RESEARCH ARTICLE

ASSESSMENT OFAWARENESS, KNOWLEDGE AND IMPACT OF THEEVOLVING ARTIFICIAL INTELLIGENCE TECHNOLOGY AMONGST THE PHASE ISTUDENTS OF MEDICAL COLLEGE

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Manuscript Info	*Abstract*
……………………. *Manuscript History* Received: 10 January 2024 Final Accepted: 14 February 2024 Published: March 2024 *Key words:-* Artificial Intelligence, Medical Students, Medical Education, Technology	……………………………………………………………… Artificial intelligence (AI) is utilized in health-care settings; which mimics human thinking and decision-making skills. Since, it is an emerging technology beneficial for medical education and patient care. It becomesnecessary that medical students prepare themselves for their tryst with AI . However, the training of medical students, faculty and inclusion of AI based competencies are required for the medical fraternity to be trained in AI. AI is spreading its horizons to various sectors.The present study is undertaken to assess the comprehension of the phase I medical students about AI technology in terms of information , knowledge and impact. It is a questionnaire-based study which involved voluntary and anonymous participation.The results were analyzedstatistically.The present study depicts that the medical students are fully aware of the AI technology but usage is in judicious manner only. There is awareness about the advantages and disadvantages of AI. Medical students have desire to study AI provided it is included in the medical curriculum. Medical teachers adopt AI in teaching -learning for educating the students but medical students majorly affirm that medical college teachers are irreplaceable. But, the impact of AI is ever expanding and will be an ongoing debate in future.

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Introduction:-

Artificial intelligence (AI) is a technology with ability to transform and revolutionize medical education.Due to the ability to analyze and interpret large quantities of data at elevated rates accurately and enhanced visual learning intelligently; artificial intelligence (AI) has gained immense role and importance in health-care and medical education.Artificial intelligence (AI) can even provide customized learning experiences for medical students and health-care professionals to aid diagnosis, treatment and prognosis (Acharya et al,2023).Artificial intelligence (AI) is a rapidly emerging field of computer science. It is based on creation and advancement of alogrithms and software that mimic human thinking and decision making (Narayanan et al, 2023).There are two types of AI: Predictive AI which utilizes data and logarithms to predict or foretell some type of output e.g. diagnosis,treatment, prognosis etc.Generative AI that generates or delivers new output based on prompts (e.g.texts, images etc.) (Rajpurkar et al , 2022) (Sahni & Carrus , 2023).

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The term AI was coined by John Mc Carthy in 1955 and is defined as a machine possessing intelligent behavior such as perception, reasoning, learning, communication and capacity to perform human tasks.AI is composed of three important paradigms: symbolic (logic and knowledge based), statistical (probability-based and machine learning) and sub-symbolic(embodied cognition and search). Hence AI has the ability to span across diverse domains of perception, reasoning, knowledge, planning and communication (Chan &Zary , 2019).As per Father John Mc Carthy"Artificial Intelligence is a far superior intellect than the best human intelligence in nearly every area, including computers and language logic. It is the synthesis of science and engineering that makes human welfare intelligent machinery "(Sudha &Prakash , 2021).

In the recent times, medical students have to be competent medical professionals, probably will have to deal with AI software tools which will be used in clinical practice.Hence, they should be apprehensive and comprehensive of the rapidly emerging technology which is beneficial for medical education and patient care.Hence it becomes imperative and pivotal that medical students prepare themselves for their stint with AI in medicine (Park et al ,2019).

Medical Education in the contemporary times is characterized by demanding teaching-learning curriculum, information overload, expanding knowledge and scientific discoveries.Therefore, learners tend to struggle hard in grasping, retention and application of such huge information.Boon in disguise is AI; which focuses on judicious information management. With the support of AI, a data -rich environment can be managed, steered and supported. Although, the fundamental understanding of the basics of medicine as well as clinical applications with their interconnectedness is important for learners; it is equally important that they learn to practice medicinewith the aid of AI. Learners should understand the fourimportant V's of big data:Volume (the quantity of data today compared to the past), variety (validity of the various sources of data) , velocity (the rate at which data is being produced) and veracity (the quality of data needs to be assessed).Therefore, the knowledge and technical knowledge expertise of the synthesizing, analyzing of personalized data in health care delivery through AI applications need urgent attention and improvision within the medical curriculum. Learners should be slowly trained in verbal communication, voice input, translating tactileinformation, provisional diagnostic information into digital form by usage of data mining tool within clinical practice scenarios.Hence learners should be educated about AI as well as the shift in language of medical education like intelligent tutoring systems, adaptable virtual facilitators,data mining,intelligent feedback etc. (Srivastava &Waghmare, 2020).

