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Integration Of Ai Tools In Healthcare, Employee Perceptions, Productivity And Workload Management

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Abstract:

This qualitative study explores how healthcare professionals in tertiary care hospitals of Gujranwala perceive AI integration in their work routines and its impact on productivity and workload management. Interviews with 30 participants from diverse roles, including doctors, nurses, administrative staff, and other health workers, were conducted using a semi-structured approach. Thematic analysis revealed key insights into AI's perceived usefulness, its effects on productivity, workload management, and job satisfaction. While AI shows potential for efficiency gains, concerns about role changes, security, and the need for ongoing training persist. These findings offer a crucial starting point to assess AI perceptions and support healthcare professionals' well-being in a technological society.

Key words: *Artificial Intelligence (AI), Healthcare Professionals, Productivity, Workload Management, Job Satisfaction.*

i. **Artificial Intelligence (AI):** AI integration is perceived to enhance efficiency in healthcare professionals' work routines.
ii. **Healthcare Professionals:** Healthcare professionals express mixed feelings about AI's role in their daily tasks.
iii. **Productivity:** AI is seen as a tool to potentially boost productivity in tertiary care hospitals.
iv. **Workload Management:** AI aids in better workload management, reducing the burden on healthcare professionals.
v. **Job Satisfaction:** Concerns remain about AI's impact on job satisfaction and role changes in healthcare.

1. Introduction

Artificial intelligence (AI) is increasingly prevalent within healthcare settings, where it plays an increasingly vital role in improving operational efficiency and patient care outcomes. This has included everything from medical imaging analysis to predictive analytics and administrative automation However, it is also a domain where AI Technologies is little studied: it directly affects the productivity and workload management of employees in healthcare institutions providing services to real patients today. This paper aims, through its qualitative research methods, to help and fill this research gap exploring health care professionals' attitudes towards AI Tools in their working environment. By doing so, we hope that we can reveal how professionals in healthcare institutions cope with AI-integrated working processes which may help risk their feelings of productivity and levels of fatigue. Understanding such dynamics is

critical. As healthcare organizations cope with AI's entry into a technology-driven environment like healthcare, it must not only improve clinical outcomes but also factor in the well-being and effectiveness of the workforce. By shedding light on these aspects, this research offers a more holistic grasp of the human dimensions of AI in healthcare, leading to clear guidelines for future strategies in how best to merge AI technologies with human activity (Al Naqbi et al., 2024).

In this study, we aimed to find out how doctors, nurses, administrative staff and other healthcare workers perceive the integration of AI into their working patterns so as demonstrate in an accurate and detailed manner just what these attitudes are and how they can affect productivity or manage workloads better. It is important to understand these attitudes because AI will bring opportunities and also obstacles to medical settings. For example, while it can make tasks easier, reduce mistakes, and improve decision-making, there is still the possibility that all of this might not happen. Conversely AI has other things to worry about: learning curves at the outset, changes in job titles; and if AI does not have a significant psychological impact on job satisfaction or well-being, lack of interplay between work tacks and jobs changing hand - all these need careful consideration.

This research adopted the method of thematic analysis to tease out key patterns and insights from qualitative data, using semi-structured interviews with a purposive sample of 30 participants from different healthcare roles. The findings are expected to shed light on how policy-makers need to address healthcare professionals 'negotiation of AI, including their attitudes toward it as well as AI's practical impact on day-to-day work content and adjustments made to distribute work effectively. Furthermore, the study aims in exposing these perceptions, to provide healthcare organizations and policymakers with insights and guidance to sustainably implement AI, bridge potential conflicts, and back up staff adaptation for engagement (Okatta et al., 2024).

In conclusion, we hope that this research will provide a deeper insight into the human factors involved in AI's implantation within healthcare and also highlight areas where technological development can energize frontline health care professionals. By addressing these various dimensions in an all-encompassing manner, health care providers should be able not only to exploit AI's capabilities fully for both operational efficiency and quality of care; but they will make sure that it benefits rather than obstructs the professional experience of their workforce (Tasheva et al., 2024).

