, S. J., & Forkert, N. D. (2021). Machine learning for precision medicine. *Genome*, 64(4), 416-425. Retrieved from: <https://cdnsiencepub.com/doi/pdf/10.1139/gen-2020-0131?download=true>
10. Mahdavi, M., Nassiri, M., Kooshyar, M. M., Vakili-Azghandi, M., Avan, A., Sandry, R., ... & Gopalan, V. (2019). Hereditary breast cancer; Genetic penetrance and current status with BRCA. *Journal of cellular physiology*, 234(5), 5741-5750. Retrieved from: https://espace.library.uq.edu.au/view/UQ:77eab14/UQ77eab14_OA.pdf
11. Naithani, N., Sinha, S., Misra, P., Vasudevan, B., & Sahu, R. (2021). Precision medicine: Concept and tools. *medical journal armed forces india*, 77(3), 249-257. Retrieved from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8282508/>
12. Pereira, R., Oliveira, J., & Sousa, M. (2020). Bioinformatics and computational tools for next-generation sequencing analysis in clinical genetics. *Journal of clinical medicine*, 9(1), 132. Retrieved from: <https://www.frontiersin.org/articles/10.3389/fgene.2020.544162/full>
13. Schork, N. J. (2019). Artificial intelligence and personalized medicine. *Precision medicine in Cancer therapy*, 265-283. Retrieved from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7580505/>
14. Walter, D., & Ophir, Y. (2019). News frame analysis: An inductive mixed-method computational approach. *Communication Methods and Measures*, 13(4), 248-266. Retrieved from: https://www.researchgate.net/profile/Yotam-Ophir-3/publication/335867777_A_Multi-method_Approach_for_Identifying_and_Grouping_Frame_Elements_with_Topic_Modeling_and_Network_Analysis/links/5f0c8254a6fdcc2f323376aa/A-Multi-method-Approach-for-Identifying-and-Grouping-Frame-Elements-with-Topic-Modeling-and-Network-Analysis.pdf