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Indian Journal of Skin Allergy

*Letter to Editor*

# Are dermatologists a well-informed audience for artificial intelligence? A knowledge, attitude, and practice survey

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Dear Editor,

Due to its huge clinical, dermoscopic, and dermatopathological picture library, dermatology has taken the lead in the medical field's artificial intelligence (AI) implementation. Although consumer access to this technology has been made widely possible, there is barely any data regarding dermatologists' opinions on AI. A recently published report by Janda and Soyer highlighted the various advantages, disadvantages, and nine ethical considerations of using AI in conjunction with a physician's practice.[1]

In this survey, we created an anonymous online poll with 17 questions aimed at achieving a better understanding of a dermatologists' knowledge (K1-K5), attitude (A1-A7), and practice (P1-P6) toward the implementation of AI in the field of dermatology [Table 1]. The correct or incorrect responses were determined based on established knowledge and guidelines in the field of AI as it applies to dermatology. The correct responses were predefined and validated through cognitive interviews, content validity, and pilot testing. The survey was delivered to dermatologists through a number of online means, including emails, WhatsApp, Facebook, and Instagram, and the study took place between July 2023 and October 2023. The total score was graded from 0 to 16 (0–5 for K, 0–6 for A, and 0–5 for P). A 7$^{th}$ question in attitude asked the respondents about which field, according to them, would flourish the most with AI (clinical, dermatoscopy, or dermatopathology) [Table 1]. To verify the identity of each respondent and prevent multiple responses by the same respondent, their unique registration number and email addresses were used.

The study included 103 dermatologists with 64 post-graduate training students, 26 junior dermatologists (<10 years of specialist experience), and 13 senior dermatologists (≥10 years of experience). We found that only 59 (57.28%) of respondents had a high or excellent understanding of AI in dermatology (score ≥13). In this study, trainees and young dermatologists ($P = 0.0001$) had a significantly higher knowledge of AI and machine learning (ML) [Table 2].

Only 36 (34.95%) knew the difference between AI and ML. Up to 75 were well informed of the applications of AI in dermatology, and only 16 (15.34%) dermatologists had been provided training for AI as part of their medical curriculum or continuing medical education.

On analysis of attitude score, we observed that 77 (74.76%) and 72 (69.90%) dermatologists believed that AI could transform the field of medicine and dermatology, respectively. In fact, 57 (55.34%) dermatologists even believed that AI could replace human dermatologists in the foreseeable future, and 28 (27.18%) were scared by the prospect of AI in dermatology, with 59 (57.28%) respondents agreeing that AI could increase the rate of misdiagnosis. However, a majority of subjects (75; 72.84%) were optimistic regarding its utilization in the field. We discussed three potential uses of AI in dermatology with our subjects. Dermatoscopic images were thought to have the most potential (48; 46.60%), which was much higher than the potential for dermatopathological (17; 16.50%) or clinical images (6; 5.82%). A favorable attitude was connected with having more knowledge of AI in the field of dermatology ($P < 0.0001$). Younger dermatologists expressed less trepidation and more excitement about the employment of AI in dermatology and other fields of medicine as a whole.

Overall, the dermatologists participating in this study performed poorly in the domain of practice. Only trainees or young dermatologists used AI-related tools. Just 12 (11.65%) dermatologists (all trainees) used AI software or mobile applications to diagnose skin cancer. In our study, the AI software or mobile applications used by these dermatologists were Skinvision, ChatGPT, Skin Scanner, Skinive, and Cureskin. The apps that the respondents said they were using were; https://skinive.com/, https://cureskin.com/, https://www.skinvision.com/, https://chatgpt.com/, https://ai-derm.com

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**Received:** 26 March 2024 **Accepted:** 05 June 2024 **EPub Ahead of Print:** 03 August 2024 **Published:** 17 October 2024 **DOI:** 10.25259/IJSA_20_2024

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**Table 1:** The KAP questionnaire with correct responses.