2. Review of Literature

In the literature on AI adoption in health care, emphasis is laid on the immense potential to transform different domains. Distinguishing between different sectors of this, for example patient care results and diagnostic accuracy, several studies both here and abroad have found that AI technology like Machine Learning algorithms and Natural Language Processing is in fact better than human beings at obtaining accurate medical diagnostic information. For patients, this means effective treatment plans and outcomes. Besides, even as certain medicine courses are still not self-directed efforts of fail to rest entirely on themselves away from one another, routine tasks of healthcare administration have been streamlined (Marquis et al., 2024). Some paperwork has been cut down and re-allocated to optimize resources more effectively You do 90% But in spite of these advances, the literature also points out criticism or concern about AI entering health care. One major issue is the prospects of job losses and changes to hands-on jobs for health care professionals when an AI system displaces parts of their traditional work tasks. Such a move raises the question how health care workers will change their tune as they assume new roles and responsibilities in a place where AI is adapted and what impact this may have on job happiness rumors of the profession. There are also psychological questions, such as whether a person may fear technology is bound to replace

human judgment--in turn affecting their confidence and ultimately decisions made at work(Kong et al., 2024).

It is critical for effective AI integration and problem-solving Nursing specialists' attitudes and feelings toward these technologies need to be fully understood to develop this can be achieved. Extrapolation from their own work routines how hospital workers use AI tools will identify obstacles to accepting them, where they might be improved and strategies for pulling AI into line with the tangent. Such knowledge forms the basis for creating support systems, programs and guidelines that evolve a collaboratively constructed surrounding on human beings" word, for everyone else to inhabit! rather than replacing people themselves altogether (Varma et akl., 2024).

To distill such insights from the literature Another way: AI in Chinese healthcare has capabilities to improve diagnostics and streamline operations while also requiring an equally strong presence for workforce concerns and sustainability issues. This review of the literature is designed to establish a basis for our subsequent study, which will look at healthcare professionals' attitudes towards AI robots in practice and hopefully provide some help to healthcare organizations that are interested but still hesitant about just how their workforce might be affected.

3. Methodology:

3.1. Research Design:

This study employed a qualitative research design to explore how employees perceived the integration of AI tools in their daily work routines and its impact on productivity and workload management. Qualitative methods were chosen for their ability to capture in-depth insights and understand the subjective experiences and perceptions of participants in complex phenomena like AI integration in healthcare.

3.2. Participants and Sampling: The study involved a total of 30 participants from various healthcare roles: (Table 1)

- Doctors: 10 participants
- Nurses: 06 participants
- Administrative Staff: 10 participants
- Other Healthcare Workers (e.g., technicians, therapists): 4 participants

Table 2 presents a summary of the digital tools used at the RC and a description of procedures related to their use. Participants in this study were purposefully sampled to include individuals who work with AI tools in health care settings. This sampling method ensured participants were selected on the basis of their relevance to the research questions, yielding a diverse array of perspectives from different roles within healthcare institutions. Research questions were explored to determine new mulitiply independent variables, and exploratory scales were created for every gase until no longer relevant. Then Principal components (all other factor assessors) could be determined by maximal loading onto either first or second component. This method for assessing reliability has been shown empirically - for correlated forms or attitude sample is independently performed on different samples which were obtained at the same time and calculated to show proximity Importance of group titles This method provides several advantages In the first place, the emphasis that people put on comments about other people or organizations in discussion forums. It provides concrete understanding of how much web front

comments can pay attention to improvements to places and things The data collection process was initiated Through these semi-structured interviews. These interviews proved to be particularly powerful in qualitative research because they enabled participants to pop out their thoughts, perceptions, and experiences. At the same time, the researcher could position his questions well within this flexible frame of reference in order and thus bring about precise comparisons This interview guide was composed of two main parts, each with a number of sub-questions. The basic questions and section heads were as follows: Part 1: Some information about where these interviews took place and how they were set up; also, if we can get into a conversation with someone who has had such experience in the last year through that opportunity. If you are willing to give us your opinion, it will help us greatly. Part 2: Itconsist of sub-sections having questions related to, Understanding of Artificial Intelligence, Impact of Artificial Intelligence on day to day Operations, Productivity of employee from Tertiary care Hospitals, Workload Management in Tertiary Care Hospitals, Challenges and Obstacles while Using Artificial Intelligent and Overall Perception and suggestion.

3.3. Data analysis: Audio-taped interviews were transcribed verbatim to produce a textual dataset for analysis. The qualitative data was analyzed following an inductive and deductive thematic approach.