Introduction of AI applications in health-care settings shall transform the practice of clinicians by increasing accuracy and predictiveness of treatments. But these reforms will need the clinicians to be proficient in AI technology and capacity to use AI application efficiently. In the past many studies have reported the use AI applications in diverse specialties of medicine such as radiology, pathology, cardiovascular medicine, ophthalmology, dentistry and dermatology (Buabbas et al, 2023).The AI educational tools have been developed with focus on increasing the quality of the schooling and strengthen teaching and learning.AI assists the computers traditionally in researching human intelligence. But several research aspects should be considered in the medical education sectors such as data protection, creation, processing of data pertaining to students as well astechnological advances.AI based applications in medical education include:

1) **Tutoring**- Intelligent Tutoring system (ITS) or adaptive tutors engage students in dialogue, question -answers and even feedback.
2) **Personalized Training**: ITS and adaptive tutor which adapts to in a customized manner to individual requirements, difficulties and pace in teaching -learning.AI also provides for the specially abled learners such as austistic children to identify facial expressions.
3) **Testing**: Computers adaptive evaluation enable to assess the mastering of the students involved in the accuracy of the assurance provided enabling precision of the identification of level of cognition of the students.
4) **Automative Tasks**: AI can perform routine tasks such as grading assignments, correction, taking attendance and generating questionnaires (Sudha &Prakash , 2021).

It has become important for medical educators to increase their knowledge pertaining to AI, understand the prominence and current role of AI in medical education, review strategies for integrating AI and education and ethically use AI.Similarly, medical institutions are recommended to revise and review the policies of usage of AI, support faulty development program as well as resources for teaching, develop information checking tools for originality and tools to avoid plagiarism to faculties (Boscardin et al , 2023).

The time is just right for medical and paramedical educators to include the introduction of AI and its common application into the medical curriculum. The field of AI is complex and rather infinite. Hence AI curriculum should be chosen so wisely so that the learners are not overwhelmed, maintaining the relevancy, future application and acknowledging the evolving health-care settings. Appropriate time needs to be set aside for AI literacy in the medical curriculum for the benefit of the teachers, students and patients. In the clinical curriculum, in addition to the teaching the basics such as browsing the electronic health record (EHR), should teach predictive statistics which assists teaching epidemiological and population health. This aspect of AI can benefit in predicting spread of epidemics, communicable disease, pandemics its control and spread. Students and teachers should learn to use the resources in the medical records, patient databases and other internet resources. Medical students should be taught the data science, natural language processing and image processing which is important in understanding the impact of AI in health -care settings.For medical students interested in administration, business and entrepreneurship, electives in AI should be offered to secure the future of the heath -care system. Hence the student can develop some basic coding skills, facilitating software development skillsin future.Large resources are available free of cost on open -source website on internet.These will enable medical students to develop skills in AI, which will enable them to emerge as leaders in medical informatics in future (Hussain &Bhatti , 2022).

