

Ethical Perspectives of Health Professionals in Usage of Artificial Intelligence/robotics in Health Care: A Cross-Sectional Study

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ABSTRACT

BACKGROUND

“Artificial intelligence” (AI) is a broad term that refers to technology that enables robots and computers to mimic human intellect. Over the past few decades, Artificial Intelligence (AI) has gained unprecedented attention and is being called the fourth industrial revolution. But revolutions rarely come without side-effects. Various concerns have been raised as regards the unique properties and risks inherent to AI technologies. Hence the Aim of this study was to Assess Ethical Perspectives of Health Professionals In Usage Of Artificial Intelligence/Robotics In Health Care.

METHOD

A cross sectional questionnaire study was conducted among the Health Care Professionals. The questionnaire consisted of two parts. First part collected data related to Years of Experience in Health Care and second part collected the Knowledge on Ethical Perspectives of Usage of Artificial Intelligence/Robotics In Health Care. The questions were circulated through Google forms.

RESULTS

A total of 164 Health Professionals participated in the survey. 31.7% had more than 5 years of experience in health care and 68.3% of them had less than 5 years of experience in health care. 97% and 95.1 % of them were aware of use of Artificial intelligence and Robotics in Health care respectively.

52.4% agreed that AI based on machine learning poses several risks to data protection. 45.7% agreed that machine learning systems are not transparent. 51.8% agreed that Machine learning systems intentionally or inadvertently can cause reproduction of already existing biases. When Concerns on Autonomy was raised, 61% agreed that AI can reduce individual autonomy, 27.4% strongly agreed that AI and Robotics can cause Loss of human decision-making. 53% agreed that Robotic systems replaces human contact with technology, which is a fundamental ethical issue. 48.2% agreed that the inaccuracy in the system algorithm of AI and Robotics can cause unfair outcomes. 63.4% agreed that the robotics is an evolving system that is inherently and continuously changing, therefore the risk of harms needs to be evaluated. Practitioners and hospitals using AI and Robotics needs to be trained and hence have the ultimate responsibility of its use. Only 46.3% of them strongly agreed. 53% agreed that the use of AI without human mediation raises concerns about vulnerabilities. 50% agreed that Implementation of guidelines or set standards can minimize bias.

CONCLUSION

The development of formal AI training programmes should be prioritised in order to promote the logical

and empirically based distribution of information in medical schools and hospitals. In order to inform policy creation and curriculum modifications for medical education, more extensive research is required to determine how medical professionals and students see artificial intelligence (AI). This will help to spur innovation by igniting desire to developing technology.

KEY WORDS: Artificial Intelligence, Health care, Robots, Machine Learning, Curriculum.

INTRODUCTION

“Artificial intelligence” (AI) is a broad term that refers to technology that enables robots and computers to mimic human intellect. Over the past few decades, Artificial Intelligence (AI) has gained unprecedented attention and is being called the fourth industrial revolution. But revolutions rarely come without side-effects. Healthcare systems are under pressure from chronic illness, an increase in patient demand, and limited resources. The amount of data in all healthcare settings has increased at the same time that the use of digital health technology is growing. If effectively utilised, medical professionals might concentrate on the reasons behind sickness and monitor the effectiveness of therapies and preventative measures. Therefore, lawmakers, policymakers, and other decision-makers need to be aware of this. Clinical entrepreneurs, computer scientists, and data scientists contend that artificial intelligence (AI), particularly machine learning, will be essential to the success of healthcare reform. Usually, AI is applied as a system that consists both hardware and software. In terms of software, algorithms are the primary focus of artificial intelligence. An AI algorithm's conceptual framework is an artificial neural network (ANN). This model of the human brain consists of a network of neurons connected by weighted communication channels. AI searches through enormous datasets for intricate non-linear relationships using a variety of techniques (analytics). Through training—the correction of small algorithmic errors—machines gain confidence and increase prediction model accuracy. Various concerns have been raised as regards the unique properties and risks inherent to AI technologies. Artificial intelligence (AI) has brought out a number of legal and ethical challenges for society, including those involving privacy and surveillance, prejudice and discrimination, and the role of human judgement. These challenges may also pose a philosophical difficulty. Worries regarding more recent computer technology data breaches and new sources of inaccuracy have emerged as a consequence of its employ. Errors in the process or guidelines within the healthcare industry can have disastrous repercussions for the patient who was the mistake's victim. Since patients arrive coming into contact with medical professionals during times in their life when they are most susceptible, it is vital to keep this in mind. As of right now, there are no clear rules in place to discuss the potential moral and legal ramifications of using artificial intelligence in healthcare. The potential for new technology to lead to data breaches and inaccuracies is a worry that comes with using it. Errors in the high-risk field of medicine can have dire repercussions for the patient who makes them. It is essential to bear in mind that patients interact with doctors during periods of their lives when they are at their most vulnerable. Such AI-clinician collaboration, in which AI is utilised to give evidence-based management and medical decision-guide to the clinician (AI-Health), can be successful if properly harnessed. It can offer services related to diagnostics, medication development, epidemiology, individualised treatment, and operational effectiveness in the healthcare industry. But as Ngiam and Khor note, a strong governance structure is necessary to safeguard people from harm, particularly harm brought on by unethical behaviour, if AI solutions are to be included into medical practise. Hippocrates, the medical practitioner, set the foundation for ethical norms in medicine, which are the source of the