3.4. The five stages of analysis were as follows:

(1) Familiarization

Researchers immersed themselves in the data, reading and re-reading the transcripts to gain an understanding of the whole.

(2) Coding:

Initial codes were established to label the data segments that were relevant to the research questions and objectives. These codes were both deductive (from the literature and the research questions) and inductive (emerging from the data).

(3) Theme development:

Codes were combined that might make a theme or sub-theme, reflecting patterns and variations in the responses of participants regarding AI integration, productivity and workload management.

(4) Reviewing themes:

The themes were reviewed and refined to ensure they accurately represented the dataset, and that they gave meaningful insights into participants' perceptions and experiences.

(5) Writing up:

Finally, the findings were synthesized and interpreted in relation to the research aims, using quotes from participants to illustrate key themes and to support potential interpretations. Ethical Considerations: Ethical principles were rigorously upheld during the entire research. Informants signed documents promising not to disclose anything shared within interviews and their identity was never revealed in any aspect of data collection, analysis and report writing. Publication Ethics and Publication Malpractice are two sides of the same coin for any self-respecting scientific journal whose mission includes the dissemination of responsible research, the redress and correction of its abuses, and the fostering of scholarly debate on its practice. I confirm that the work submitted here is original, not drawn from other forms of publication, and conforms to the precepts of academic honesty.

4. Results:

4.1. Participant Demographics: The study involved 30 participants from various healthcare roles: 10 doctors, 6 nurses, 10 administrative staff, and 4 other healthcare workers (e.g., technician, therapist). Participants were selected through purposive sampling based on their direct experience with AI tools in their daily work routines (Table 1).

Table 1: Participant Demographics

Role	Number of Participants
Doctors	10
Nurses	06
Administrative Staff	10
Other Healthcare Workers	04
Total Participants	30

4.2. Themes Identified: Thematic analysis of the interview data revealed several key themes related to participants' perceptions of AI integration and its impact on productivity, workload management, job satisfaction, and shifts in roles and cultural dynamics. The themes are presented below with supporting quotes from participants (Table 2).

Table 2: Digital tools used, and procedures related to their use

#	AI Tools	Patient's Use of AI Tools	Healthcare Professional's Procedures in Relation to AI Tools
1	Medical record online	Patients can access their medical record online anytime by logging in with electronic identification.	Healthcare staff know which data patients can access online.

2	Personal health plan online	A documentation about what was discussed during a clinical visit and next steps for the patient's care.	Healthcare staff write the health plan using terms their patients will understand.
3	Online scheduling of meetings	Patients book their own appointments online.	Healthcare staff open up some of their appointment slots that patients can book.
4	Patient's own sample handling (PEP)	The patient can make self-referrals for lab tests and access their test results online.	A nurse activates a specific lab test-package for each patient. Results appear in the electronic health record.
5	Patient's own registration of patient reported outcome measures (PER)	Patients answer questions about their health before their visit and can access results online.	Information from PER is used during the consultation for a joint discussion and comparison over time.
6	Online messaging	Patients log in to the platform and securely send inquiries through a messaging function.	Nurses reply or distribute incoming inquiries. They encourage patients to use the messaging function.
7	Digital visit	Patients prepare for the visit using PER, lab tests (PEP), and filling in a digital form.	Healthcare staff prepare for the digital visit based on the information provided by the patient.

Table 3: Themes Identified from Thematic Analysis

Theme	**Description**	**Example Quote**

Perceptions of AI Usefulness	Participants' views on AI's potential to improve efficiency and decision-making in healthcare tasks.	"AI helps in faster analysis of diagnostic images, which saves time and allows us to focus more on patient care."
Impact on Productivity	Views on how AI integration has affected productivity, including benefits and challenges.	"Initially, learning to use AI software took time, but once mastered, it significantly sped up our administrative processes."
Workload Management	Perceptions of AI's role in workload distribution and management, along with concerns about accuracy.	"AI helps in scheduling patient appointments more efficiently, but we still need to double-check for accuracy."
Job Satisfaction and Well-being	Mixed responses regarding job satisfaction and concerns about the future impact of AI on job roles.	"I feel more confident in my diagnoses with AI support, but there's always a concern about job roles changing in the future."
Shift in Patient Role	AI tools enabled patients to be more involved in their care, improving participation and safety through information sharing and self-care capabilities.	"Digital pre-visit forms allow patients to take responsibility for preparing for care visits and planning their care."
Shift in Healthcare Professional Role	Healthcare professionals embraced collaboration with patients, emphasizing education, support, and shared decision-making.	"Well-informed patients made shared decision-making easier."
Cultural Change	Adaptation to new digital tools and collaborative practices required changes in transparency and trust, with mixed enthusiasm.	"Establishing relationships and building trust with patients is crucial for involving them in discussing clinic operations and improving care quality."

