

AI and Medicine: Future Implications on Doctors in India

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Abstract- This research article investigates the advances and implications of artificial intelligence in medicine. AI has emerged as a game-changing technology with enormous promise to improve healthcare delivery, diagnosis, and treatment. The study looks at many uses of artificial intelligence in medicine, such as medical imaging analysis, illness prediction, drug development, and personalized medicine. It goes at the advantages and disadvantages of incorporating AI into medical practices, such as enhanced accuracy, increased efficiency, and ethical concerns. Furthermore, the article investigates possible future paths as well as the role of AI in altering the healthcare environment. Overall, this study emphasizes the revolutionary capability of AI in medicine, as well as the necessity for continuing research and ethical guidelines to maximize its advantages.

Keywords: Artificial Intelligence, Medicine, India

1. INTRODUCTION

Artificial intelligence (AI) has transformed practically every aspect of human endeavour, including medicine. AI has had a tremendous impact on the medical business in recent years, transforming the way doctors diagnose and treat diseases and assisting researchers in the discovery of novel medicines. In this article, we will look at some of the means by which AI is transforming the fields of medicine. The preceding assertion is supported by some of the domains of medicine where AI is proving to be beneficial, such as

1.1 ARTIFICIAL INTELLIGENCE : WHAT IS IT

Kok et al(2009) stated that the promise of building intelligent computers has captivated many people for as long as computers have existed, and as we will see in the historical overview, the earliest hints in the direction of Artificial Intelligence stretch back much further. The actual definition and meaning of the word intelligence, and especially Artificial Intelligence, has been hotly debated and has generated much confusion. For instance, The New International Webster's Comprehensive Dictionary of the English Language has the following definitions of Artificial Intelligence:

1. An area of study in the field of computer science. Artificial intelligence is concerned with the development of computers able to engage in human-like thought processes such as learning, reasoning, and self-correction.
 2. The concept is that machines can be improved to assume some capabilities normally thought to be like human intelligence, such as learning, adapting, self-correction, etc.
 3. The extension of human intelligence through the use of computers, as in times past, physical power was extended through the use of mechanical tools.
 4. In a restricted sense, the study of techniques to use computers more effectively by improved programming technique
- Because of the quick advances, definitions have also evolved throughout time. More current definitions speak of "imitating intelligent human behaviour," which is already a far better definition.

1.2 ARTIFICIAL INTELLIGENCE IN MEDICINE

1. **Medical Imaging:**
Medical imaging is a vital tool used by clinicians to diagnose and monitor a wide range of medical disorders. However, even for seasoned radiologists, evaluating medical pictures can be difficult. This is where artificial intelligence comes in. AI systems can analyze medical photos fast and accurately, discovering anomalies that the human eye may overlook.
2. **Precision Medicine:**
Precision medicine is a patient-care strategy that takes into account individual differences in genes, environment, and lifestyle. AI is assisting in the realization of precision medicine by analyzing massive volumes of patient data to detect trends and build personalized treatment strategies.
3. **Drug Development:**
Creating new medications is a time-consuming and expensive process that might take years or even decades. AI is assisting in the acceleration of drug development by predicting how pharmaceuticals will interact with biological systems and identifying probable negative effects. This enables researchers to swiftly discover viable medication candidates and concentrate their efforts on the most promising research pathways.
4. **Medical Research:**
By analyzing massive volumes of data from clinical trials and research studies, AI is also assisting in the acceleration of medical research. This can assist researchers in identifying new patterns and insights that standard methods of analysis may miss.
5. **Virtual Assistants:**

Chatbots and other virtual assistants are becoming more widespread in healthcare settings. These artificial intelligence-powered assistants can aid patients in scheduling appointments, answering common medical questions, and even providing basic medical advice.

In innumerable ways, AI is revolutionizing the area of medicine. AI is helping to revolutionize the way we identify and treat diseases, from enhancing the accuracy of medical imaging to speeding up the drug development process. As AI technology advances, we may expect to see even more fascinating discoveries in the realm of medicine in the next few years. But first, we must understand how AI came to be.

