Original Article

ARTIFICIAL INTELLIGENCE: MEDICAL STUDENTS ATTITUDE IN DISTRICT PESHAWAR PAKISTAN.

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Abstract

Background: Artificial intelligence (AI) is an advanced computer technology used in the medical field to elude the errors and enhance effectiveness and efficiency, especially in clinical work. Developing countries can utilize the same models to improve their health care system as the industrialized world. Globally medicine is evolving to the era of "Artificial intelligence", medical education must include these modern technologies and competencies to reform. We intended to determine the attitude of the medical students towards the introduction of AI in Undergraduate Medical Education in District Peshawar.
Methods: This cross-sectional descriptive study was carried out among 384 students of two medical colleges in Peshawar, utilizing a convenient sampling technique for data collection. A self-administered questionnaire, with 5 points Likert scale was used to collect data. Data was analyzed through SPSS version (22.2).
Results: Majority of the students 61.7% had no previous knowledge of AI. Mean scores for AIs perceived usefulness in Radiology, replacement with human Radiologist, anticipated dominance in clinical practice, willingness for introduction in medical education, excitement to adopt, perceived as a burden, practicability were 1.89, 2.83, 2.76, 2.35, 2.13, 3.18, 2.39 respectively.
Conclusion: The positive attitude was seen among medical students regarding the inclusion of Artificial intelligence in undergraduate medical education.
Keywords: Artificial Intelligence, undergraduate medical education, knowledge, Pakistan

Introduction

Alan Turing (1912-1954) was the first believer in computer-based Artificial Intelligence (1). While Machine learning started emerging from the 2010s, the term AI gained its popularity since Dartmouth college conference in 1956 (2). AI use sophisticated computer algorithms to 'intelligently learn' features from a large volume of healthcare data, and then consumes the obtained insights to assist in clinical practice. (3) Artificial intelligence (AI) is introduced in the health care system of developed countries to remove the errors and improve the effectiveness, efficiency, accuracy, and outcome of clinical practice (4). Application of computer-assisted medical techniques has the ability to improve the healthcare outcomes in rural areas of developing countries (5). Radiology is the field where AI had been most experimented and showed the great possibility to improve clinical results through intelligent protocols, precise imaging studies, quick image analysis, data registries, and better diagnosis (6). However, in clinical practice, while dealing with human lives, the role of AI will be more of assisting Radiologists and cannot replace them (7) (8). Medical science and technology have rapidly evolved globally during the last 20 years. (8) Medicine is evolving into the era of Artificial intelligence, involving dealing with big data through decision support software programs (9). A large number of researches published on AI and billions of dollars spent on health care AI companies highlights its importance, anticipating launch and proliferation of AI products in the health care system in the coming decades. Raising the question that are medical professionals informed enough to accept these new technologies (10). Medical education should be synonymous according to international standards and for this purpose it should be reformed frequently (11). 21st-century medical education must include modern technology and competencies on the use of simulations, basics of data collection, analyzing skills, and its utilization through artificial intelligence applications. (9) Pakistan is in the initial stages of use of Health informatics (12). Since 2018, AI is evolving in Pakistan under the President's initiative on Artificial Intelligence and Computing. (13) To the best of our knowledge, no literature is available regarding the introduction of a curriculum of Artificial intelligence in undergraduate medical education of Pakistan. Current study appeared to be the first survey conducted to determine the readiness and attitude of the medical students towards the introduction of AI curriculum in undergraduate medical education in District Peshawar.

Methodology

We conducted this cross-sectional study on 384 two medical colleges of Khyber Pakhtunkhwa in Peshawar from December 2018 to February 2019 by using non-probability convenient sampling. We included all the students those two medical colleges. Students below 18 years and above 25 years, unwilling and on sick leave were excluded from the study. Ethical approval and consents were obtained. A self-constructed pretested questionnaire with five-points Likert Scale rating from 1(strongly agree) to 5 (strongly disagree) was used. The questionnaire included the definition and some very basic information about AI. After the pilot study, questionnaires were distributed to 200 students from each college. A total of 384 students filled the questionnaires. Frequency and percentages were calculated using SPSS 22.2 and graphs were developed in excel.