| | Responses | Score |
|---|---|---|
| **Knowledge questionnaire** | | |
| K1. Do you know what is AI? | Yes<br>No | 1<br>0 |
| K2. Do you know what ML is? | Yes<br>No | 1<br>0 |
| K3. Is there a difference between AI and ML? | Yes<br>No<br>Don't know | 1<br>0<br>0 |
| K4. Do you know of any applications of AI in dermatology? | Yes<br>No<br>Don't know | 1<br>0<br>0 |
| K5. Does your medical training or CME training include a curriculum for AI? | Yes<br>No | 1<br>0 |
| Total score | | 0–5 |
| **Attitude questionnaire** | | |
| A1. Do you think AI will transform the field of medicine? | Yes<br>No<br>Can't say | 1<br>0<br>0 |
| A2. Do you think AI will transform the field of dermatology? | Yes<br>No<br>Can't say | 1<br>0<br>0 |
| A3. Do you think AI will eventually replace all dermatologists? | Yes<br>No<br>Can't say | 0<br>1<br>0 |
| A4. Are you scared by a development that involves frequent usage of AI in dermatology? | Yes<br>No<br>Can't say | 0<br>1<br>0 |
| A5. Are you optimistic about a development that involves frequent usage of AI in dermatology? | Yes<br>No<br>Can't say | 1<br>0<br>0 |
| A6. Do you think AI will increase the rates of misdiagnosis in dermatology? | Yes<br>No<br>Can't say | 1<br>0<br>0 |
| A7. In your opinion, which dermatological field would benefit the most from AI? | Clinical Dermatology<br>Dermatoscopy<br>Dermatopathology<br>None of the above | Scores not included |
| Total score | | 0–6 |
| **Practice questionnaire** | | |
| P1. Have you used an AI-based tool for any purpose? | Yes<br>No | 1<br>0 |
| P2. Have you used an AI based tool for the diagnosis of skin cancer? | Yes<br>No | 1<br>0 |
| P3. Have you used an AI based tool for the diagnosis of any other skin condition? | Yes<br>No | 1<br>0 |
| P4. Did you find it easy to use AI? | Yes<br>No<br>Never used | 1<br>0<br>0 |
| P5. Did you find the usage of AI helpful? | Yes<br>No<br>Never used | 1<br>0<br>0 |
| Total score | | 0–5 |

AI: Artificial intelligence, ML: Machine learning, CME: Continuing medical education, KAP: Knowledge, attitude, and practice

**Table 2:** Detailed analysis of the KAP questionnaire.

| Questions | Percentage of subjects with correct attitude out of total subjects (*n*=103) | | | | |
|---|---|---|---|---|---|
| | Number of subjects with correct knowledge (out of total subjects-103) (%) | Trainees (group A; n=64) (%) | Young dermatologists (Group B; *n*=26) (%) | Senior dermatologists (Group C; *n*=13) (%) | *P*-value |
| Knowledge | | | | | |
| K1. Do you know what is AI? | 95 (92.23) | 64 (100.00) | 22 (84.62) | 9 (69.23) | 0.0001 |
| K2. Do you know what ML is? | 45 (43.69) | 38 (59.38) | 5 (19.23) | 2 (15.38) | 0.0001 |
| K3. Is there a difference between AI and ML? | 36 (32.95) | 32 (50.00) | 4 (15.38) | 1 (7.69) | 0.0001 |
| K4. Do you know of any applications of AI in dermatology? | 75 (72.82) | 57 (89.06) | 16 (61.54) | 3 (23.08) | <0.00001 |
| K5. Does your medical training or CME training include a curriculum for AI? | 16 (15.53) | 9 (14.06) | 8 (30.77) | 1 (7.69) | 0.18 |
| Mean knowledge score | 2.59±2.15 | | | | |
| **Attitude** | **Percentage of patients with correct attitude** | | | | |
| | **Total (*n*) (%)** | **Trainees (Group A) (%)** | **Young dermatologists (Group B) (%)** | **Senior dermatologists (Group C) (%)** | ***P*-value** |
| A1. Do you think AI will transform the field of medicine? | 77 (74.76) | 51 (79.69) | 20 (76.92) | 7 (53.83) | 0.06 |
| A2. Do you think AI will transform the field of dermatology? | 72 (69.90) | 51 (79.69) | 19 (73.08) | 3 (23.08) | 0.0002 |
| A3. Do you think AI will eventually replace all dermatologists? | 57 (55.34) | 34 (53.13) | 15 (57.69) | 8 (61.54) | 0.56 |
| A4. Are you scared by a development that involves frequent usage of AI in dermatology? | 28 (27.18) | 1 (1.56) | 19 (73.08) | 9 (69.23) | <0.00001 |
| A5. Are you optimistic about a development that involves frequent usage of AI in dermatology? | 75 (72.82) | 63 (98.44) | 5 (19.23) | 4 (30.76) | <0.00001 |
| A6. Do you think AI will increase the rates of misdiagnosis in dermatology? | 59 (57.28) | 32 (50.00) | 21 (80.77) | 8 (61.54) | 0.07 |
| A7 In your opinion, which dermatological field would benefit the most from AI? | | | | | |
| Clinical Dermatology | 6 (5.82) | 6 (9.52) | 0 | 0 | |
| Dermatoscopy | 48 (46.60) | 33 (52.38) | 12 (46.15) | 3 (23.08) | |
| Dermatopathology | 17 (16.50) | 10 (15.87) | 7 (26.92) | 0 | |
| Mean attitude score | 3.58±2.11 | | | | |
| **Practice** | **Percentage of patients with correct practices** | | | | |
| | **Total (*n*) (%)** | **Trainees (Group A) (%)** | **Young dermatologists (Group B) (%)** | **Senior dermatologists (Group C) (%)** | ***P*-value** |
| P1. Have you used an AI-based tool for any purpose? | 38 (36.89) | 30 (46.88) | 8 (30.77) | 0 | 0.02 |
| P2. Have you used an AI based tool for the diagnosis of skin cancer? | 12 (11.65) | 12 (18.75) | 0 | 0 | - |
| P3. Have you used an AI based tool for the diagnosis of any other skin condition? | 9 (8.74) | 9 (14.06) | 0 | 0 | - |
| P4. Did you find it easy to use AI? | 11 (10.68) | 11 (17.19) | 0 | 0 | - |
| P5. Did you find the usage of AI helpful? | 11 (10.68) | 11 (17.19) | 0 | 0 | - |
| Mean practice score | 0.79±3.14 | | | | |