Hippocratic Oath. The question of whether AI "fits within existing legal categories or whether a new category with its special features and implications should be developed" is one that is constantly being debated. Although using AI in clinical settings has great potential to enhance healthcare, there are currently ethical concerns that need to be considered. Four significant ethical concerns need to be resolved for AI in healthcare to reach its full potential: Important considerations include: (1) informed permission to utilise data; (2) safety and transparency; (3) algorithmic fairness and biases; and (4) data privacy. The question of whether AI systems may be regarded as lawful is controversial from both a legal and political standpoint (European Parliament resolution, February 16, 2017).^{1,2,3} Hence the objective of this study was to Assess Ethical Perspectives of Health Professionals In Usage Of Artificial Intelligence/Robotics In Health Care.

METHODOLOGY

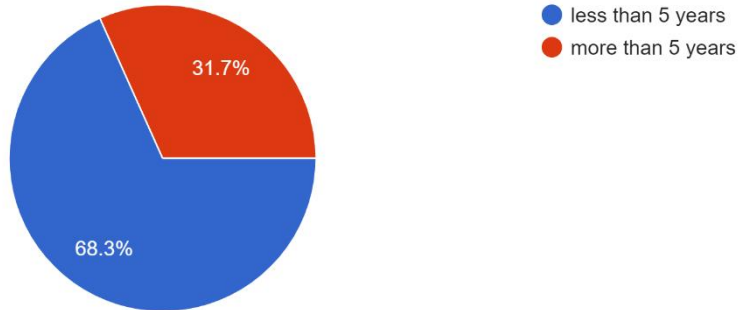
This Cross sectional study was conducted among the Health Professionals. The data were collected using structured, self-administered questionnaires in the English language. The questionnaire was developed by reviewing previous studies. The tool was checked for reliability and face validity. The Cronbach's alpha score was >0.8 which showed good agreement. Face validity was done by giving the questionnaire to subject experts. Ethical clearance was obtained from the institutional ethics committee before its wider use. Questionnaire send as online forms to participants and data was collected for two months. The questionnaire consisted of two parts. In the first part - Years of Experience in Health Care was asked and in the second part, Knowledge on Ethical Perspectives of Usage of Artificial Intelligence/Robotics In Health Care was asked. The study participants were selected based on convenience sampling. The collected data was fed into Excel Spreadsheets and analyzed using SPSS Software (Version 23). Descriptive analysis of the data was performed.

RESULTS AND DISCUSSIONS

164 people in total volunteered to take part in the study. Most (97%) of them were aware of usage of Artificial Intelligence and Robotics in Health Care Systems. 52.4% agreed that AI based on machine learning poses several risks to data protection which was similar to a study conducted by Ahmed et al.⁴ 45.7% agreed that machine learning systems are not transparent. 51.8% agreed that Machine learning systems intentionally or inadvertently can cause reproduction of already existing biases. When Concerns on Autonomy was raised, 61% agreed that AI can reduce individual autonomy, 27.4% strongly agreed that AI and Robotics can cause Loss of human decision-making which was similar to a study by Murat et al.⁵ 53% agreed that Robotic systems replaces human contact with technology, which is a fundamental ethical issue. 48.2% agreed that the inaccuracy in the system algorithm of AI and Robotics can cause unfair outcomes which was similar to a review by Stahl et al.¹ 63.4% agreed that the robotics is an evolving system that is inherently and continuously changing, therefore the risk of harms needs to be evaluated. Practitioners and hospitals using AI and Robotics needs to be trained and hence have the ultimate responsibility of its use. Only 46.3% of them strongly agreed. 53% agreed that the use of AI without human mediation raises concerns about vulnerabilities. 50% agreed that Implementation of guidelines or set standards can minimize bias.⁶