1.3 FUTURE OF MEDICINE IN INDIA

Kumar and Pal(2018) stated that , With a minimum admission age of 17 years and a course duration of 5.6 years, Indian medical graduates can practise medicine by the age of 25. The central and state governments have raised the retirement age for doctors from 60 to 65 years. MCI formally announced in 2010 that the retirement age for medical teachers would be 70 years.

In 2017, 1.8 million registered medical graduates serviced 1.33 billion Indians, according to a rigorous count. As of 2017, the ratio

	Number of doctors	Number of doctors
Doctors at PHC India	2005	2016
Rural Health Statistics Government of India		
Doctors at PHCs required	23,236	25,354
Doctors at PHCs sanctioned	24,476	34,068
Doctors at PHCs in position	20,308	26,464
Doctors at PHCs vacant	4282	8774
Doctors at PHCs shortfall	1004	3244

PHC: Primary Health Center

was 1.34 doctors for every 1,000 Indian citizens. Even using the most conservative predictions, including severe attrition standards, this suggests that India has already met the WHO norm of 1:1,000 doctor population ratio.

During the last two decades, the Indian medical school system has made a significant turnaround, successfully doubling the number of MBBS positions. According to this report, when the enrolment rate for MBBS students was 67,218 each year in 2017, the number of doctors was projected to expand by four shortfall by 2024 to 14,00,000 without taking into account any increase in medical schools.

According to the government of India's Rural Health Statistics, there was a tiny shortfall of 3244 doctors at Primary Health Centres (PHCs) in 2016, as compared to sanctioned posts; India currently has a potential of generating 67,000 MBBS doctors per year. In India, the total number of PHC posts sanctioned is only 34,068 – almost half of the current number of MBBS doctors produced annually. When compared to capacity, the shortage is negligible. Given the Indian population and high morbidity levels, there are extremely few sanctioned jobs for doctors engaged in the public healthcare delivery system. There appears to be an oversupply of MBBS doctors who are unemployed in the public sector. Because the private healthcare industry is mostly urban, hospital-centric, and speciality driven, it does not have the ability or need to employ basic MBBS doctors. As it is presently, there has been a persistent ambivalence towards hiring medical practitioners in the public healthcare delivery system, particularly in primary care and community-based settings.

However, as of 2023, the goal of reaching 14,00,000 doctors has not yet been met, but it will be soon as the National Medical Commission (NMC) reports that "the doctor-population ratio in the country is 1:834 against the WHO norms of 1:1,000," as stated by Minister of State for Health and Family Welfare Bharati Pravin Pawar. The calculation of the doctor-patient ratio has gilded the figures, but more importantly, the continued expansion of medical education infrastructure has resulted in an increase in the number of active doctors in the pool. Pawar addressed this issue in her response as well: "There has been a 67% increase in medical colleges from 387 prior to 2014 to 648 currently." Further, there is an increase of 87 per cent in MBBS seats from 51,348 before 2014 to 96,077 as of now and an increase of 105 per cent in PG seats from 31,185 before 2014 to 64,059 as of now." Furthermore, MBBS seats have increased by 87% from 51,348 in 2014 to 96,077 today, while PG seats have increased by 105% from 31,185 in 2014 to 64,059 today."

2.PROCEDURE AND METHODOLOGY

2.1.AIM OF THE STUDY

We are aiming to establish the future implications of artificial intelligence on doctors in India as well as the whole medical profession in this study .To acquire data for this study, we adopted a mass survey approach, asking several questions regarding

artificial intelligence and the field of medicine. We picked this study in order to learn what society believes about artificial intelligence and its future. The research questions in this project will bring us to those answers.

2.2. NUMBER OF PARTICIPANTS

We considered the responses of 135 participants and their perspectives on the previously mentioned issue of artificial intelligence.