Taking into consideration all the facts; the present study was undertaken to study the impact and hence the outcome of artificial intelligence in the medical students of our medical college.Since Artificial Intelligence is slowly spreading its horizons into the different sectors such as industry, social media, medicine, education, it is necessary to assess the comprehension of the younger generation especially phase I medical students regarding the AI technology.It was necessary to undertake the present study to take an overview of the existing situation in terms of information, knowledge and impact.
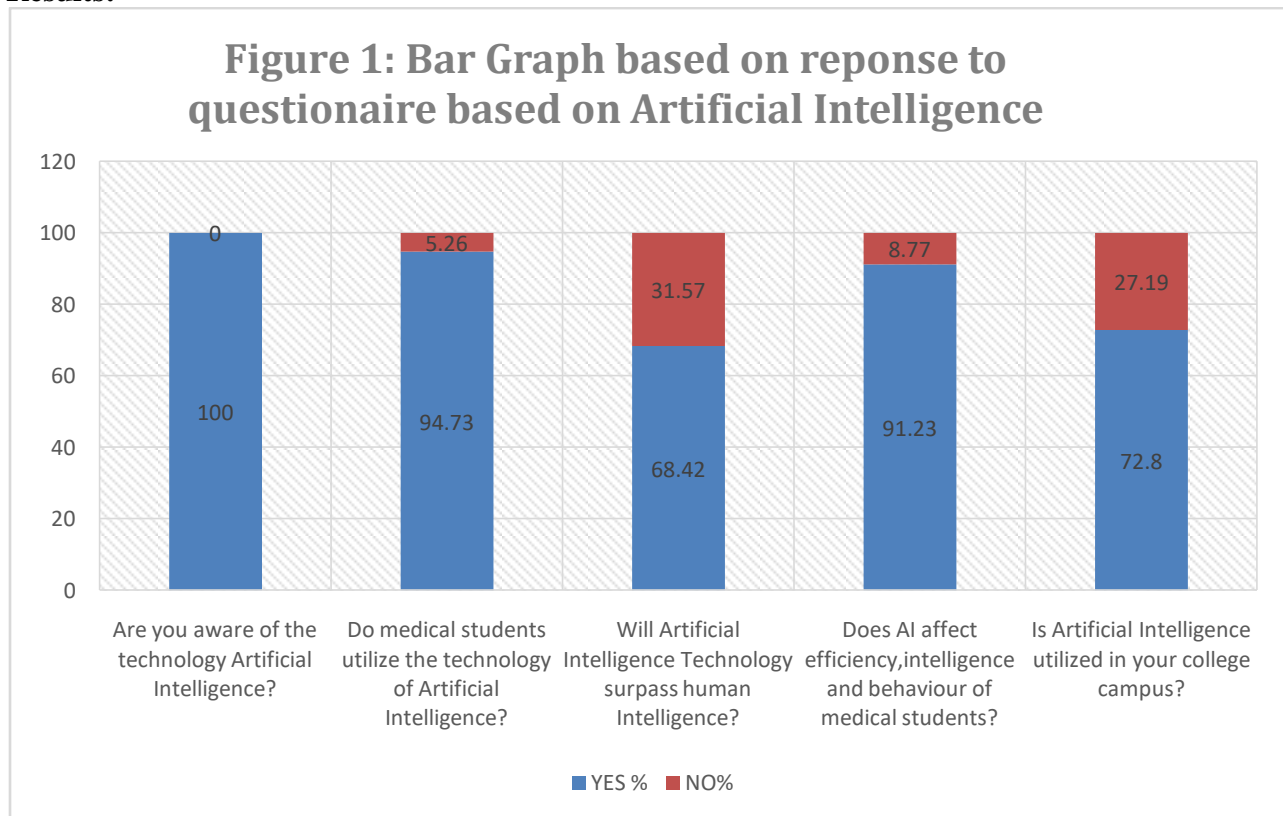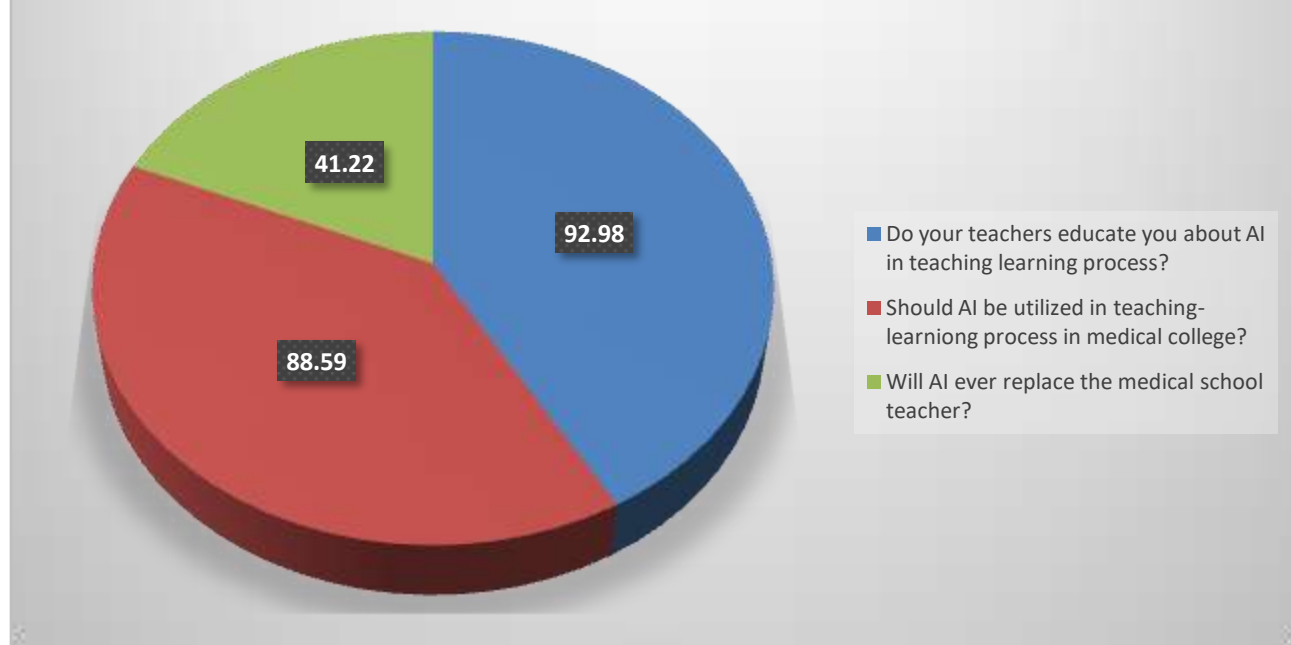
Results:-