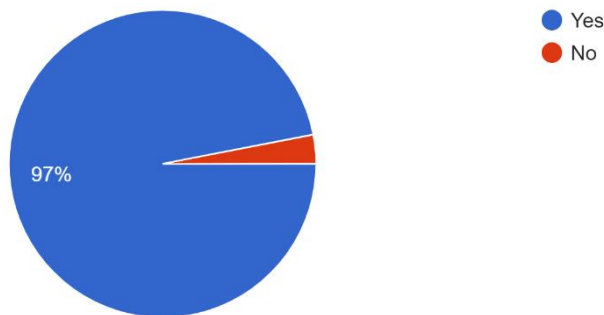
Years of experience in Health Care:

164 responses



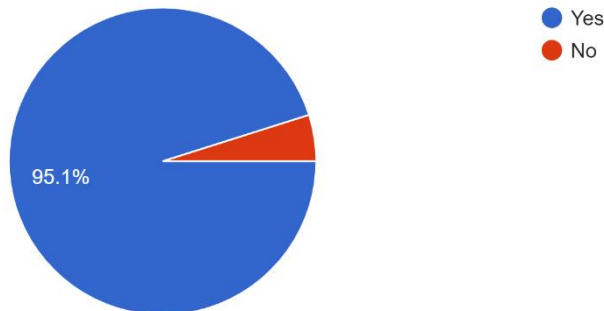
Are you aware about Artificial intelligence?

164 responses



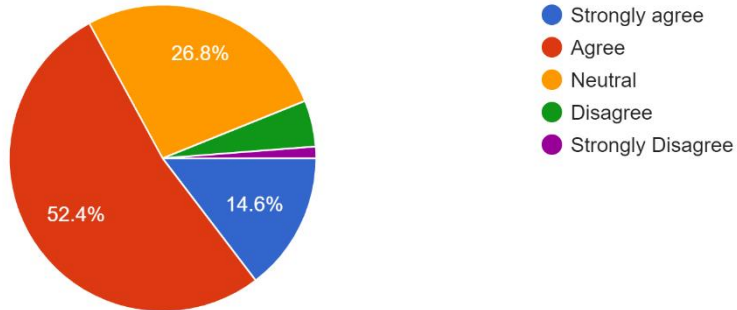
Are you aware about robotics?

164 responses



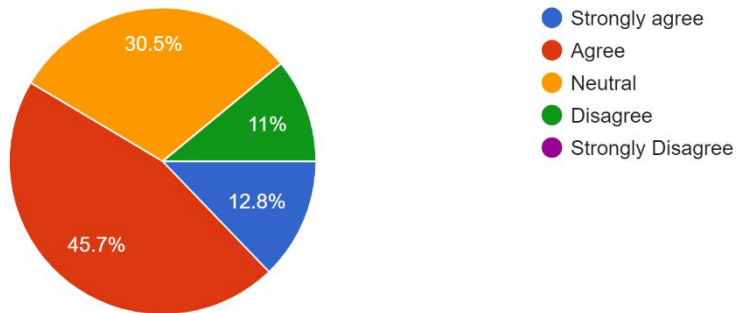
1. AI based on machine learning poses several risks to data protection.

164 responses



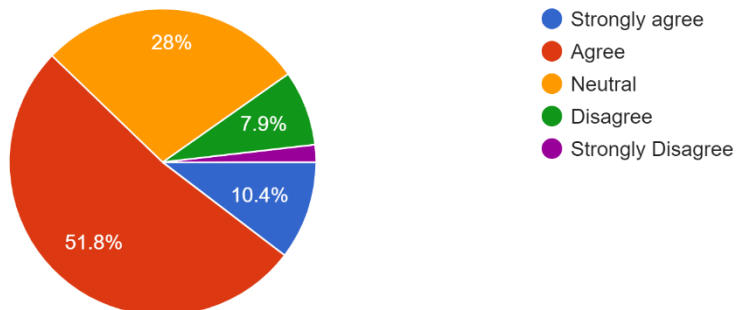
2. Machine learning systems are not transparent.

164 responses



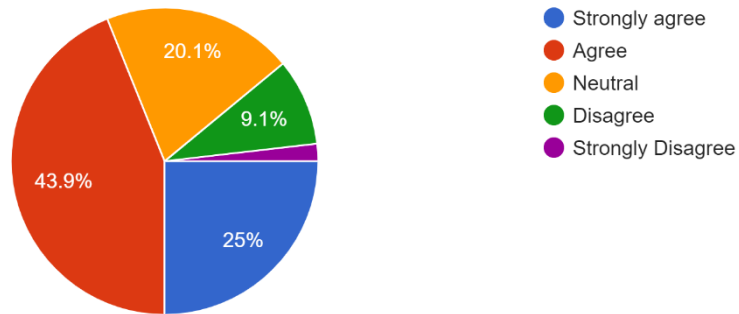
3. Machine learning systems intentionally or inadvertently can cause reproduction of already existing biases.