Results

Demographic information is given in Table 1.

Table 1: Demographic profile of the respondents

Categories		Frequency	Percent %
AGE	19	3	.8
	20	52	13.5
	21	174	45.3
	22	136	35.4
	23	15	3.9
	24	4	1.0
CLASS	1st year	3	0.8
	2nd year	54	14.1
	3rd year	176	45.8
	4th year	140	36.5
	5th year	11	2.9
GENDER	Female	156	40.6
	Male	228	59.4
COLLEGE	KMC	184	47.9
	PMC	200	52.1

N=147 (38.3%) claimed that they had previous knowledge of AI, while 237(61.7%) said that they had no previous knowledge of AI. N=130(33.9%) strongly agreed, 193(50.3%) agreed, 13(3.45) disagreed, 7(1.85) strongly disagreed that AI will be a helpful technology in the field of radiology, while 41(10.75%) remained neutral. Mean score calculated was 1.89. Fig 1 shows the student's frequency and responses regarding "Anticipated dominance of AI in future clinical practice". Mean score was calculated as 2.76.

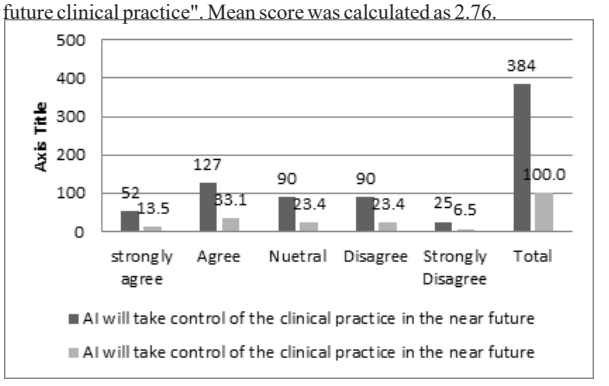

Figure 1: Anticipated dominance of Artificial Intelligence in future clinical practice

Out of the total, 47 (12.2%) strongly agreed, 123 (32%) Agreed, 98(25.5%) strongly disagreed, 98(25.5%) disagreed while 89 (23.2%) remained neutral while responding to the question that "AI will reduce the scope of human Radiologist". Mean score calculated was 2.83.

Table 1 shows the student's frequency and percentage of the responses regarding "Introduction of AI in undergraduate medical education". Mean score was 2.35.

Table 2. Willingness to include AI in medical education

	Scale	Frequency (%)
1	Strongly Agree	106 (27.6)
2	Agree	140 (36.5)
3	Neutral	61 (15.9)
4	Disagree	51 (13.3)
5	Strongly Disagree	26 (6.8)
	Total	384 (100)

N=133 (34.6%) disagreed, n=50 (13%) strongly disagreed 50 (13.0%) strongly agreed, 82(21.4%) agreed, while n=79 (20.6%) remained neutral in response to "whether the inclusion of AI in medical education will be an additional burden". Mean of the scores was 3.18.

N= 91 (23.7%) strongly agreed, 197(51.3%) agreed, 7(4.4%) disagree, 14(3.6%) strongly disagree while 65(16.9%) remained neutral when asked that whether they are excited to utilize AI technology in the clinical practice. Mean of the total score was 2.13. When asked "Will AI technology be practicable in Pakistan?" 94(24.5 %) of the students strongly agreed, 153(39.8%) students agreed, 33(8.6 %) of the students strongly disagree, 39(10.2 %) students disagree, while 65 (16.9 %) remained Neutral. Mean of the scores was 2.39.