2.3. SURVEY

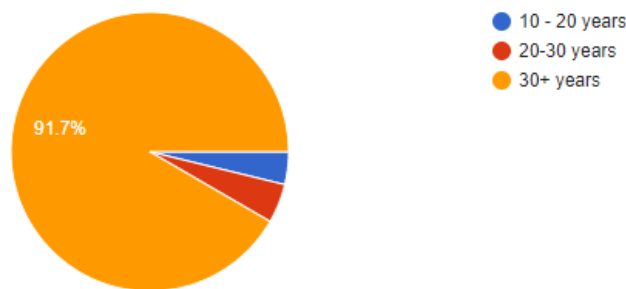
The survey used for this study consisted of 9 questions related to artificial intelligence and medicine. The questions addressed all of the major areas relevant to the research. The survey begins with an inquiry into the contestant's age and continues to ask whether the current state of doctors and medicine in India is adequate. Following this, the participants were asked to give their opinion on artificial intelligence while discussing the field of medicine and other questions related to artificial intelligence that tested their knowledge on the already implemented use of artificial intelligence in this field. We also asked them if they would let an AI do surgery on them or their loved ones.

3. RESULTS

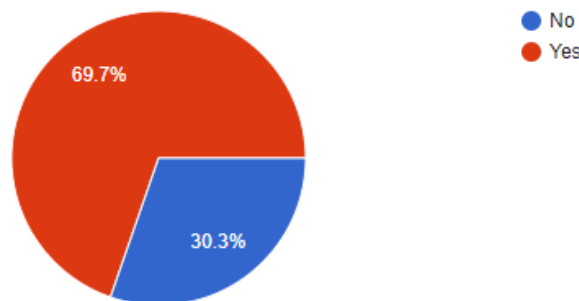
3.1. RESULT OF THE SURVEY

The result of the following survey is as follows:

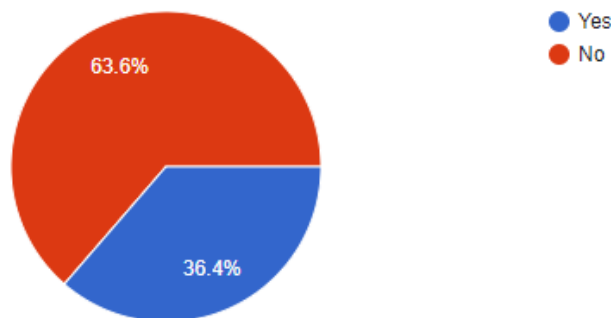
- Participants' ages were divided into three groups: those under 10, those between 20 and 30, and those above 30. The assessment's findings indicate that 30 and older age groups accounted for 91.7% of the contestants, with 3.8% and 4.5% of participants in the remaining age categories of 10 to 20 and 20 to 30 respectively.



- Participants were questioned on whether Indian doctors were qualified to care for the country's populace. According to the survey, 69.7% of respondents believe that there are enough doctors to serve the population; nevertheless, 30.3% of participants in this pool believe that there are not enough doctors in India to serve the country's population.



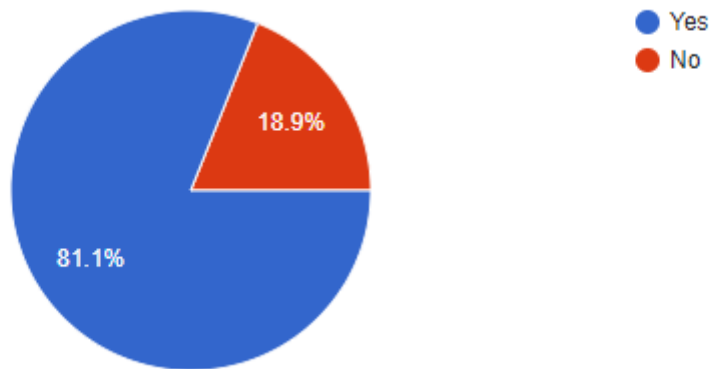
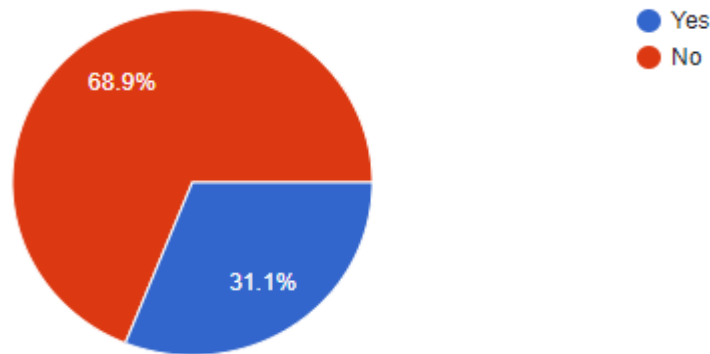
- Participants were asked if they believed that AI would dominate the medical industry in a hundred years. 36.4% of the participants agreed with the statement, while 63.6% of the participants thought it would not occur, at least not in the next 100 years.