164 responses



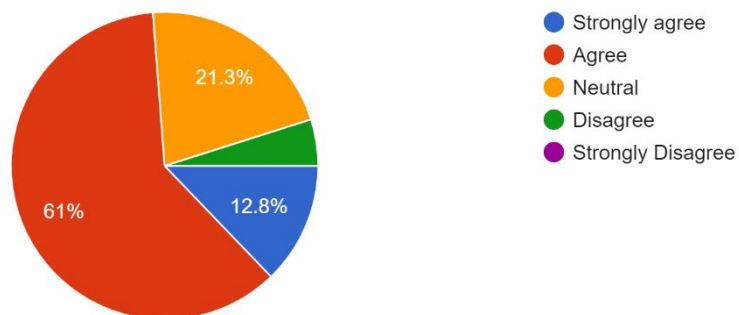
4. The potential of AI-related technologies creates a new wave of automation and thereby can replace jobs that is likely to concerned with unemployment.

164 responses



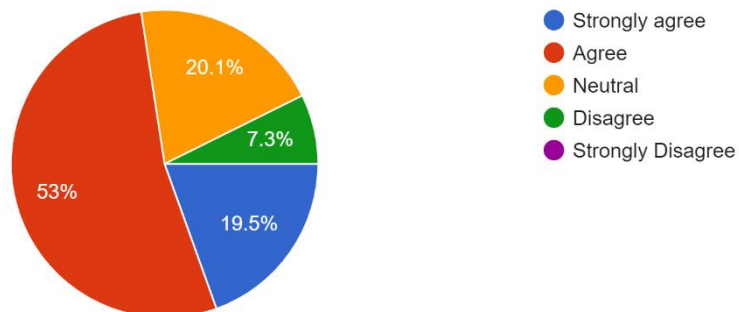
5. AI can reduce individual autonomy.

164 responses



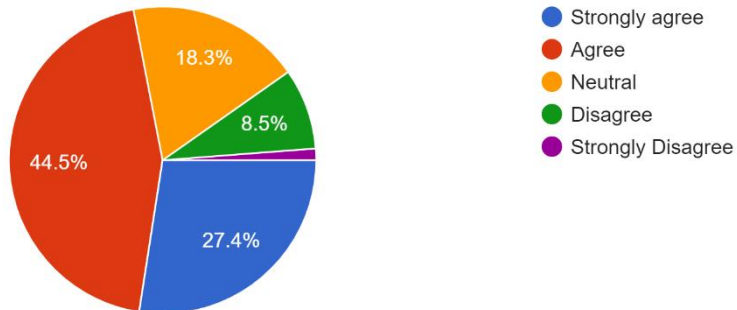
6. Robotic systems replaces human contact with technology, which is a fundamental ethical issue.

164 responses



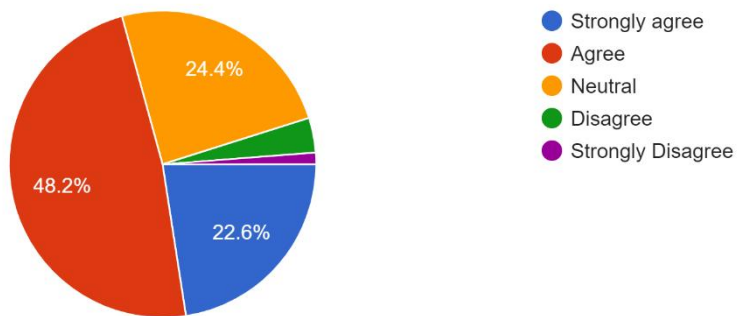
7. AI and Robotics can cause Loss of human decision-making.

