Judul artikel : **Spectrums of AI Integration in Doctor's Clinical Autonomy: Integrating Ethics of Care and Bioethical Principles, within Indonesia's Communal and Hierarchical Context**

Nama jurnal : **Asian Bioethics Review**

Link website jurnal : https://link.springer.com/journal/41649

ISSNs : Print **1793-8759**, Online **1793-9453**

Reputasi jurnal : Scopus Q1

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Status artikel : *published,* link DOI = https://doi.org/10.1007/s41649-025-00407-8

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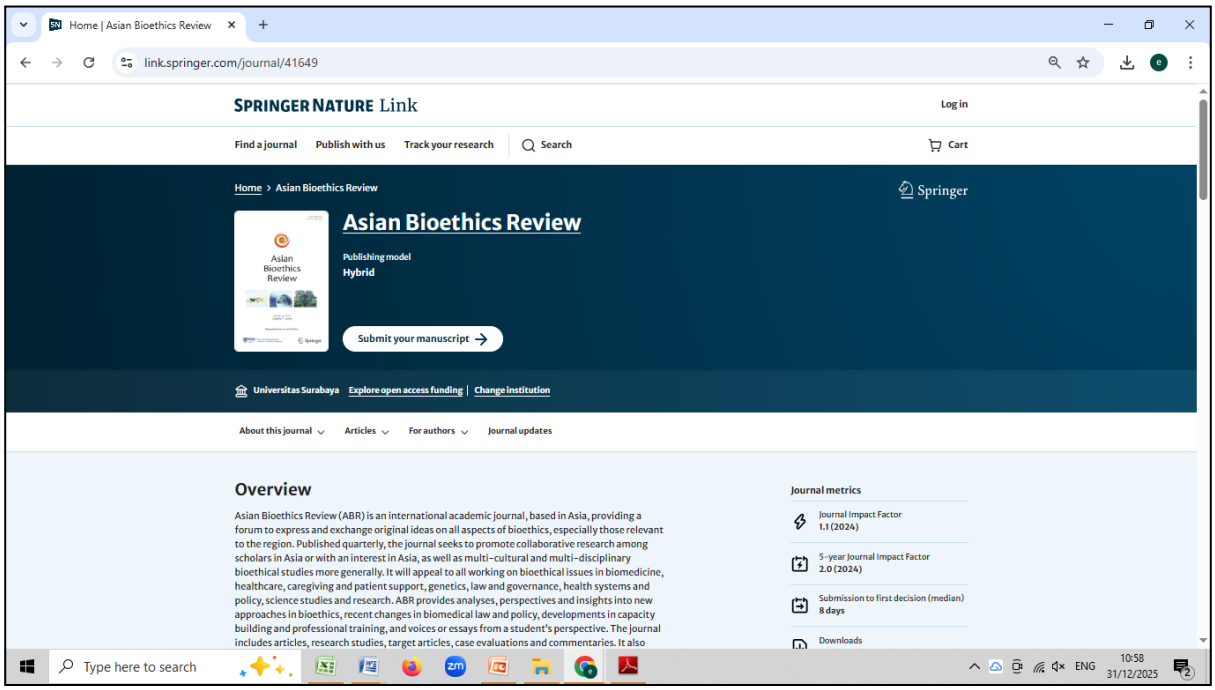