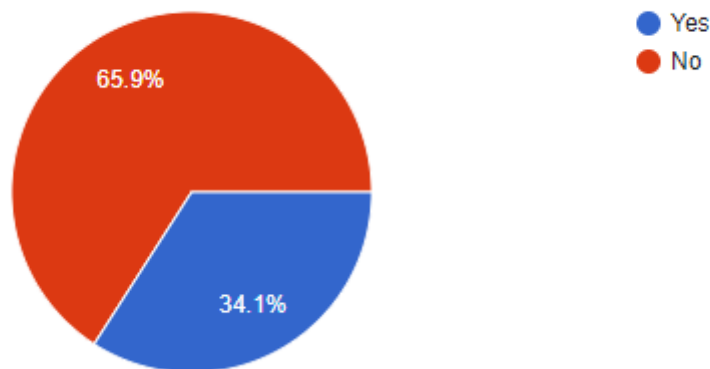
- Later, participants were asked if they would feel at ease if an artificial intelligence performed surgery on them or a family

member. 31.1% of respondents agreed with the statement, while the remaining 68.9% said that they would not feel at ease if an artificial intelligence operated on them or a family member.

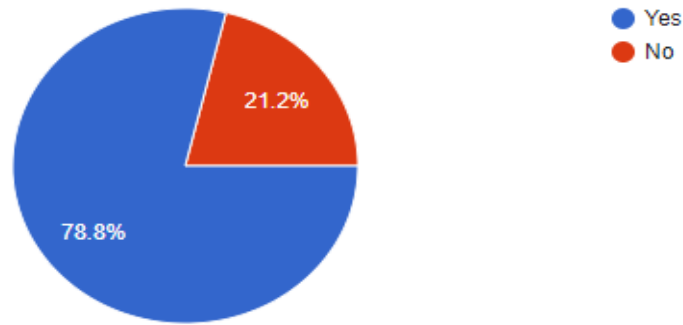
- The following question questioned the participants if they believed that the absence of human contact would have an impact on the medical industry. 81.1% of the participant pool, who were all in favour, said they agreed strongly. 18.9% of the population voted against it in disagreement.



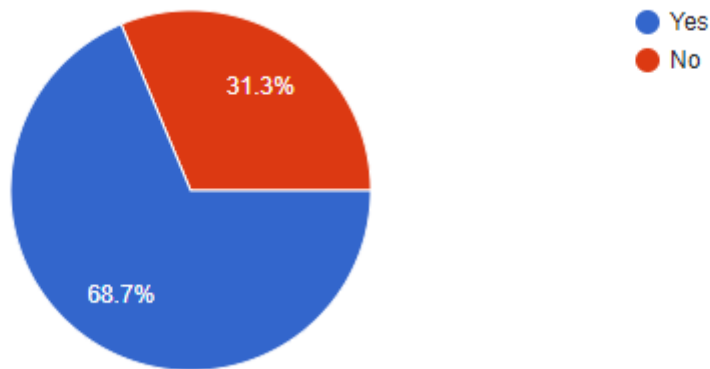
- Participants in the sixth question were asked whether they would believe a prescription given by an AI bot. When asked if they trusted the AI bot, 65.9% of the sample said no, while 34.1% said yes.