KAP: Knowledge, attitude, and practice; AI: Artificial intelligence; ML: Machine learning; CME: Continuing medical education

A recent report by Polesie *et al*.[2] found that dermatologists have a positive attitude toward AI, Lim, and Flaherty[3] suggested that AI should be carefully incorporated into routine clinical practice after dermatologists have received proper training for the usage of AI. According to a recent survey by Pinto Dos Santos *et al*., most undergraduate medical students are aware of the possible uses and implications of AI in medicine and they are not worried that AI will eventually replace human doctors.[4] A similar observation was made by us as well, with a majority of subjects being optimistic about its use in dermatology. In a similar survey by Oh *et al*., 60% of physicians agreed that they had a decent familiarity with AI, and 73.4% considered that technology had useful implications in the medical profession.[5]

Dermatology's most desirable AI aim right now is skin tumor diagnosis. However, our findings suggest that Indian dermatologists from the western part of the country are not well aware of this usage. The gap in the correct knowledge with inadequate practices was seen in senior dermatologists with a very poor understanding of AI and ML in most senior doctors. Our study had several limitations. These include small sample size, exclusion of physicians from other medical streams, and significant variation in the number of trainees, junior dermatologists, and senior dermatologists, with a notably low number of senior dermatologists. In addition, differences in clinical experience and familiarity with technological advances among participants may have introduced bias.

The survey's results imply that although the Indian dermatology fraternity has a positive view of AI, its usage is very limited in the country. Young dermatologists are especially optimistic about its usage and well aware of its applications, but their exposure to the field is limited by the absence of inclusion of this subject in their current curriculum. In addition, most subjects had limited access to AI and had not used it in the field of dermatology. The majority of dermatologists who participated in this survey believe that AI will strengthen our ability to diagnose, but with a considerable possibility of misdiagnosis. A small percentage of respondents, especially senior dermatologists, expressed anxiety about being replaced by AI and felt threatened by it.

### Ethical approval

The Institutional Review Board approval is not required.

### Declaration of patient consent

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

### Financial support and sponsorship

Nil.

### Conflicts of interest

There are no conflicts of interest.

### Use of artificial intelligence (AI)-assisted technology for manuscript preparation

The authors confirm that there was no use of artificial intelligence (AI)-assisted technology for assisting in the writing or editing of the manuscript and no images were manipulated using AI.

## REFERENCES

1. Janda M, Soyer HP. Can clinical decision making be enhanced by artificial intelligence? Br J Dermatol 2019;180:247-8.
2. Polesie S, Gillstedt M, Kittler H, Lallas A, Tschandl P, Zalaudek I, *et al*. Attitudes towards artificial intelligence within dermatology: An international online survey. Br J Dermatol 2020;183:159-61.
3. Lim BC, Flaherty G. Artificial intelligence in dermatology: Are we there yet? Br J Dermatol 2019;181:190-1.
4. Pinto Dos Santos D, Giese D, Brodehl S, Chon SH, Staab W, Kleinert R, *et al*. Medical students' attitude towards artificial intelligence: A multicentre survey. Eur Radiol 2019;29:1640-6.
5. Oh S, Kim JH, Choi SW, Lee HJ, Hong J, Kwon SH. Physician confidence in artificial intelligence: An online mobile survey. J Med Internet Res 2019;21:e12422.

**How to cite this article:** Mohta A, Mohta A. Are dermatologists a well-informed audience for artificial intelligence? A knowledge, attitude, and practice survey. Indian J Skin Allergy. 2024;3:134-7. doi: 10.25259/IJSA_20_2024