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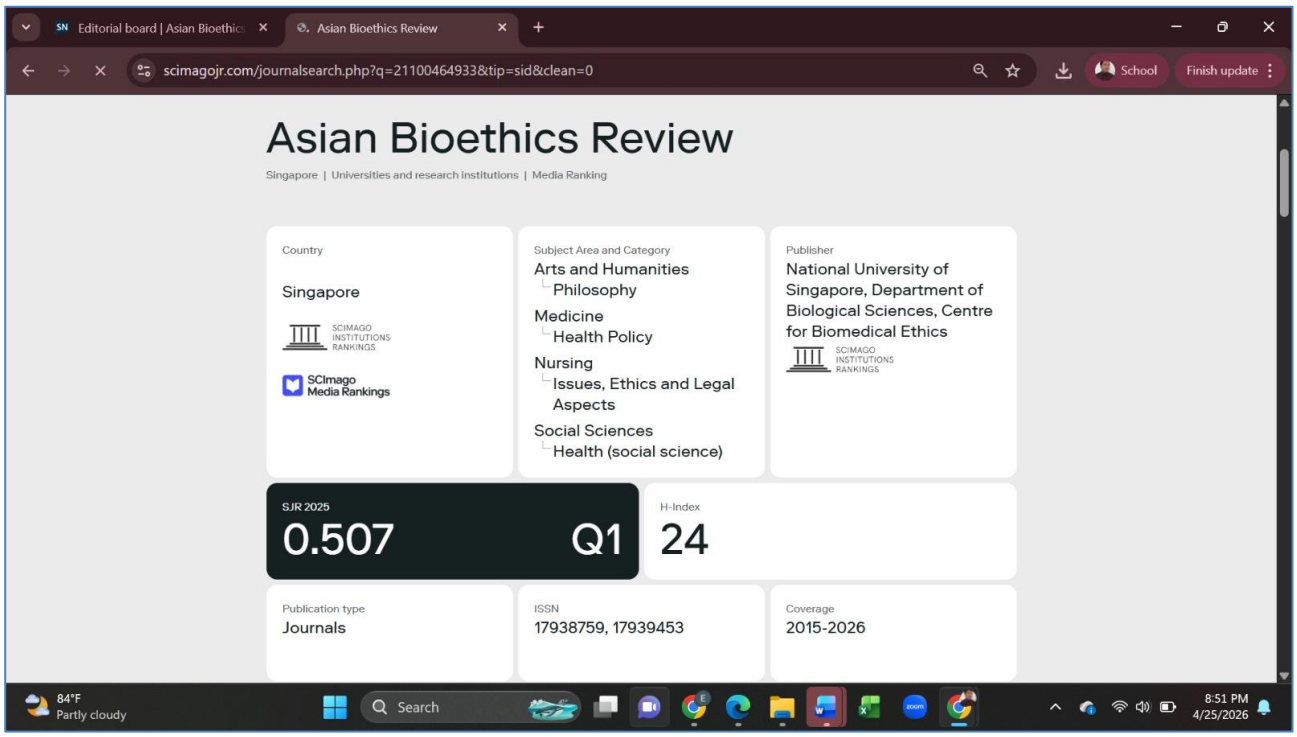