Figure 1: Bar Graph based on reponse to questionaire based on Artificial Intelligence

Figure 2: Pie Chart based on YES %reponse to questionaire based on Artificial Intelligence

- 92.98 — Do your teachers educate you about AI in teaching learning process?
- 88.59 — Should AI be utilized in teaching-learniong process in medical college?
- 41.22 — Will AI ever replace the medical school teacher?

Materials and Methods:-

The medical students of phase I admitted in the year 2023-24 for MBBS course atSSPM Medical College and Lifetime Hospital,Padve, Sindhudurg in Maharashtra were included in the study. On the day the questionnaire was administered only the present number of students (n=114) were included and absentees were excluded to avoid any sort of biases.The questionnaire was blinded with anonymous participation by the medical students to prevent further bias during statistical analysis.The questionnaire utilized for the studywas designed such that it included 2 close-ended questions and two open- ended questions could be analyzedstatisticallyafter the entire data was obtained from the respondents.

Ethical Status

The present study was undertaken post priorpermission taken and approval thereafter at the institutional level.It was considered to be ethical and posed no risk to human life at any level. Neither did it incur any cost to the respondents.The informed consent of the students was taken prior to the study; involved voluntary and anonymous participation by the students present on the day of the questionnaireadministration

Discussion:-

In the present study undertaken as per the results obtained, all the medical students are aware of the existing technology Artificial Intelligence.All the students as per the results obtained were aware and utilizing Artificial Intelligence. The medical students utilized platforms like Chat GPT to complete their projects and home assignments.They affirmed that the time factor could be saved in the completion of work done using AI;hence ,94.73% of the medical students were utilizing AI.Medical students are aware of the impact and possibility that AI technology will surpass human intelligence since 68.42% have responded positively regarding the same.91.23% medical students think that AI will affect their efficiency, intelligence and behavior but 8.77% think likewise.Only 72.80% of medical students are aware that AI is utilized in the college campus whereas 27.19%are still unaware of the same.92.98% of the medical students have responded that their teachers educate them about AI during their teaching-learning process. However, 88.59% of medical students believe that AI should actually be utilized and

included in the teaching -learning process. 94.6% medical students have affirmed that AI will never replace the medical teacher. However, this only time will unfold in future.

