

Acceptability of artificial intelligence among Indian dermatologists

Sir,

The Association for the Advancement of Artificial Intelligence defines "artificial intelligence" as "the scientific understanding of the mechanisms underlying thought and intelligent behaviour and their embodiment in machines."¹ Artificial intelligence is gaining importance in medicine, more so in specialties that depend on an image-based diagnosis such as radiology, histopathology, and dermatology. In the field of dermatology, several machine learning algorithms based on mobile phone applications for diagnosis have been developed and are freely available.² We undertook this study to know the acceptability of artificial intelligence among Indian dermatologists, their attitudes, and specific apprehensions associated with it.

We prepared a questionnaire (not validated, prepared by RP and SG) using Google Forms and circulated it among qualified Indian dermatologists and dermatology trainees. There were 166 respondents (99 males and 67 females). The mean age of respondents was 36.45±13 years (range: 23–69 years). The mean duration of experience was 7.80±10.92 years. The percentage of dermatologists working in a government hospital was 28.3%, those working in a private hospital or clinics were 29.5%, 16.9% had their own clinic and the remaining 25.3% were trainees.

The responses to the statements in the survey are given in Table 1 and Figure 1.

A significantly greater percentage of older dermatologists, >35 years of age, as compared to those aged ≤35 years perceived that artificial intelligence will benefit dermatology more than other specialties in medicine (agree/strongly agree: 50.9% versus 45.9%, disagree/strongly disagree: 20% versus 34.2%; $P=0.03$) and that any new development in artificial intelligence in dermatology is welcome (agree/strongly agree: 89% versus 61.2%, disagree/strongly disagree: 3.6% versus 24.3%; $P=0.012$). Dermatologists aged ≤35 years perceived more often that artificial intelligence may replace dermatologists in the future (agree/strongly agree: 16.2%

vs.5.4%; $P=0.007$) [Table 2]. This may reflect that the younger dermatologists are more apprehensive regarding settling in their career after finishing their degree.

Dermatologists with more than five years experience agreed that artificial intelligence should be included as a part of the training during dermatology residency ($P=0.001$) and were more interested in artificial intelligence ($P=0.004$) than the trainees and the dermatologists with less than five years of experience.

A greater percentage of the older dermatologists as compared to the younger dermatologists had acceptability for the use of artificial intelligence.

In our study, there was no difference in the perception of artificial intelligence based on government or private sector employment.

Polesie *et al.* observed that the men showed more excitement and less fear of the use of artificial intelligence in dermatology.³ We saw no difference in the perception towards artificial intelligence between the two genders. In a study from China, 95.3% of participating dermatologists believed the role of artificial intelligence was to assist them in the diagnosis and treatment and only 3.4% thought artificial intelligence would replace dermatologists.⁴ In our study, we had 12.6% agreeing/strongly agreeing that artificial intelligence will replace dermatologists in the future while the majority (64.4%) disagreed/strongly disagreed with it.

In a survey on medical students from Korea, 95% agreed artificial intelligence will be used in dermatology and only 6% believed artificial intelligence will replace dermatologists in the future. Among the medical students 84% responded that they would use artificial intelligence in future after obtaining their medical degree.⁵ In a study on pathologists working in dermatopathology, 72.3% agreed/strongly agreed that artificial intelligence will improve dermatopathology and only 6.0% agreed/strongly agreed that dermatopathologists will be replaced by artificial intelligence in the future.⁶

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Table 1: Responses to the statements in the survey showing the varied perception of artificial intelligence among Indian dermatologists