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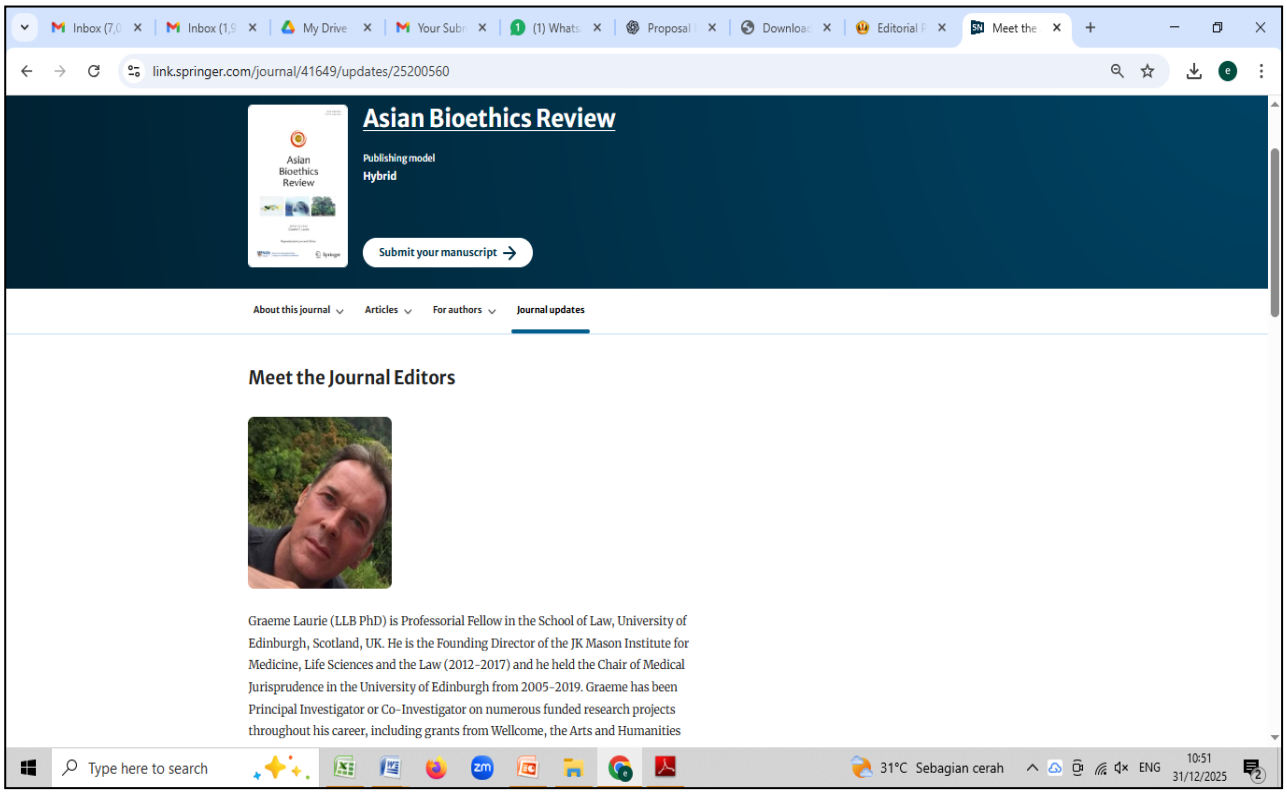

