REVIEW

Journal of Ethnomedicine and Medical Wellness (*JEMEDWELL*) 2025, Volume 1, Number 1: 9-11

Implications of Changing the Health Paradigm from the Medicine 1.0 to 4.0 Era

I Nyoman Gede Semarajana[1*], Kadek Ayu Wiswapawani[1], Ida Bagus Yorky Brahmantya[2], I Gusti Ngurah Putra Eka Santosa[3]

[1]Bachelor of Medicine Study Program, Faculty of Medicine, Universitas Mahasaraswati Denpasar, Indonesia; [2]Medical Education Unit, Faculty of Medicine, Universitas Mahasaraswati Denpasar, Indonesia; [3]Physiology Department, Faculty of Medicine, Universitas Mahasaraswati Denpasar, Indonesia.

*Corresponding author:
I Nyoman Gede Semarajana;
Bachelor of Medicine Study Program, Faculty of Medicine, Universitas Mahasaraswati Denpasar, Indonesia;
semarajana@unmas.ac.id

Received: 2024-12-15
Accepted: 2025-02-10
Published: 2025-03-08

ABSTRACT

The evolution of healthcare paradigms has transitioned from the traditional Medicine 1.0 era to the current Medicine 4.0 era, characterized by digitalization, connectivity, and personalization. Medicine 1.0 focused on reactive treatment with fragmented care, while Medicine 4.0 emphasizes patient-centric and seamless care through advanced technologies like artificial intelligence and the Internet of Things (IoT). This narrative review explores the implications of this paradigm shift, highlighting the challenges and opportunities associated with integrating emerging technologies into healthcare practices. The review identifies the need to validate these technologies through rigorous scientific methods, ensure equitable access, and develop comprehensive training programs for healthcare professionals. Policy frameworks must also be refined to support sustainable implementation. Despite the complexities, the transition to Medicine 4.0 holds the potential to enhance healthcare delivery, improve patient outcomes, and create a more inclusive healthcare system. Embracing this shift requires addressing technological integration, professional training, and policy development to realize the transformative benefits of Medicine 4.0 fully.

Keywords: healthcare, medicine, paradigm.
Cite This Article: Semarajana, I.N.G., Wiswapawani, K.A., Brahmantya, I.B.Y., Santosa, I.G.N.P.E. 2025. Implications of Changing the Health Paradigm from the Medicine 1.0 to 4.0 Era. *Journal of Ethnomedicine and Medical Wellness* 1(1): 9-11

INTRODUCTION

The evolution of healthcare paradigms has been dynamic, transitioning from the traditional Medicine 1.0 era to the current era of Medicine 4.0. In the past, healthcare predominantly focused on treating illnesses reactively, with a fragmented approach that often lacked continuity of care.[1] However, as Mohr et al. (2018) highlight, the value of treatment for conditions like schizophrenia necessitates a shift towards a more patient-centric and seamless care model.[1] This transition demands challenging adaptations in health and social care systems, emphasizing the need to move from fragmentation to a more integrated and holistic approach.[1] The existing paradigm in healthcare, often referred to as Medicine 1.0, is characterized by its focus on disease treatment rather than prevention and patient-centered care.[2] This traditional paradigm has limitations in addressing the complexities of modern healthcare challenges, such as the syndemic of inequity and the impact of events like the COVID-19 pandemic on healthcare delivery.[2]

The rationale for reviewing the implications of changing the health paradigm from Medicine 1.0 to 4.0 lies in understanding the transformative impact of this shift on healthcare delivery, patient outcomes, and overall health system performance. As highlighted by Chaudhuri (2022), addressing inequities in health requires a fundamental restructuring of the existing healthcare paradigm to effectively tackle anomalies within the system[2,3] further emphasize the importance of translating value-based purchasing into value-based care, underscoring the need for aligning healthcare delivery with excellence in clinical indicators and patient experiences.[3] This shift towards value-based care signifies a departure from the traditional fee-for-service model towards a more outcomes-driven and patient-centered approach.[3]

In healthcare, paradigm shifts are essential for progress and innovation. Anand et al. (2020) discuss how fruitful inquiry thrives in an environment of open debate regarding the validity and usefulness of existing paradigms, leading to transformative shifts in thinking and practice.[4] The challenges associated with implementing such paradigm shifts are acknowledged by Turner et al. (2022), who highlight the complexities and obstacles of transitioning to new healthcare models, such as those focused on suicide prevention.[5] Despite the challenges, Weberg (2023) emphasizes embracing paradigm shifts in healthcare leadership to navigate changing times successfully.[6] This underscores the critical role of leadership in driving and sustaining transformative changes in healthcare systems.