164 responses



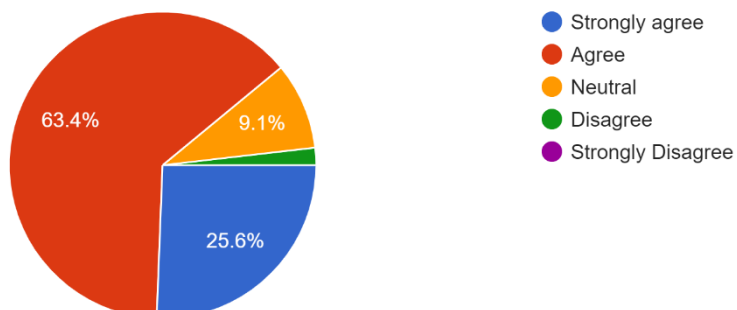
8. The inaccuracy in the system algorithm of AI and Robotics can cause unfair outcomes

164 responses



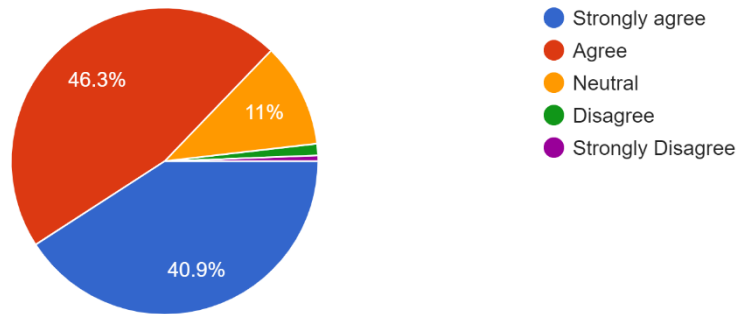
9. The robotics is an evolving system that is inherently and continuously changing. Therefore, the risk of harms needs to be evaluated.

164 responses



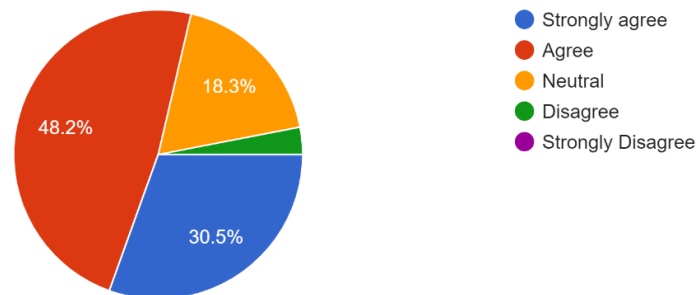
10. Practitioners and hospitals using AI and Robotics needs to be trained and hence have the ultimate responsibility of its use.

164 responses



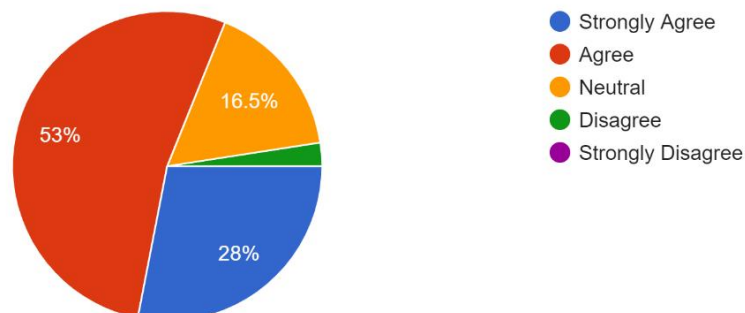
11. AI systems in healthcare should not be launched unless they warrant a sufficient degree of equal opportunity.

164 responses



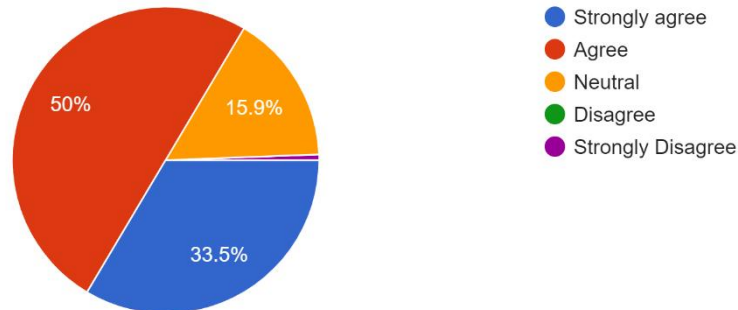
12. The use of AI without human mediation raises concerns about vulnerabilities.

164 responses



13. Implementation of guidelines or set standards to minimize bias should be done

164 responses



LIMITATIONS

However, there are certain restrictions with this open survey.

- First, only a predetermined sample of the population was participated in the survey. As a result, the findings cannot be applied to the entire Indian Health Care Workers.
- Second, open survey questionnaires may introduce some level of social desirability bias.

CONCLUSION

Formal training courses to teach about AI should be focused on to facilitate coherent and scientifically supported dissemination of knowledge in medical schools and hospitals. Further large-scale studies are needed to understand the perception and attitude of medical students and doctors regarding AI to steer policy development and medical education curriculum changes to spark an interest in emerging technologies and drive innovation.

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