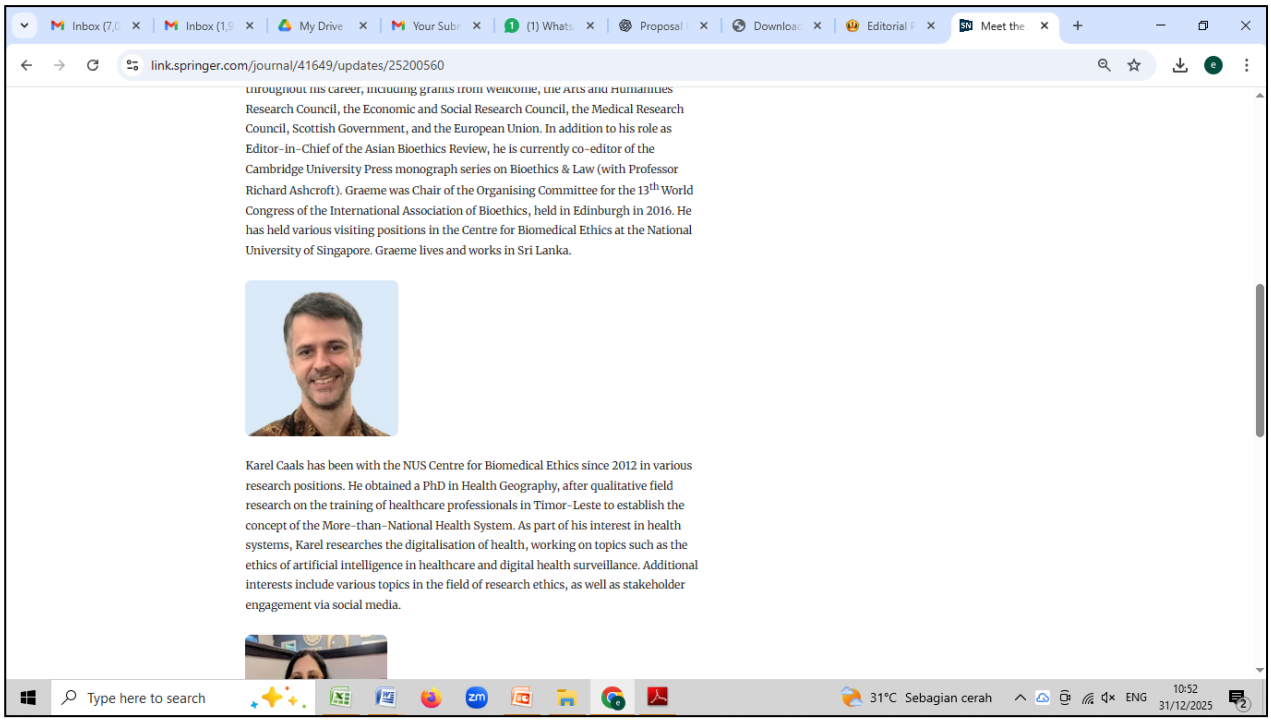

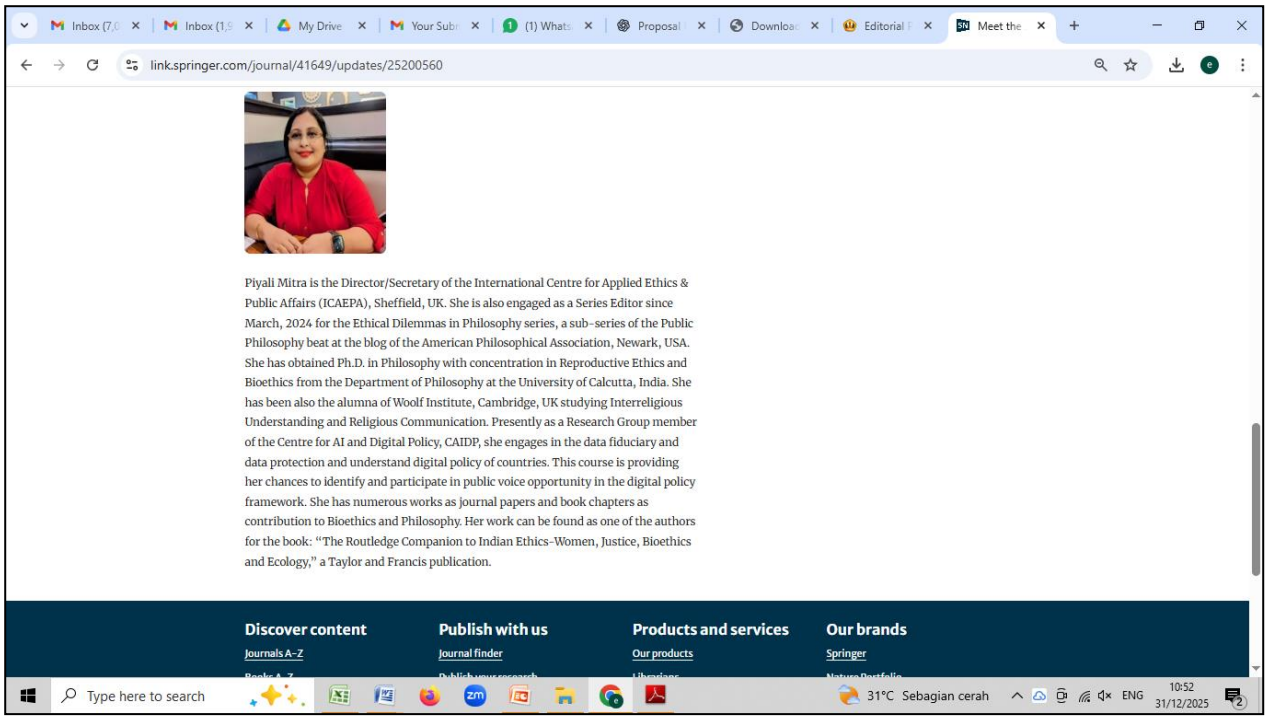

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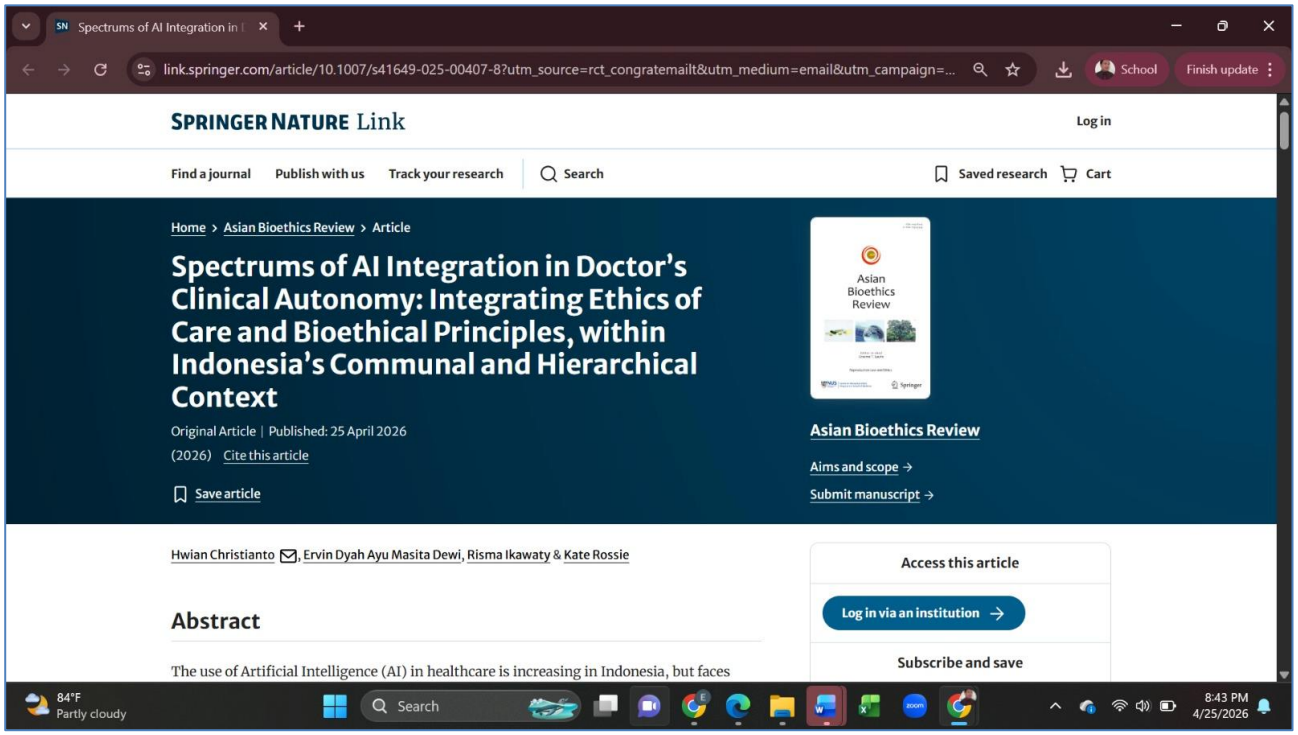
Tampilan artikel di jurnal Asian Bioethics Review



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Original Article | Published: 25 April 2026