The transition towards Medicine 4.0 represents a significant departure from traditional healthcare approaches, necessitating a reevaluation of practices and policies to align with the evolving needs of patients and communities. Nuti et al. (2021) discuss the challenges faced by hospitals in adapting their planning and control systems to embrace public value management, signaling a paradigm shift in healthcare system management[7,8] stress the importance of prioritizing health equity

in implementation science, highlighting the need to address historical injustices and systemic disparities through policy and practice changes.[8] This shift towards health equity is a fundamental aspect of the changing healthcare paradigm, requiring a reorientation of priorities and strategies to ensure fair and just healthcare delivery for all individuals and communities.[6] Therefore, considering the paradigm shift's challenges, opportunities, and outcomes, this review explores the implications of transitioning from the conventional Medicine 1.0 era to the more integrated and patient-centric Medicine 4.0 era.

Medicine 1.0: The Traditional Era

The development of the medicine era began from the period of traditional medicine, namely the Medicine 1.0 era. The Traditional Era is included in the Medicine Era 1.0 era. This era includes the practice of medicine before the development of technology and substantial scientific advances. Health workers at this time tend to rely more on clinical knowledge and experience, hoping for a still simple society. People in the Medicine 1.0 era get essential health services and treatment for acute diseases. Medical practice in providing health services tends to be more responsive, with an approach to treating diseases after the onset of disease symptoms.[9]

The public thoroughly considers the capabilities and assessments of doctors without the supporting technology used. In addition, traditional medicine often involves elements of magi and religion following the beliefs of the local community. This is due to the limited sources of knowledge about treatment. Thus, alternative medicine is still widely applied because it is a medical science passed down from generation to generation.[10]

Medicine 2.0: Early to Mid-20th Century

Development and progress in the health sector began to occur in the early 20th to mid-20th century. This era is called the era of medicine 2.0. In the Medicine 2.0 era, there has been an acceleration in biomedical research that has contributed to the development and progress of medicine. Various discoveries emerged with vaccines, antibiotics, and more advanced surgical techniques during this period. People in the medicine 2.0 era are beginning to express more hope related to the skills and abilities of medical personnel in curing and preventing diseases. Medical personnel are beginning to implement a data- and evidence-based approach. The science of medicine is supported by scientific research. In addition, hospitals are starting to develop into more organized health service centers. Health workers widely use basic medical technology such as X-rays.[11]

Medicine 3.0: Mid to Late 20th Century

The emergence of significant developments in the health sector has ushered in the evolution of medicine into the era of medicine 3.0. The era of medicine 3.0 began from the middle to the end of the 20th century. The Industrial Revolution has led to the advancement of science in medicine compared to the previous era. The medicine 3.0 era is marked by the synergy of science and technology technology in the application of health services. This progress affects the paradigm of society that views treatment more widely. People tend to expect more precise, efficient, and effective health care according to the symptoms and complaints of the disease experienced. In this era, supporting technologies such as computers began to help diagnose and manage medical data and support medical decision-making considerations.[12] Healthcare workers are starting to collaborate with other specialists and emphasize using technology to support clinical decisions. The hospital information management system (HIMS) has been implemented to improve the efficiency and quality of health services aimed at optimizing health services for patients.[11]

Medicine 4.0: The Digital Era and Personalization

Entering the 21st century, the era of medicine shows a more advanced development than the 20th century. At this time, it began to enter the Medicine 4.0 era. The era of medicine 4.0 is the culmination of the industrial revolution 4.0.[13] The industrial revolution in the health sector that occurred is more oriented towards connectivity, digitalization, and personalization of medical practices. Public expectations in this era are more oriented towards personalized health service involvement, evidence-based in the form of data, and integrated. Supporting data is also based on the latest research results, which is more significant. The era of medicine 4.0 begins to utilize technologies such as the Internet of Things (IoT), artificial intelligence, and big data that facilitate the ease of analyzing existing health data in real-time (instantaneously) and maximizing the personalization of health services for patients.[14] Conversely, the public paradigm about health workers is increasing and expanding. Health workers are expected to have the ability to use advanced technology to improve diagnosis, treatment, and disease management. So, the chance to recover is more optimal and effective. Progress in this era is also marked by the introduction of wearable devices and Telemedicine, which are the main components of daily health care.[15] Both contribute to providing easy access to health information globally and more adaptively to the broader community.

From the development and progress that has occurred since the Medicine 1.0 era to the Medicine 4.0 era, people are also adapting to keep up with their abilities and take advantage of increasingly sophisticated technology.[16] In the Medicine 1.0 era, people expect to obtain health services, primary care, and traditional treatment of acute diseases. Medical practitioners during this time are highly guided by clinical skills and experience to provide disease care.[17] Then, entering the 20th century in the Medicine 2.0 era, the progress of the industrial revolution has implications for people's expectations about treatment that are increasingly different. This is characterized by the ability to heal and prevent disease through antibiotics and vaccinations.

Meanwhile, in the Medicine 3.0 era, people choose health services that are more accurate, fast, precise, and effective. Information technology is growing rapidly and is beginning to be widely used by health workers. This era

is oriented towards communication and the importance of collaboration between different specialist fields to maximize the quality of treatment.

