

Research on the new path of deepening grassroots medical care from the perspective of metaverse

Yani Hu, Jingjie Pang *

School of Anhui Medical University, Hefei, 230032, China

* Corresponding author: Jingjie Pang

Abstract: Metaverse and related technologies can break the traditional model in the field of medical care, and provide a feasible infrastructure platform for modern medical care and even future medical care through the Metaverse full-scene interaction mode, and improve medical services with computing power the ability to combine clinical research with clinical practice provides the possibility to break down the time and space barriers of medical care. The current level of grassroots medical care lags behind that of the city. It is of great practical significance to study the feasibility of implementing virtual surgical micro-manipulation technology in grassroots medical care under the perspective of metaverse and the current awareness of grassroots people on virtual medical technology to solve this problem. [Research method] Based on the provincial college students' innovation and entrepreneurship project "Virtual Surgical Micromanipulation Technology under the Perspective of Yuan Universe", this research group relies on the social practice team of Anhui Medical University's 2022 summer trips to the countryside to go to a town in Shou County, Huainan City, Anhui Province. Investigate science popularization activities to understand the current level of understanding of the grassroots people on the new medical model and investigate the feasibility and generalization of virtual surgery micro-manipulation technology under the perspective of the metaverse in grassroots hospitals. [Research conclusion] In view of this, the analysis of the questionnaire survey results of grassroots general practitioners and grassroots people show that the current level of grassroots medical care has a lot of room for development, the level of general practitioners needs to be improved, the concept of the metaverse needs to be popularized and promoted, and the masses are not interested in new medical technologies. The ability to accept is high, and Metaverse virtual medical care can be promoted and feasible at the grassroots level.

Keywords: Metaverse; Virtual surgery; Primary care general practitioner.

1. Introduction

General Secretary Xi Jinping pointed out in the report of the 20th National Congress of the Communist Party of China, "Promote the construction of a healthy China, put the protection of people's health in a strategic position of priority development, and implement the national strategy to actively respond to population aging." [1] A person's health affects a family, the health of billions of people determines the future of a country and nation. Health is an inevitable requirement for promoting the all-round development of people, and it is also the basic condition and important driving force for economic and social development. However, the traditional medical model has the characteristics of "three lows, two difficulties, and four deficiencies": three lows: low coverage of high-end equipment in community hospitals, low mastery of high-end technologies, and low recognition by patients; two difficulties: difficulty living in famous hospitals and seeing famous doctors Difficult; four deficiencies: insufficient prevention, insufficient management, insufficient treatment, and insufficient rehabilitation.

With the maturity of Internet-related technologies, Metaverse emerged as the times require, finding a new breakthrough for solving primary medical problems. Through the metaverse virtual surgery technology, we hope to build a brand-new medical system, not only to copy the existing known medical knowledge system, but more importantly, to enable grassroots doctors and patients to take advantage of the development of the Internet, so that the level of primary medical care has been greatly improved. With the improvement of network communication speed and the

expansion of bandwidth, the application of virtual medical technology to primary medical care is no longer grassroots. In the Metaverse, a virtual consultation room can be built, and doctors and patients can wear AR devices and communicate face-to-face through 3D holography. This can increase surgical efficiency and improve the doctor-patient relationship. For example, Surgical Théâtre uses 360° VR visualization technology to simulate the patient's structural anatomy from the inside out according to the patient's data before surgery, which can clearly show each part, solve the blind spot of the perspective, and simulate the entire surgery process before surgery, which is extremely Large avoidance of various problems can reduce operative time, incidence of complications and radiation exposure. When explaining to patients and their families before and after surgery, interactive 3D images can be used to illustrate problems and better address their concerns. Using remote perception and manipulation technology to perform remote minimally invasive surgery in 3D and 4D stereoscopic high-definition vision, and then integrating artificial intelligence and other technologies, it will bring new developments to the medical field in the metaverse world.

2. Research Objects and Data Sources This survey is divided into online questionnaires and field visits

The general practitioners at the grassroots level and the general public were respectively investigated on the current satisfaction with the current grassroots medical structure and the cognition and acceptance of virtual medical technology

from the perspective of the Metaverse. It provides directions for how to strengthen the construction of the grassroots medical service system in the future, and whether the metaverse virtual technology can be extended to grassroots medical care and other issues. At the same time, based on the grassroots people's understanding of the new vocabulary of virtual medical surgery, the grassroots residents' ability to accept new things (tolerance) is evaluated. To provide direction for the cultivation of general practitioners who are "specialized in learning" in primary medical care. For this survey, we conducted interviews and surveys of local residents and grassroots general practitioners in a town in Shou County, Huainan City, Anhui Province, regardless of age and gender. After in-depth exchanges and communication with local villagers, the questionnaires are distributed, and they are helped to understand and guide them to fill in the questionnaires. A total of 500 questionnaires were distributed, and finally in the statistical data stage, after excluding invalid questionnaires, a total of 362 valid questionnaires were collected. Among them, 21.5% are between 25 and 40 years old, 28.7% are between 40 and 60 years old, 23.7% are over 60 years old, and 25.9% are under 25 years old. Of these, 44.2% were men and 55.8% were women.