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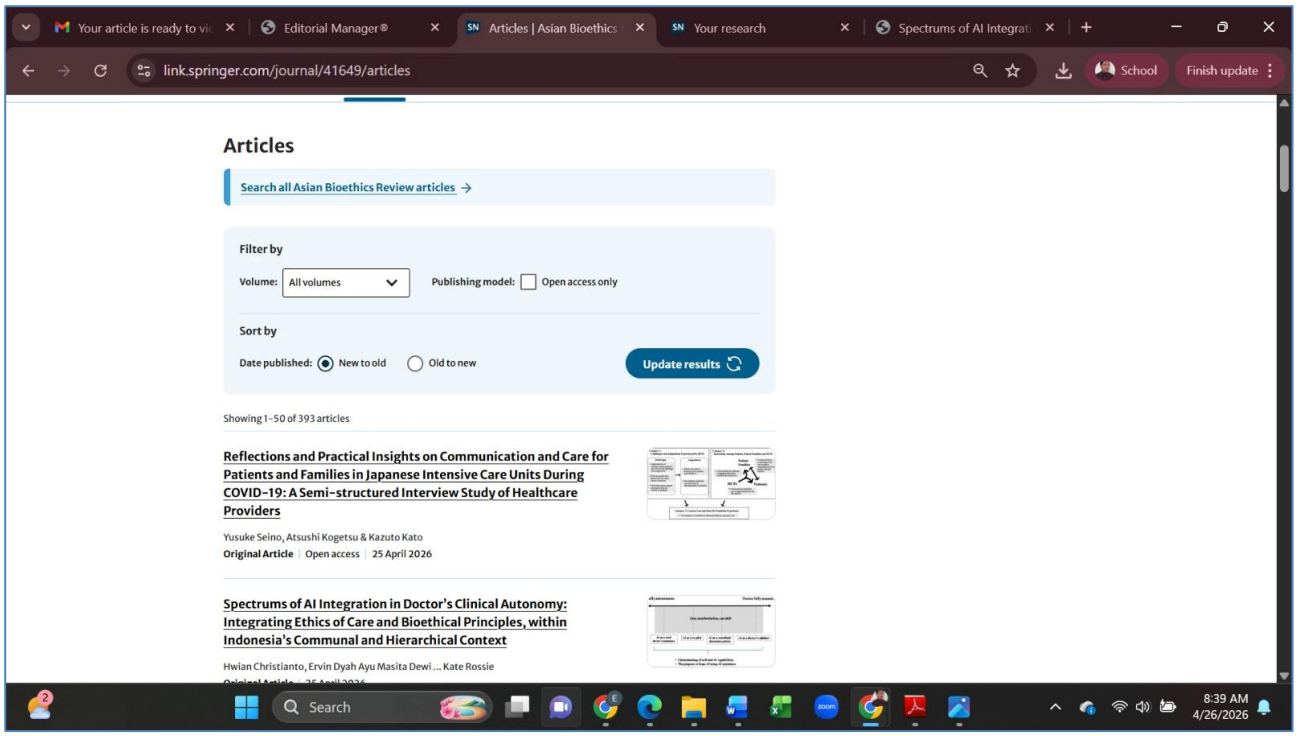
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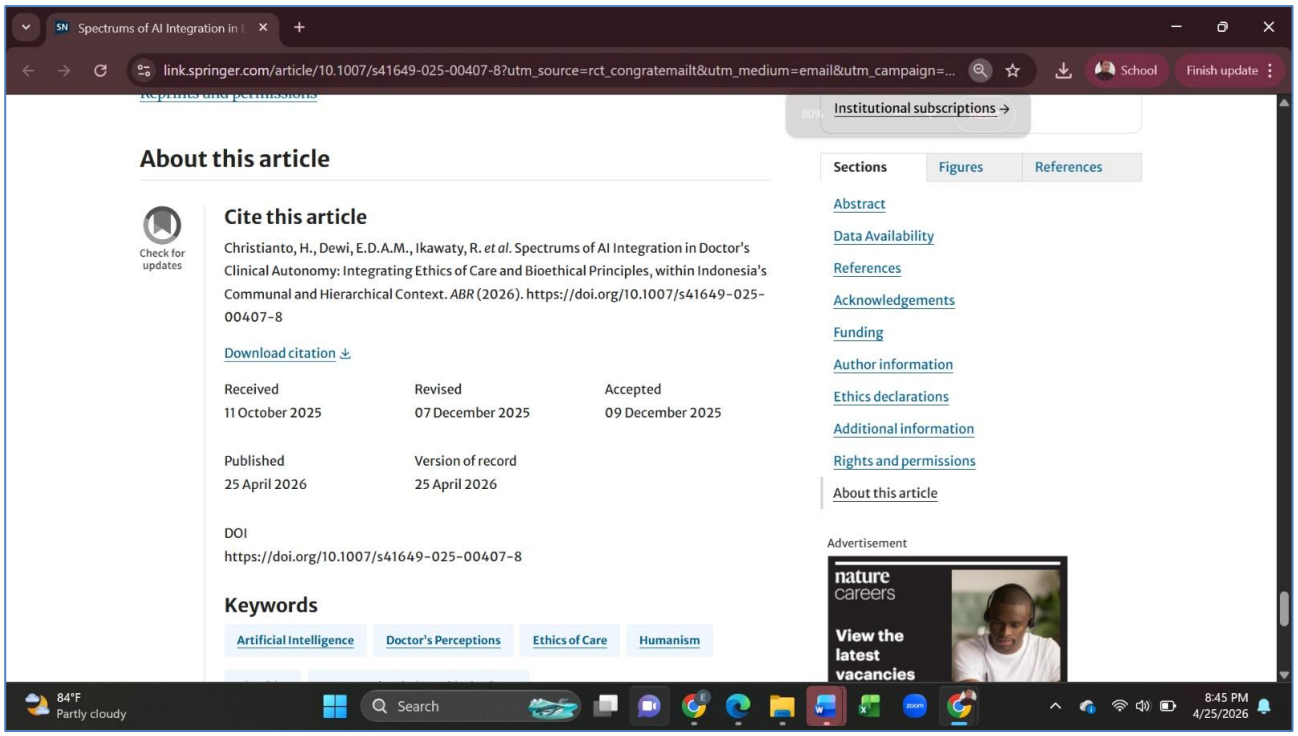
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Christianto, H., Dewi, E.D.A.M., Ikawaty, R. et al. Spectrums of AI Integration in Doctor's Clinical Autonomy: Integrating Ethics of Care and Bioethical Principles, within Indonesia's Communal and Hierarchical Context. ABR (2026). https://doi.org/10.1007/s41649-025-00407-8
Download citation
Received 11 October 2025
Revised 07 December 2025
Accepted 09 December 2025
Published 25 April 2026
Version of record 25 April 2026
DOI https://doi.org/10.1007/s41649-025-00407-8
Keywords
Artificial Intelligence
Doctor's Perceptions
Ethics of Care
Humanism
Sections
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ORIGINAL ARTICLE