In the Medicine 4.0 era, people's expectations have shifted to integrated, personalized, and data-based health services. Although the attention in the field of medicine and industry in this era is more towards discovery and innovation on a molecular scale, the training provided in physiology remains an important aspect that provides the foundation and support for developments before the era of medicine 4.0.[12]

Future Directions

Future research should address the challenges and leverage the opportunities presented by the transition from Medicine 1.0 to Medicine 4.0. One key area is validating and integrating emerging technologies such as artificial intelligence, big data, and the Internet of Things (IoT) into healthcare practices. These technologies have the potential to revolutionize personalized and predictive medicine, but their implementation requires rigorous scientific validation, standardized protocols, and robust data privacy measures. Additionally, exploring the socio-economic impacts of these technologies on different populations will be crucial to ensure equitable access and prevent the exacerbation of existing health disparities.

Another critical direction for future research is the development of comprehensive training programs for healthcare professionals to navigate the evolving landscape of Medicine 4.0 effectively. These programs should emphasize the importance of digital literacy, interdisciplinary collaboration, and cultural competence, equipping practitioners with the skills to integrate advanced technologies with traditional care approaches. Furthermore, policy frameworks must be developed and refined to support the sustainable implementation of Medicine 4.0, focusing on aspects such as regulatory standards, funding mechanisms, and ethical considerations.

CONCLUSION

The shift from Medicine 1.0 to Medicine 4.0 marks a significant evolution in healthcare, characterized by increased digitalization, connectivity, and personalization of medical practices. This narrative review highlights the transformative potential of this transition in enhancing healthcare delivery, patient outcomes, and system efficiency. However, realizing this potential requires a concerted effort to address the challenges related to technology integration, healthcare professional training, and policy development.

CONFLICT OF INTEREST

All authors declared that there is no conflict of interest regarding this article.

FUNDING

This article is self-funded by authors.

ETHICS APPROVAL

Not applied.

AUTHOR'S CONTRIBUTION

All authors contributed equally in the writing process of this article.

REFERENCES

1. Mohr P, Galderisi S, Boyer P, Wasserman D, Arteel P, Ieven A, et al. Value of schizophrenia treatment I: The patient journey. European Psychiatry. 2018;53:107–15.
2. Chaudhuri ER. The Syndemic of Inequity and COVID-19 in Virtual Care. J Med Internet Res. 2022;24(6):e37717.
3. Aroh D, Colella J, Douglas C, Eddings A. An Example of Translating Value-Based Purchasing Into Value-Based Care. Urol Nurs. 2015;35(2):61.
4. Anand G, Larson EC, Mahoney JT. Thomas Kuhn on Paradigms. Prod Oper Manag. 2020.
5. Turner K, Pisani AR, Sveticic J, O'Connor N, Woerwag-Mehta S, Burke K, et al. The Paradox of Suicide Prevention. Int J Environ Res Public Health. 2022;19(22):14983.
6. Weberg D. Fractures in the Faultline: Addressable Issues in Nursing. Nurs Adm Q. 2023;47(3):E21.
7. Nuti S, Noto G, Grillo Ruggieri T, Vainieri M. The Challenges of Hospitals' Planning & Control Systems: The Path toward Public Value Management. Int J Environ Res Public Health. 2021;18(5):2732.
8. Brownson RC, Kumanyika SK, Kreuter MW, Haire-Joshu D. Implementation science should give higher priority to health equity. Implementation Science. 2021;16(1):28.
9. Yulion R, Manik F, Ulandri KR. Edukasi Penggunaan Obat Konvensional dan Obat Tradisional Berbasis Kearifan Lokal di Desa Terusan Kecamatan Maro Sebo Ilir Kabupaten Batanghari Provinsi Jambi. Jurnal Inovasi Pengabdian dan Pemberdayaan Masyarakat. 2022;2(2):217–24.
10. Nasrudin J. Relasi Agama, Magi, Sains dengan Sistem Pengobatan Tradisional-Modern pada Masyarakat Pedesaan. Hanifiya: Jurnal Studi Agama-Agama. 2019;2(1):42–58.
11. Annisa A. Sejarah Revolusi Industri dari 1.0 sampai 4.0 [Internet]. 2021.
12. Miller MI, Brightman AO, Epstein FH, Grande-Allen KJ, Green JJ, Haase E, et al. BME 2.0: Engineering the Future of Medicine. BME Front. 2023;4:1.
13. Haleem A, Javaid M, Pratap Singh R, Suman R. Medical 4.0 technologies for healthcare: Features, capabilities, and applications. Internet of Things and Cyber-Physical Systems. 2022;2:12–30.
14. Wolf B, Scholze C. "Medicine 4.0." Current Directions in Biomedical Engineering. 2017;3.
15. Tran BX, Vu GT, Ha GH, Vuong Q-H, Ho M-T, Vuong T-T, et al. Global Evolution of Research in Artificial Intelligence in Health and Medicine: A Bibliometric Study. J Clin Med. 2019;8(3):360.
16. Nah S, McNealy J, Kim JH, Joo J. Communicating Artificial Intelligence (AI): Theory, Research, and Practice. Commun Stud. 2020;71(3):369–72.
17. Wahyuni NPS. Penyelenggaraan Pengobatan Tradisional di Indonesia. Jurnal Yoga dan Kesehatan. 2021;4(2):149.