3. Analysis of survey results

3.1. The concept of "metaverse" needs to be promoted

The popular science survey shows that 56.63% of people have never heard of the concept of "metaverse", only 10.22% of people know the concept of "metaverse" well, and 33.15% have only heard of it. This concept but completely do not understand its connotation. It shows that at the grassroots level in the countryside, many people only know the name of the word "Metaverse" but do not know its meaning. Among those who have heard of its concept, 56.68% learned about it through the Internet, and the remaining 43.32% learned about it through friends and other channels. It can be seen that the promotion and publicity of new concepts at the grassroots level in the new countryside is not limited to word of mouth, and the current leader is the Internet. Metaverse is the Internet on virtual reality (VR) and augmented reality (AR) glasses, and it is the next-generation mobile computing platform that will become popular. The Internet is virtual, and the new countryside is real. It is necessary for the two to connect with each other and actively promote and popularize it, so that "meta-universe medicine" can go further. In the future, more people will learn about and choose Metaverse Medicine, and Metaverse Medicine will not stop at "heard of, but don't understand" but will move towards grassroots medical care and public medical treatment [2]. Therefore, we should actively promote and popularize the concept of "Metaverse" through Internet means [3]. This is a relatively innovative and effective approach in recent years, and it is also the development trend of promoting and popularizing various knowledge and cultural methods in the future.

3.2. General practitioners and the general public have high expectations for the popularization of "Metaverse" technology at the grassroots level

Before promoting and popularizing the medical technology under the perspective of the Metaverse to general

practitioners in primary health centers, 78.2% of general practitioners said they had never heard of the Metaverse Virtual medical technology, 22.8% of general practitioners said they had heard of Metaverse virtual medical technology, but did not understand the specific operation and content. After the popularization of the research team, 100% of the doctors expressed their willingness to learn and apply this technology to primary care, and they are optimistic about the future of Metaverse Medical.

3.3. The public has great expectations for the development of primary care

According to the survey report, only 16.3% of people think that township health centers can completely satisfy, 36.46% think that they can basically satisfy, more than 37% think that a small part of them can, and 9.94% think that they cannot satisfy at all. The large population base at the grassroots level is a concentration of patients, and township health centers are responsible for the initial consultation, testing, diagnosis, confirmation, treatment, and referral of diseases. However, when choosing the place to seek medical treatment, more than 50% of the grassroots people would directly choose the county people's hospital, and only 37.85% of them choose the township health center. After fieldwork and visits, there are many elderly people and children who have no choice but to go to township health centers because of the inconvenience of travel. The grassroots people are interested in "Can township health centers undertake some minor surgeries?" "Can the examination process be made more personal?" And other issues are very concerned. 25.14% of people strongly expect the township health center to undertake the surgery, while only 9.12% do not, but compared to the question "Are you willing to do the surgery in the township health center?" However, when comparing the data of this question, only 25.14% of people are willing to do it, more than 30% are not willing and 10.22% are very unwilling. Analysis of the data shows that people at the grassroots level have great expectations for the development of primary care, but they are not willing to visit the hospital due to various factors, which undoubtedly shows that the development of primary care has a long way to go.

3.4. The clinical ability of doctors in primary hospitals needs to be improved in response to the questionnaire

"How is the medical skill of doctors in township health centers? In this question, only 9.39% of people think that the medical level of township health centers is very high, while 50.28% of people think that the level is average and can only see minor diseases and take medicine and injections. As a "health gatekeeper", a general practitioner must have a solid multidisciplinary knowledge of basic theories, including medical care, prevention, rehabilitation, maternal and child health care, and family planning, as well as a certain knowledge of humanities and the ability to guide and relieve patients' mental stress. Due to the nature of community services, general practitioners must have the ability to handle the initial diagnosis of various common diseases in rural areas. They should also be able to correctly administer first aid measures, such as CPR and anti-shock, and be able to do a good job of triage, so that they can provide good guidance to the grassroots and avoid the phenomenon of patients blindly seeking specialists.