| S.No. | Statement | Strongly agree (%) | Agree (%) | Neither agree/disagree (%) | Disagree (%) | Strongly disagree (%) |
|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------|----------------------------|--------------|-----------------------|
| 1. | Artificial intelligence will benefit medicine in general | 35 (21.0) | 83 (50) | 19 (11.4) | 22 (13.2) | 7 (4.2) |
| 2. | Artificial intelligence will benefit dermatology | 29 (17.4) | 84 (50.6) | 18 (10.8) | 25 (15.0) | 10 (6.0) |
| 3. | Artificial intelligence will benefit dermatology more than other medicine branches | 21 (12.6) | 58 (34.9) | 38 (22.8) | 37 (22.2) | 12 (7.2) |
| 4. | Artificial intelligence will replace dermatologists in the future | 4 (2.4) | 17 (10.2) | 38 (22.8) | 70 (42.1) | 37 (22.2) |
| 5. | Any new development in artificial intelligence in dermatology is welcome by me | 24 (14.4) | 88 (53.0) | 25 (15.0) | 19 (11.4) | 10 (6.0) |
| 6. | Artificial intelligence should be made part of training during dermatology residency | 21 (12.6) | 69 (41.5) | 36 (21.6) | 26 (15.6) | 14 (8.4) |
| 7. | I am open to using artificial intelligence in my dermatology practice in the near future | 27 (16.2) | 75 (45.1) | 33 (19.8) | 18 (10.8) | 13 (7.8) |
| 8. | Artificial intelligence will affect my dermatology practice adversely | 12 (7.2) | 37 (22.2) | 51 (30.7) | 55 (33.1) | 11 (6.6) |
| 9. | I am afraid artificial intelligence will be used more by qualified general practitioners for making diagnosis in dermatology | 47 (28.3) | 78 (46.9) | 28 (16.8) | 7 (4.2) | 6 (3.6) |
| 10. | I am afraid artificial intelligence will be used more by qualified general practitioners for making diagnosis in dermatology thereby affecting my practice | 30 (18.0) | 45 (27.1) | 44 (26.5) | 37 (22.2) | 10 (6.0) |
| 11. | I am afraid artificial intelligence will be used more by people practicing alternate medicine and traditional healers | 59 (35.5) | 73 (43.9) | 25 (15.0) | 7 (4.2) | 2 (1.2) |
| 12. | I am afraid artificial intelligence will be misused by patients leading to self-diagnosis and self-treatment, which may harm them | 71 (42.7) | 69 (41.5) | 15 (9.0) | 9 (5.4) | 2 (1.2) |

Table 2: Sub-group analysis based on age where responses to the statements in the survey were statistically significant

| Years | Strongly Agree (%) | Agree (%) | Neither agree/disagree (%) | Disagree (%) | Strongly disagree (%) | P-value |
|------------------------------------------------------------------------------------|--------------------|-----------|----------------------------|--------------|-----------------------|---------|
| Artificial intelligence will benefit dermatology more than other medicine branches | | | | | | |
| ≤35 | 11 (9.9) | 40 (36.0) | 22 (19.8) | 26 (23.4) | 12 (10.8) | 0.030 |
| >35 | 10 (18.1) | 18 (32.7) | 16 (29.0) | 11 (20.0) | 0 (0) | |
| Any new development in artificial intelligence in dermatology is welcome by me | | | | | | |
| ≤35 | 13 (11.7) | 55 (49.5) | 16 (14.4) | 18 (16.2) | 9 (8.1) | 0.012 |
| >35 | 11 (29.0) | 33 (60.0) | 9 (16.3) | 1 (1.8) | 1 (1.8) | |
| Artificial intelligence will replace dermatologists in the future | | | | | | |
| ≤35 | 4 (3.6) | 14 (12.6) | 17 (15.3) | 47 (42.3) | 29 (26.1) | 0.007 |
| >35 | 0 (0) | 3 (5.4) | 21 (38.1) | 23 (41.8) | 8 (14.5) | |

Overall, there is a positive attitude towards artificial intelligence among most Indian dermatologists seen in our study which was similar to the previous studies.^{3,4} The majority also perceived that artificial intelligence will be used more by the general practitioners, alternative medicine practitioners, traditional healers, and by patients for self-diagnosis and self-treatment. However, as to the question in the survey whether artificial intelligence is a boon or bane to dermatology, it was observed that most of the Indian dermatologists were not sure.