The advantages of AI according to the medical students arei) availability of information and data collection as well as processing in less period of time ii) assistance in diagnosis, treatment, prognosis and in health care settings for the patients   iii)Reduces time spent on data analysis   iv) Utilized in training and in simulation laboratories for medical students. The disadvantages cited were i) students will become over -reliant and lazy. ii) Many ethical principles and issues need to be considered before over indulgence   iii)privacy and confidentiality issues need to be addressed. iv) AI technology is also prone to errors that means over dependence can be harmful. Overall, these are the major advantages and disadvantages cited as per the medical students included in our study.

Strict validation tests are a pre-requisite for drugs or nay other medical devices prior to usage on patients.Similarly, AI technology has to initially pass a strict validation for safety and efficacy before utilization on the patients.Thorough check about the clinical validation, beneficial effects should be assessed nullifying all the harmful effects on the patients is necessary before using AI technology clinically (Park et al ,2019). Several challenges can be cited prior to introduction of AI technology into the health care setting such as

1. Integration into the medical education curriculum required careful planning; since it has to align with the educational goals, learningoutcomes and teaching methodologies.For this even apt training of the educators are necessary.
2. Ethical considerations about patient privacy , informed consent, data security and algorithmic accountability need to be resolved. Hence proper guidelines in these regards are necessary.
3. Resistance from various stakeholders such as educators, regulatory bodies and institutions pertaining to job displacement, upgradation of skills, effect on doctor-patient relationship need to be addressed.
4. In many countries the electronic health records (EHR) is still not systematic in the health care settings which need to be rectified since training the machine cannot be undertaken without it.
5. The process of machine learning (ML) is expensive and vast process.A single model annotation at least 10000 images are required.
6. Although machine learning will constantly update the knowledge base, but it will not be sufficient since heterogenous data is collected from various geographical locations (Acharya et al,2023)(Narayanan et al , 2023)

According to Seth et al 2023 the core competencies required to align AI in health care have been identified as
1. Fundamental concepts in data science in health care
2. Health data sources
3. Analysis of health data
4. Usage of technology delivery of patient care
5. Ethics, privacy and cybersecurity

The competencies required for utilization of AI-based tools by health -care professionals are---- basic knowledge of fundamentals of AI, social and ethical aspects of AI, AI dominated clinical cases, evidence based evaluations of AI based tools, work flow analysis of AI based tools, continuous improvement of AI based technology (Seth et al , 2023) (Russell et al , 2023)

Clinicians and machines working in synergy have capacity to improvise clinical decision making and patient health care benefits. AI can curate, analyze, access retain large amounts of data in terms of medical records, reports, environment data, pharmacy details etc. but it cannot replace the art of caring or the human touch imparted. However, AI needs to be integrated into the medical curriculum. This will facilitate speedy and accurate diagnosis, decrease errors, reduce medical expenses, replacerepetitive and monotonous tasks. It will also result in minimally invasive surgery and decrease death rates (Paranjpe et al , 2019).

In the future the medical students may have to deal with competencies of Artificial Intelligence in their curriculum. However, it is evident that medical students have to be aware of the developments in the field of AI.Medical students have to understand that they have to be competent and proficient to face stiff competition from the fact that AI is a result of machine learning and involves deep learning which is capable of developing its own intelligence due to neural networks.

Conclusion:-

The present study denotes that medical students included in the study are fully aware of the AI technology. However, they use the technology judiciously. They are aware of the pros and cons of the fast-developing technology and its impact.In the present study, majority of the medical students have expressed the desire to study AI provided it is included in the teaching- learning curriculum.Although, teachers educate them thoroughly regarding the developing aspects of AI technology in the teaching -learning curriculum but the responsesof the medical students are majorly affirming that medical college teachers are irreplaceable by AI technology. However, optimistic it may sound the impact of AI is fast evolving thereforeonly the future will depict the result to this ongoing debate.

Acknowledgements:-

Conflict of Interest:

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