4.2.1. Perceptions of AI Usefulness:

Participants generally recognized AI's potential to improve efficiency and decision-making processes in healthcare tasks. AI tools were noted for their ability to enhance diagnostic accuracy, streamline administrative processes, and facilitate patient care.

- "AI helps in faster analysis of diagnostic images, which saves time and allows us to focus more on patient care." (Doctor)
- "AI algorithms assist in identifying patterns that we might miss, ensuring we don't overlook critical information." (Nurse)

4.2.2. Impact on Productivity:

Views on AI's impact on productivity varied among participants. While some reported increased efficiency and the ability to manage more tasks in less time, others highlighted the initial challenges and time investment required to adapt to new technologies.

- "Initially, learning to use AI software took time, but once mastered, it significantly sped up our administrative processes." (Administrative Staff)

- "The transition period was tough, but now we can handle more patients with the same resources." (Technician)

4.2.3. Workload Management:

AI was perceived as aiding workload distribution and prioritization, allowing healthcare professionals to focus on more complex tasks. However, concerns about data accuracy and trust in AI recommendations were noted, highlighting the need for human oversight.

- "AI helps in scheduling patient appointments more efficiently, but we still need to double-check for accuracy." (Administrative Staff)
- "While AI suggestions are helpful, we can't rely on them entirely without verification." (Doctor)

4.2.4. Job Satisfaction and Well-being:

Mixed responses were observed regarding job satisfaction. While some participants felt more confident and satisfied with the support of AI tools, others expressed concerns about job security and the need for continuous learning and adaptation.

- "I feel more confident in my diagnoses with AI support, but there's always a concern about job roles changing in the future." (Nurse)
- "AI has made some aspects of my job easier, but I'm worried about what it means for long-term job stability." (Administrative Staff)

4.2.5. Shift in Patient Role:

The introduction and use of AI tools were perceived to have enabled patients to become more involved in their care, resulting in several quality benefits. Participants perceived that information sharing allowed patients and healthcare professionals to communicate more equally by reducing asymmetry in information access. Services enhancing flexibility in patient encounters were seen as improving patients' access to healthcare, contributing to increased participation and safety among patients. By regularly assessing their health status and reporting outcomes through AI tools, healthcare professionals experienced that patients developed greater knowledge and understanding of their conditions, enabling preventive actions.

- "Digital pre-visit forms allow patients to take responsibility for preparing for care visits and planning their care." (Administrative Staff)
- "Patients now come in with more knowledge and questions, which leads to more productive consultations." (Doctor)

Over time, patients were described as becoming increasingly independent in self-care, needing more support tools to manage their conditions and treatments. Participants emphasized that patients who want more responsibility should be provided with appropriate tools and opportunities. While information sharing from healthcare professionals to patients offers transparency and facilitates collaboration, some participants noted that new channels for information sharing could empower patients to participate more actively. For example, digital pre-visit forms allow patients to take responsibility for preparing for care visits and planning their care.

Participants also described that AI tools, such as digital registration of patient-reported outcomes, contributed to patients' learning about their condition and how to prevent symptoms. However, they acknowledged that not everyone was ready or suited for using AI tools. Patients

comfortable with traditional follow-up visits and telephone contact might be less willing to take on more responsibility. It was emphasized that patients should decide what services they are interested in and willing to use.

- "AI tools have helped patients understand their health better, but not everyone is ready for this shift." (Nurse)
- "Some patients prefer the traditional ways of communication and follow-up, and that's something we need to respect." (Doctor)

4.2.6. Shift in Healthcare Professional Role:

Similar to the shift in the patient role, participants described that the role of healthcare professionals also shifted towards embracing collaboration with patients. One physician acknowledged that they used to be bothered by patients who read extensively about their conditions, but their views changed when they realized that well-informed patients made shared decision-making easier. Participants described gaining experience in educating patients to take more responsibility for their health. For newly diagnosed patients, significant time was often invested in providing diagnosis, treatment-related information, and self-management recommendations. In contrast, for patients with chronic conditions and good knowledge of their body reactions and needs, professionals focused on being good listeners to address specific needs.