In an article on the National Strategy for artificial intelligence issued by the Government of India, it was recognized that there is a great scope of artificial intelligence to tackle the current disparities in quality healthcare across the country. The issues of ethics, privacy, and security in artificial intelligence were also discussed in the article.⁷ However, there was no comment on stringent regulation on the use of artificial intelligence for the healthcare sector as enforced in other countries.⁷⁻⁹

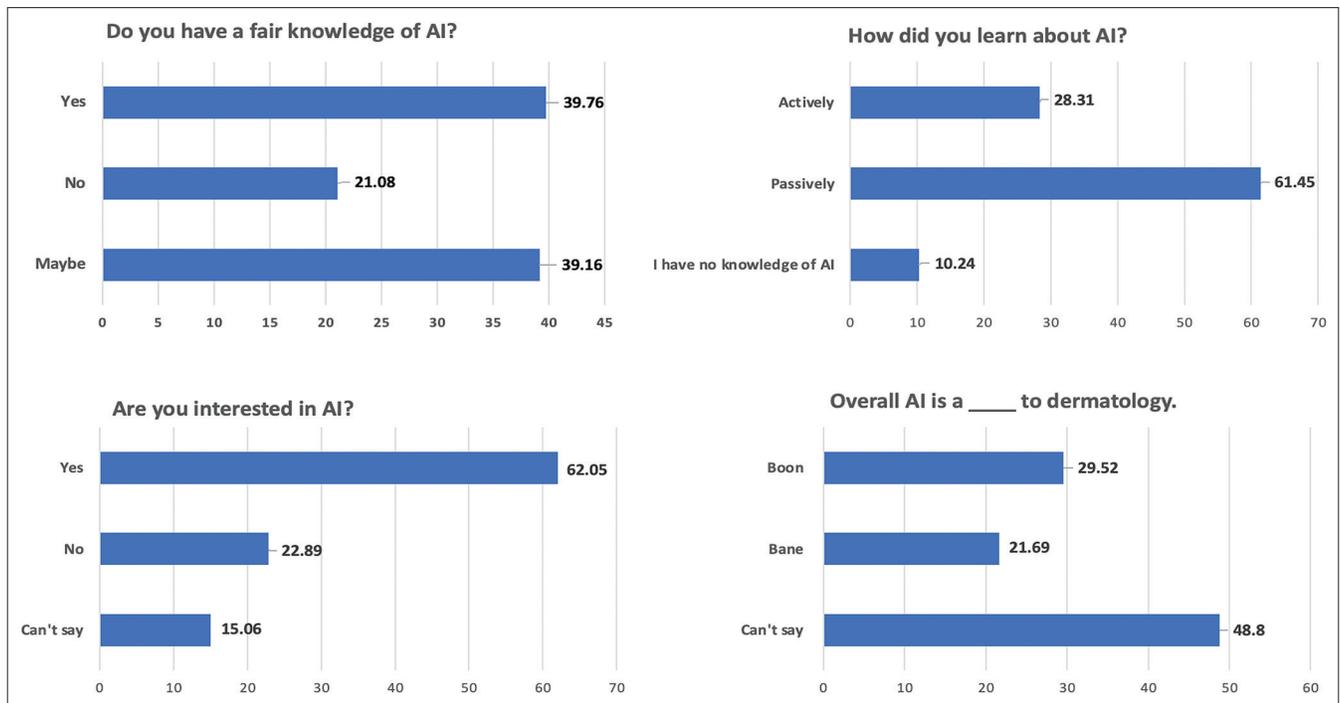


Figure 1: Responses by Indian dermatologists to the questions in the survey

Our study highlights that there are specific apprehensions among dermatologists regarding artificial intelligence. This can be addressed by the regulatory bodies involved in artificial intelligence in healthcare in our country.

Since the development of artificial intelligence in dermatology is inevitable, the authors opine that dermatologists should focus more on the cognitive tasks in dermatology, sharpen their procedural and counseling skills, and be more empathetic to the patient, as current artificial intelligence technology cannot fulfill these aspects of patient care.

Our study was limited by the number of respondents to the survey.

Declaration of patient consent

Patient’s consent not required as there are no patients in this study.

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Conflicts of interest

There are no conflicts of interest.

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