Spectrums of AI Integration in Doctor's Clinical Autonomy: Integrating Ethics of Care and Bioethical Principles, within Indonesia's Communal and Hierarchical Context

Hwian Christianto[1] · **Ervin Dyah Ayu Masita Dewi**[2] · **Risma Ikawaty**[3] · **Kate Rossie**[4]

Received: 11 October 2025 / Revised: 7 December 2025 / Accepted: 9 December 2025

Abstract

The use of Artificial Intelligence (AI) in healthcare is increasing in Indonesia, but faces challenges related to Indonesia's communal and hierarchical cultural context. Ethical issues are becoming increasingly complex, not only in terms of the principles of beneficence and non-maleficence, but also in relation to humanization and care in doctor-patient relationships. The position of AI in healthcare is determined by doctors' perceptions. This study captures doctors' perceptions of the use of AI in healthcare services in relation to the principles of bioethics and ethics of care, within the context of Indonesia's culture. The study used a descriptive qualitative approach through in-depth semi-structured interviews with twenty-five doctor participants practicing emergency services in Indonesia. The results revealed four spectrums of AI integration within the clinical autonomy of doctor: (1) as a doctor's assistant/tool, (2) as a co-pilot with a specific role, (3) as a doctor's discussion partner, and (4) as a reinforcement of doctor recommendations. These four spectrums reflect ethical issues between the basic principles of bioethics and the humanism of doctor-patient relationships influenced by communal and hierarchical culture. A collaborative approach between the basic principles of bioethics and the ethics of care is seen as more contextual to Indonesia's communal and hierarchical culture, to minimize the risk of dehumanization. The practical implication of these findings is the need for training for doctors, not only about AI, but also ethics of care and empathetic communication.