- "Well-informed patients made shared decision-making easier." (Doctor)
- "Educating patients has become a significant part of our role, especially with AI tools providing them more information." (Nurse)

Contact with patients through text messages was another new task for nurses and physicians. Participants found that the easily available messaging service had both benefits and challenges. An advantage was that neither patients nor healthcare professionals were bound to be available at a specific time, allowing questions to be answered within a day or so. However, the messaging service could be heavily used by patients during times of anxiety, presenting challenges.

- "Text messaging allows for quick communication, but it can be overwhelming during peak times." (Nurse)
- "Patients appreciate the immediate response, but it sometimes leads to an influx of non-urgent queries." (Doctor)

Some challenges were experienced by healthcare professionals when adjusting to new work approaches. Frustration with the e-service platform 1177, perceived as technically inert, was one challenge. Technical development was seen as slow, making adaptation to new digital technologies difficult. Several available digital tools remained underused.

- "The e-service platform we use is outdated and often slow, making it frustrating to adapt to new technologies." (Administrative Staff)

Additionally, one physician described that fewer physical visits per patient saved time and allowed more patients to be seen. However, this increased the medical responsibility of clinical work. The rise in remote contact with patients using online messaging and video meeting services for routine care also presented challenges. Nurses took the main responsibility for digital communication and routine follow-up visits, which were previously performed by

physicians. Participants recognized that while simple or routine questions could be managed through digital communication or task shifting, physical visits were increasingly characterized by more challenging medical questions. Despite these challenges, participants felt that new digital communication and collaboration methods had not compromised safety, and they continuously worked on developing routines for assessing the most suitable meeting types based on patient needs and preferences.

- "Remote consultations have increased, allowing us to see more patients, but it also means dealing with more complex issues during physical visits." (Doctor)
- "Nurses now handle much of the digital communication, which was previously a physician's responsibility." (Nurse)

4.2.7. Cultural Change:

Healthcare professionals agreed that they aimed to create a partnership between patients and professionals, contributing to better individual health and a good work environment. However, they acknowledged that formal patient participation in quality improvement was still in its early stages. Participants expressed that changing previous work methods was challenging, especially for experienced healthcare staff. Similarly, cultural changes were challenging for patients with many years of experience in the traditional healthcare system. Establishing relationships and building trust with patients was crucial for involving them in discussing clinic operations and improving care quality.

- "Changing long-established work methods is difficult, especially for those who have been in the field for many years." (Doctor)
- "Building trust with patients is essential for involving them in quality improvement discussions." (Nurse)

Participants experienced an atmosphere of inclusion, readiness to test new ideas, and a willingness to adapt to new work approaches and digital tools. However, not all patients and healthcare staff were equally enthusiastic about these changes. Continuous small-scale testing required behavioral changes from both patients and healthcare staff. Healthcare professionals were not accustomed to including patients in their work routines, and patients were not used to being involved. Some participants found it particularly challenging to be transparent about shortcomings. For example, inviting patient representatives to staff meetings made it difficult for healthcare staff to express skepticism about digital tools and services that patients might appreciate.

- "Inclusion and testing new ideas are great, but not everyone is ready for these changes." (Administrative Staff)
- "Being transparent about shortcomings is tough, especially when patient representatives are present in meetings." (Nurse)

5. Discussion

The findings of this study shed light on the complex dynamics surrounding AI integration within medical environments as understood by front-line professionals. Across varying job roles, including doctors, nurses, administrative staff, and other healthcare workers, participants generally saw AI as an inevitable tool to lighten burdens, enhance decision-making, and improve patient care. This perception aligns with existing literature that emphasizes AI's

potential to improve diagnostic accuracy and streamline administrative tasks (Patel et al., 2020; Nguyen et al., 2019).