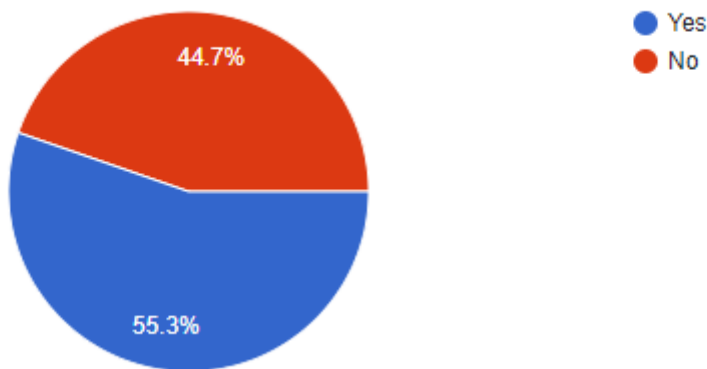
- The next question examined the participants' understanding of how artificial intelligence has already been used in some medical processes, such as medical imaging. A total of 78.8% of the pool gave an affirmative response, while 21.2% disagreed.



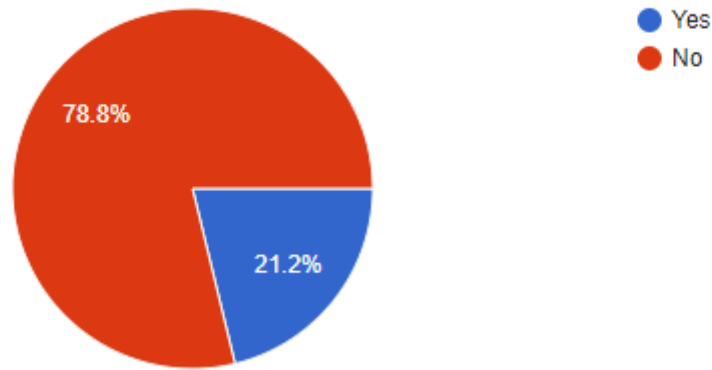
- This question was designed to find out whether participants preferred nurses and medical workers versus artificial intelligence robots. 31.3% of people disagreed, while 68.7% agreed



- The purpose of this question was to determine whether or not the participants would choose a customized medicine made just for them and created by artificial intelligence. The pool was nearly split in half on this topic, with 55.3% agreeing and 44.7% disagreeing



- Participants were asked if they believed that doctors would ever be replaced. In the last question., 78% of responders agreed with this, while the remaining 21.5% disagreed.



4. DISCUSSION

4.1. AGE OF THE PARTICIPANT POOL

The survey's first question asked participants to indicate their ages, and 91.7% of respondents indicated they were 30 years of age or older. This indicates that the survey's primary target group was the urban working class with steady jobs. This demonstrates that the findings of our study article represent solely the opinions of this group of people. Since they are the ones who are working and may require medical attention due to their advanced ages—which may be 50 or even 60—they should be heard as they age over the next 50 years; this cohort will be the ones that need the greatest medical care.

4.2. THE SITUATION OF INDIAN DOCTORS

The second question consisted of a question investigating the views of the participants on whether the doctors in India are good enough for the population of India, to which 69.7% of the pool responded with a yes, but the other 30.3% responded with a no, which is quite an interesting stand. 30.3% of participants saying no means almost one-third of the total pool doesn't think that the doctors in India are not good enough, if we take on a scale such as the population of India, 30% of India consists of about 42.228 crore people, who if were to think that doctors in India are not good enough would be a disaster, therefore the situation of doctors in India should be improved, if not that good healthcare should be spread across the nation. **Karan et al. (2021)** stated that Investment in human resources for health could strengthen the health systems in India