3.5. The grassroots people have a strong will to introduce general practitioner talents

General practitioners

Also known as general practitioners or family doctors, are providers of health services who perform general medical care, doctors who provide integrated health care services for people, families and communities, and carry out the whole process and all-round responsible management of life, health and disease, and are new medical talents with a relatively high degree of professionalism. As of 2018, the number of trained and qualified general practitioners in China reached 308,700, with 2.22 general practitioners per 10,000 population, of which the number of primary general practitioners reached 254,000, with 1.82 primary general practitioners per 10,000 population. Through the survey visit, 42.27% of the people very much expect the doctors of clinical orientation specialty to be rooted in the grassroots, 35.36% expect more, and only 8.84% do not expect. For the grassroots people, the limited level of medical care for the grassroots leads to a lack of willingness to choose the township health center for medical treatment. For primary general practitioners, on the one hand, the small number of patients leads to a small workload for doctors and a relatively small accumulation of cases; on the other hand, due to salary and other issues, resulting in many general practitioners will not choose to be rooted in the grassroots.

3.6. The questionnaire data show that only 25.97% of people have contracted a general practitioner and 74.03% of people have not

This indicates that the "family contracting service program" of primary care doctors is not popular enough, and more investment should be made in this area. Meanwhile, 37.29% of people said that GPs should focus on the health care of the elderly, and 37.02% hoped to focus on the health care of chronic diseases. This set of data is in line with the demographic structure of contemporary Chinese society, where aging is increasing and chronic disease care is becoming an important challenge. It is important to train general practitioners in health care for the elderly and chronic disease care, so that they can really "go down and use" primary care doctors. The development of meta-universe medical care at the grassroots level should also focus on this research.

3.7. Preoperative virtual surgery under the threshold of metavision should focus on postoperative outcomes and costs

The data show that only 11.22% of people think they would not consider virtual surgery before formal surgery, which indicates that the grassroots public has a high degree of recognition of preoperative virtual simulation technology. The data show that for virtual surgery, the public is most concerned about the surgical outcome, accounting for 63.81%. This is followed by the cost of surgery with 23.7%. Surgical use and time together accounted for 12.43%. Therefore, wanting to develop preoperative virtual surgery at the grassroots level, the most important thing is the surgical effect, the people do not have extra time and money to do surgery without effect, they think that issues concerning life and health need to be taken seriously, followed by the need to

consider money, the future of virtual surgery needs to work more on the effect, followed by the fight to reduce the cost of surgery while ensuring the surgical effect, and to alleviate the expensive medical care through this technology. The problem.

3.8. The future development of "metaverse" virtual medical technology is promising

The survey shows that 70.7% of people think it is good to perform virtual surgery before surgery, and 67.6% of people are looking forward to the application of "metaverse" virtual surgery technology to primary care. From these two points, we can see that the future development of "metaverse" virtual surgery technology is promising. The attitude of the grassroots towards pre-operative virtual surgery is, on the one hand, a result of the advent of the Internet era, which has increased people's acceptance of new things, and, on the other hand, a result of their lack of understanding and familiarity with new medical technologies. This also shows that there is more and better space for the development of "meta-universe" virtual surgery technology in the grassroots, which is in line with the current development trend of primary care.

4. Understanding of how to develop primary meta-universe medical care in the long run

4.1. Meta-universe medical technology needs to be popularized and promoted

Many people think that "meta-universe" is virtual, hypothetical, far away from our real life, unattainable, and a field of research for highly knowledgeable people. In fact, the research data of primary care doctors shows that virtual technology can be very helpful to the development of primary care, but for the time being, the understanding of primary care is too low. Based on this situation, it is urgent to popularize the knowledge of primary care and one of the key points for the further development of metaverse in primary care.

4.2. Strengthen general practitioners' learning of meta-universe medical technology

Nowadays, the most ideal source of general practitioners in township health centers is graduates of medical schools majoring in general medicine, who then work for several years to reach the level of general practitioners. However, most people are not aware of the specialty of clinical medicine (free rural order-oriented medical students) and thus are not willing to choose the career of general practitioner, which reduces the number of graduates from medical schools majoring in general medicine. Therefore, active government policy incentive initiatives and strong financial security measures are needed. The establishment of a title promotion system and incentive guarantee mechanism to match GPs, the formulation of various preferential policies and timely coordination to solve problems and difficulties encountered by GPs in primary care services will improve the social status and income level of GPs to a certain extent and increase the employment attractiveness of GPs. Meanwhile, at the level of undergraduate education of medical students, the science and learning of meta-universe medical technology should be strengthened. The resource advantages of the virtual simulation experimental teaching platform in colleges and universities should be fully utilized to strengthen the recognition of metacosmic technology among medical

students at the undergraduate level.