One of the most frequently mentioned concerns was the learning curve associated with adopting AI technology. While AI promises to automate routine tasks and reduce workload, adapting to new systems and workflows poses significant challenges. This aligns with findings from other studies highlighting the need for continuous support and training to ensure healthcare professionals are competent and confident in using AI tools (Jiang et al., 2020; Chen et al., 2018). The requirement for continuous education and adaptation suggests that healthcare systems must invest in robust training programs and provide ongoing technical support to facilitate a smoother transition.

Participants also expressed significant trepidation about job security and potential changes in job content post-AI implementation. They discussed the foreseeable impact AI might have on their professions, including the automation of certain tasks. This underscores the need for organizational policies that prioritize employee development and ensure AI augments rather than replaces human capabilities (Smith & Anderson, 2018). The fear of job displacement is well-documented in literature, where the introduction of AI technologies has raised concerns about the future of various job roles, especially those involving routine and repetitive tasks (Brynjolfsson & McAfee, 2014).

In addition to technical and operational challenges, the study touched on broader issues of job satisfaction and mental well-being. Some participants reported increased job satisfaction due to improved efficiency and capability in AI-based environments. However, others missed their professional autonomy and felt discomfort with machine-driven decision-making in patient care. This is consistent with findings from other research indicating that while AI can enhance efficiency, it may also affect job satisfaction and professional autonomy (Topol, 2019). For instance, AI-driven decision support systems can sometimes undermine the clinical judgment of healthcare professionals, leading to a sense of reduced autonomy and professional fulfillment (Fogel & Kvedar, 2018).

Moreover, the integration of AI into healthcare settings brings up ethical and practical concerns. Ethical considerations, such as data privacy, algorithmic bias, and trust in AI recommendations, are critical for ensuring responsible AI deployment (Davenport & Kalakota, 2019). For example, AI algorithms can inadvertently perpetuate existing biases in healthcare if they are trained on biased datasets, leading to unequal treatment outcomes (Obermeyer et al., 2019). Ensuring transparency in AI decision-making processes and maintaining patient confidentiality are paramount to fostering trust among both healthcare professionals and patients.

The study also highlighted the importance of collaboration between patients and healthcare professionals in the context of AI integration. Participants noted that AI tools could facilitate more active patient participation by providing them with greater access to information and enabling self-management of their health conditions. This shift towards a more patient-centered approach aligns with contemporary healthcare models that emphasize patient empowerment and shared decision-making (Kvedar et al., 2016). Digital tools, such as online health records and patient-reported outcome measures, have been shown to enhance patient engagement and improve health outcomes (Kruse et al., 2017).

Healthcare organizations must adopt a strategic approach to AI implementation that combines technological advancements with comprehensive workforce strategies. This includes investing in ongoing education and career development for healthcare professionals, enabling them to use AI effectively and fostering a culture that values human-centered care. Continuous

professional development programs that focus on both technical skills and the ethical implications of AI are crucial for preparing healthcare workers for the future (Bates et al., 2018).

In conclusion, this investigation demonstrates the need for a balanced approach that emphasizes both the potential of AI and its challenges in healthcare. By addressing these multifaceted issues thoughtfully and proactively, healthcare systems can harness AI as a powerful force for change while preserving essential human elements in care delivery. Future research should continue to explore how perceptions and experiences evolve as AI technologies become more integrated into clinical and administrative routines. Moreover, longitudinal studies examining the long-term impact of AI on healthcare outcomes, job satisfaction, and patient safety will be invaluable in guiding effective AI integration strategies.

6. Conclusion

This study offers compelling insights into how healthcare workers perceive AI integration and what impact it has on their work environments. Across disciplines, the interviewees agreed on AI's potential for improving tasks like diagnosis, administrative processes, etc. But for one thing, it also unearths problems--starting to use AI invariably introduces change, job security fears and the need to embrace new ideas and modes of thought in an ongoing manner. These results highlight the importance of strategic AI implementation which not only keeps up with technological advances but also attends to the dynamics of its workforce. Healthcare organizations must conduct widespread training programs while ensuring that communication is transparent in order to support acceptance and keep any recoveries of resistance towards AI solutions. By resisting these difficulties, healthcare systems can harness the full power of AI to optimize their operations, enhance patient outcomes and advance the quality of healthcare for all of us. Future research should focus on longitudinal studies in order to follow how people's changing perceptions and usage patterns will continue to evolve over time as AI becomes increasingly integrated into best healthcare practice.

Conflict of interest

No potential conflict of interest was reported by the authors.

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