4.3. FUTURE STATE OF ARTIFICIAL INTELLIGENCE IN THE MEDICAL INDUSTRY

On asking if Artificial intelligence will take over the medical industry in the next hundred years, 63.6% of the participants responded with a no, and the other 36.4% responded with a yes. There is a very valid reason for one to negate the question because healthcare is a complicated and nuanced area that requires a combination of human skill, empathy, and ethical decision-making. Artificial Intelligence will not rule the medical business in the next 100 years. While AI can help with diagnostic and therapy suggestions, it cannot fully replace the human element in delivering individualized care, comprehending patients' emotions, and reaching difficult decisions. Additionally, challenges with patient privacy, regulation and ethics, and the need for responsibility will prevent AI from completely taking over the medical sector. As predicted by 36.4% of the participants, artificial intelligence would eventually rule the world owing to its capacity to handle enormous volumes of medical data, speed up diagnostics, and provide customized therapies. Healthcare will change as a result of its ability to increase effectiveness, accuracy, and accessibility. delivery and outcomes.

4.4. ARTIFICIAL INTELLIGENCE AND SURGERY

We asked participants if they would be okay if an artificial intelligence bot performed surgery on them or a loved one, and understandably, 68.9% said they would not feel comfortable in such a circumstance. Many individuals would be terrified of such a medical operation because an artificial intelligence bot is still in its early stages and might bring some unintended consequences, including death. Although human error has these risks, surgery by a doctor is considered normal due to hundreds of years of doctors operating on other humans, but artificial intelligence has not had that many years of surgical exposure, which is one of the main reasons why people are uncomfortable with artificial intelligence. 31.1% of participants said yes to the question. This might be because if an artificial intelligence bot that has been tested successfully were to operate on someone, the human error component of the surgical field would be erased.

4.5. ABSENCE OF HUMAN CONTACT

When asked if a lack of human contact/touch would have an effect on the field of medicine, 81.1% of participants, with a strong majority, said yes, which makes perfect sense because a lack of direct human interaction could lead to a decrease in patient trust, as patients often rely on the empathetic and reassuring presence of healthcare providers. Without human interaction, the patient's emotional well-being and comfort may be jeopardized. Furthermore, many areas of medical treatment, such as physical examinations and hands-on operations, would be difficult to execute with AI alone. The lack of human interaction may also make it difficult to collect detailed patient histories and grasp the context of their symptoms, perhaps leading to incorrect diagnoses or treatments. The 18.9% of participants who said no to the question may have done so because a lack of human touch may help the medical system to perform faster, smoother, and more focussed.

4.6. PRESCRIPTION BY AN AI

When questioned if the participants would trust a prescription given by an artificial intelligence, 65.9% of the participants responded with a no, and the other 34.1% responded with a yes. There are a number of reasons why one shouldn't believe a prescription supplied by an AI. First, AI systems could not be able to take into account complex patient characteristics and unique

conditions, which could result in therapies that are ineffective or unsuitable. Second, the prescription's accuracy may be jeopardized by biases or inaccuracies brought about by the dependence on algorithms and data. Thirdly, AI lacks the human sensitivity and comprehension that are essential in making healthcare decisions. Additionally, the ethical and legal implications of prescribing AI may be unclear, which raises questions regarding responsibility and liability. Last but not least, the quick development of AI technology calls for ongoing validation and assessment to guarantee its dependability in clinical contexts. But this being said, there's always a flip side, here that is trusting the prescription for which there are some reasons which may be that Massive volumes of data may be processed fast by AI systems, providing precise diagnosis and treatment suggestions. They may offer evidence-based recommendations, lessen human error, and increase access to healthcare knowledge, all of which will enhance patient outcomes.

4.7. PRE-EXISTING USE OF ARTIFICIAL INTELLIGENCE IN MEDICINE

When asked for the knowledge of artificial intelligence already used in the medical field for medical imaging etc, 78.8% of the participants responded with an yes, and the other 21.2% responded with a no. This shows that most of the participants were well aware of the prior use of artificial intelligence. By increasing diagnostic precision, increasing effectiveness, and enabling individualized treatment approaches, AI has revolutionized medical imaging. It is utilised for image interpretation, examining diagnostic pictures like X-rays, MRIs, and CT scans to find anomalies and help in illness diagnosis. Quantitative analysis is also made possible by AI algorithms, which automate the quantification of anatomical components, tumour sizes, and illness development. Another use of AI is to optimise workflows by prioritizing pictures, identifying urgent situations, and lightening the strain of radiologists. AI methods like image denoising and reconstruction also improve the quality of images for improved visualization and diagnosis. To evaluate therapy response, forecast illness outcomes, and find trends in patient data, predictive analytics is used. By offering 3D reconstructions of the patient's anatomy for exact surgical plans, AI also helps with surgical planning. As a whole, AI in medical imaging shows significant promise for enhancing diagnostic precision, patient outcomes, and healthcare effectiveness.