4.3. Keeping up with the times and applying virtual medical technology to the grassroots

With the increase in the speed of network communication and the expansion of bandwidth, it has become an inevitable trend and possible to apply virtual technology to medical treatment. By using a combination of virtual reality and multimedia technology, the participants and the virtual environment become a whole that interacts and influences each other. Compared with traditional forms of medical treatment, virtual medical technology has the following advantages: through the virtual simulation of three-dimensional software technology to create a model of the human body structure, so that patients can browse the human body model through human-computer interaction, "roaming" inside the model allows patients to see the human anatomy very intuitively, no longer the doctor verbally describe the patient's condition. This will make the abstract content more concrete and improve the trust between doctors and patients. Of course, virtual medical technology cannot completely replace or eliminate traditional theoretical teaching and clinical practice. Therefore, a combination of reality and virtual simulation must be used to unify virtual simulation with practical operation.

5. Conclusion

From the above, the following conclusions can be drawn.

(1) Metaverse virtual medical technology needs to be further popularized at the grassroots level, so that people really understand what Metaverse is, what it does and how it works. Only then will they be willing to accept it with confidence and prefer it.

(2) There is a lot of room for the development of primary medical care, and the people have great needs. To enhance people's happiness and sense of achievement, we must really implement primary care doctors' "good treatment of small diseases, good knowledge of big diseases, good management of slow diseases, and good transfer of emergency diseases", so that the primary care mechanism can operate effectively and solve practical problems for people. It is urgent to strengthen general practitioners' understanding and learning of new medical technology, which is one of the effective means to further develop general medicine.

(3) The meta-universe virtual medical technology should plan the evolutionary route of development with a long-term mindset on the road of development. The development direction of this technology at the grassroots level should be clearly defined, and the results should be output in stages in terms of doctors' training, medical facilities of grassroots health centers and recognition and acceptance by grassroots people, so as to ensure that the metaverse medical technology has value output in the construction of grassroots medical care, constantly ramming a good base and steadily climbing upward, and finally reaching the benefit of grassroots people and making the gap between urban and rural medical levels narrow.

(4) Preoperative virtual surgery under the metaverse perspective the focus should be on postoperative effects and costs. The technology that is truly implemented to the grassroots must be affordable and easily accessible to the people. Grassroots people pay attention to issues concerning their lives and health first, followed by their pockets. The future of virtual surgery technology under the threshold of metaverse needs to make more efforts on the effect, and the second is to strive to reduce the cost under the condition of guaranteeing the effect, which is expected to alleviate the painful point of "expensive" and "difficult to see" at the grassroots level in China.

(5) Metacosmetal medicine needs to be promoted through the new era of Internet technology. At present, the grass-roots people do not know much about the emerging metaverse virtual medical technology. The development of metaverse is a long process and cannot be achieved overnight. At present, the metaverse medical technology is still in the budding stage and the key technology is yet to be broken through. The task at hand is to make the masses understand and support it first before the technology can be further developed and applied.

(6) The acceptance of emerging medical treatment by the grassroots is increasing. The application of meta-universe medicine to primary hospitals is the inevitable development trend of primary medical care nowadays, and virtual medical technology is expected to solve the status quo of relative inequality between primary and urban medical care.

(7) "Promote the real with the virtual", and take the painful point of unbalanced medical distribution as the guide to create a realistic primary metaverse virtual medical technology system.

(8) The future development of "metaverse" virtual medical technology is promising. It has great potential and is an indispensable opportunity for China's medical diagnosis system. In the future, "metaverse" will benefit the grassroots people in China and contribute to the construction of a healthy China and the implementation of the national strategy to actively cope with the aging population.

Acknowledgment

This article is the 2019 annual teaching and research project of Anhui Provincial Quality Engineering: Experiential Teaching Research on Employment Guidance Courses for Free Medical Students in Rural Areas, and the research results of the 2021 Anhui Provincial University Student Innovation and Entrepreneurship Training Project No.: S202210366075.

References

- [1] Xi Jinping: "Holding High the Great Banner of Socialism with Chinese Characteristics and Uniting to Build a Modern Socialist Country in an All-round Way-Report at the Twentieth National Congress of the Communist Party of China", People's Publishing House, 2022 edition.
- [2] Mei, S. & Wang, X.L. (2022). A study of metacosmic medical application scenarios. *China Digital Medicine* (11),45-4.
- [3] Guo Xiaoya. Opening the veil of "meta-universe medicine" [J]. *President of Chinese Hospital*, 2022, (No. 6).