Discussion

The current study aimed to explore the attitude of the medical students regarding the introduction of AI in undergraduate medical education. 384 out of 400 students completed the survey. 156 (40.6%) female while 194(50.5%) male completed the survey. Mean age of the students was 22.5 ± 3 years. N=147(38.2%) making two-third majorities, out of n=384 students said that they had previous knowledge of AI, while 237(61.7%) said that they had no previous knowledge of AI. In a similar study conducted in Germany, 52% of medical students were aware of the AI term, while 68% had no knowledge about the AI technology (14) which is slightly higher than our students. In the current study out of the total, 33.9% strongly agreed, 50.3% agreed, 3.45% disagreed, 1.85% strongly disagreed that AI will be a helpful technology in the field of radiology, while 10.75% remained neutral, whereas medical students in Germany agreed with greater percentage (77% and 86%) compared to our students, that AI will revolutionize and improve radiology (14). N=106 (27.6%) students strongly agreed,

140 (36.5%) Agreed, Disagree 51(13.3%), 26(6.8%) strongly disagree, while 61(15.9%) remain Neutral in response to the question that "Should AI be Introduced in undergraduate Medical education". In a survey conducted in Germany over two-thirds of medical students agreed on the need for AI to be included in medical training (71%) which is more than our positive responses (cumulative 64.1%). Out of the total, 52(13.5%) strongly agreed, 127(33.1%) agreed, 25(23.4%) disagreed and 25(6.55) strongly disagreed while 90(23.4%) remained neutral that "AI will take control of the clinical practice in the near future". B Brain Wang agreed that AI technology may help clinical medical physicists spend less time on certain types of activities, but disagreed that AI would take control of clinical practice (15). However, various studies support that the latest advancement in technology will take control of health practice in the future (16).

N=47 (12.2%) strongly agreed, 123 (32%) Agreed, 98(25.5%) strongly disagreed, 98 (25.5%) disagreed while 89 (23.2%) remained neutral in responding to the question that "AI will reduce the scope of human Radiologist". In a study conducted in Germany, medical students disagreed (83%) in a large number as compared to our students (51%), with the statement that human radiologists will be replaced by AI technology. In order to assess how students will perceive AI inclusion to already significantly overburdened undergraduate curriculum, n=133 (34.6%) disagreed, n=50 (13%) strongly disagreed (cumulative 47.6%), 50(13.0%) of the students strongly agreed, 82(21.4%) students agreed (cumulative 34.4%) and n=79 (20.6%) remained neutral in response to the question "AI will be an additional burden for the medical students". The students who disagreed outnumbered the ones who agreed. No literature was seen to the best of our knowledge for the comparison of this variable in the past studies. Level of the excitement of the students for AI in clinical practice was judge, n= 91 (23.7%) strongly agreed, 197(51.3%) agreed, 7(4.4%) disagree, 14(3.6%) strongly disagree while 65(16.9%) remained neutral. Thus, the students who were excited (75%) exceeded those who showed no excitement (8%). Developing countries lag behind in emerging technologies infrastructure and implementation, crucial for reforms and advancement in the health sector, keeping the fact in mind when students were asked that whether "AI will be practicable in Pakistan?" 94(24.5%) of the students strongly agreed, 153(39.8%) students agreed 33(8.6 %) of the students strongly disagree, 39 (10.2 %) students disagree while 65(16.9 %) remained Neutral. Thus, a large percentage of 64.3% of the medical students, in contrast to few students 18.8%, claimed that AI technologies will be practicable in Pakistan. To the best of our knowledge we couldn't find any study related to AI among students in Pakistan, however, studies are available of e-health. (17) The current study focused on the attitude of the medical students in only one district of Khyber Pakhtunkhwa. Future studies can involve more districts, other strata i.e. clinicians etc. and can use qualitative method for in-depth information. In addition to this, other aspects i.e. local challenges, guidelines for AI curriculum and recommendations AI curriculum instructor can also be a focus.

Conclusion

A positive attitude was observed among medical students regarding the inclusion of Artificial intelligence in undergraduate medical education. Medical education should be updated according to the needs of the digital era and concepts of Artificial intelligence should be incorporated into undergraduate medical education

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