4.8. ABSENCE OF NURSES AND OTHER STAFF

We asked the participants if they would prefer nurses and other medical staff over an artificial intelligence bot, to which 68.7% of the participants responded with a yes, and the other 31.3% responded with a no. The medical business will suffer greatly and adversely from the lack of nurses and other medical personnel. Nurses are crucial to patient care because they offer necessary services such as medicine administration, vital sign monitoring, and emotional support. Hospitals and healthcare institutions would struggle to provide the essential quality of care without a suitable number of nurses, increasing patient risks, lengthening wait times, and compromising treatment outcomes. Additionally, the burden of the remaining healthcare professionals would increase due to the lack of medical staff, leading to burnout and a decline in overall effectiveness. In the end, the lack of nurses and other medical personnel would seriously impair the industry's ability to function and endanger the health and well-being of people. But for once, we also have some pointers that suggest that AI would be better than the medical staff, such as a lack of humane staff touch may help the medical system to perform faster, smoother, and more focussed.

4.9. PERSONALIZED DRUGS

In response to the question of whether they would utilise a personalised medicine created by artificial intelligence particularly to treat their disease, 55.3% of the participants said yes, and 44.7% said no. Here, we can see that both groups had specific justifications for their responses. The group that said yes may have said so because the drugs were made specifically for them, negating the possibility of any side effects or unexpected outcomes. In contrast, the group that said no may have said so because the drugs were made using artificial intelligence, which raises concerns about the consumer's comfort.

4.10. WILL DOCTORS EVER BE REPLACED

When questioned about doctors being replaced by artificial intelligence, the majority of the participants replied with a no, them being 78.8%. but 21.5% of the participants responded with a yes. "Doctors will not be replaced by AI", stated **Dranove and Garthwaite (2023)**; this can be supported by the following reasoning related to a number of factors. First off, medicine is a complicated discipline that calls for the use of knowledge as well as judgement, empathy, and intuition—qualities that are exclusively human. These abilities, which enable doctors to take into account a variety of elements and customise treatment strategies for specific patients, are developed via considerable training and experience. Second, providing healthcare includes more than simply identifying and treating illnesses; it also entails establishing a connection with patients. The foundation of the doctor-patient connection is communication, empathy, and understanding, which AI currently lacks. Doctors are frequently relied upon by patients for emotional support and direction that cannot be replaced by technology. Thirdly, fresh research and discoveries continually advance the field of medicine.

5. CONCLUSION

The following research paper seeks to determine the potential effects of artificial intelligence on the practice of medicine, namely on doctors and other medical professionals. This study paper was created because this question requires a response given the present development of artificial intelligence. In order to obtain the answers to some of the many significant questions that remain unresolved, we used the survey approach in this research. We surveyed 135 individuals, asking them ten questions about everything from their age to the future of artificial intelligence. The outcome led us to believe that the urban working class in India does not believe that artificial intelligence will quickly replace doctors but rather in one hundred years. This research paper has dove deep into the future of artificial intelligence not just in India but also the whole world. All the questions that one may think are important to a topic like the one in this paper have been answered in some way, shape or form. To conclude this paper we have compressed all the data to give one concluding statement on whether artificial intelligence take over the field of medicine in the near future i.e. the next hundred years. Before the final statement is provided, all the findings and statements given throughout the paper are a result of the analysis of the survey conducted for the paper. The concluding statement is that Artificial intelligence will not take over the field of medicine as a whole, at least not in the next 100 years.

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