Keywords Artificial Intelligence · Doctor's Perceptions · Ethics of Care · Humanism · Bioethics · Communal and Hierarchical Culture

Extended author information available on the last page of the article

Published online: 25 April 2026

Introduction

Medical services, especially emergency care, require precision and accuracy because they are related to saving lives and preventing disability as early as possible (Iserson 2024). Technological developments, particularly Artificial Intelligence (AI), provide significant opportunities for improving emergency medical services, particularly in the areas of diagnostic support, such as laboratory testing, imaging (radiology), triage, medical records, and telemedicine. Even during the COVID-19 pandemic, AI has begun to be used in clinical patient monitoring, predicting severity, and integrating it into patient examination procedures.

The Hippocratic Oath, reinforced by the basic bioethical principles proposed by Beauchamp, namely respect for autonomy, beneficence, non-maleficence, and justice, forms the basis of healthcare services (Beauchamp and Childress 2019). Its application cannot be separated from the cultural context. In Indonesia's communal culture, the benefit to the patient is not always commensurate with the benefit to the patient's family. Patient autonomy is often relational, not absolute, with decision-making often requiring the involvement of the family (Claramita et al. 2013a, b). The doctor-patient relationship, likewise, focuses not only on the goal of healing but also on a meaningful relationship. Therefore, the implementation of AI in healthcare services in Indonesia poses unique ethical challenges, not only related to clinical benefits, but also respect for human dignity and human relations (Astuti 2021).

Thus, to address the ethical issues surrounding the use of AI in emergency healthcare, an approach aligned with Indonesian communal values is needed. The approach which only based on the four basic principles of bioethics places greater emphasis on the benefits to patients in achieving healing or an improved quality of life (cure), while often underestimating the doctor-patient relationship, which is essential for a communal society. An approach that combines the basic principles of bioethics and the ethics of care can be considered to address this challenge. Ethics of care emphasizes not only actions and outcomes but also the motivations, relationships, and processes behind those actions (Hertzberg et al. 2024). Doctors' perceptions of the role of AI in healthcare are one of the foundations for the division of roles between doctors and AI, as well as its impact on the human touch. This research explores this issue.

Methods

Research Design and Data Collection Approach

This research which used a descriptive qualitative approach with semi-structured in-depth interviews was chosen because it can better capture the opinions of research subjects. The researcher conducted semi-structured in-depth interviews using an interview guide with twenty-five participants from May 2024 to July 2025, either online or offline. Participants were asked to share their opinions about

the contribution of doctors regarding the use of AI in determining patient diagnosis and their perception about the role of AI in healthcare. All study participants provided informed consent, and the study design was approved by the appropriate ethics review board. Participants had the opportunity to freely explain their opinions, but the researcher still had control over the interview (Green and Thorogood 2018). Participants, specifically doctors who have experience in providing emergency services in hospitals, including those who have used AI and those who have not, were selected through purposive sampling based on inclusion and exclusion criteria. Participants were determined using the snowball method, where one participant recommends the next participant, etc., until data saturation is reached (Bourgeault et al. 2010). Data saturation is reached when no new ideas are found from the research. This method is advantageous as it does not require access to hospital doctor data from the hospital management system, making it more personalized and simplifying recruiting participants. Participants came from various regions in Indonesia, so interviews were conducted online and offline according to the time agreed upon between the researcher and participants. The researcher used semi-structured interviews and a literature review as triangulation methods. Data validity was obtained from this triangulation and from the competence of researchers pursuing qualitative and health research for several years.

Data Analysis and Presentation

The researcher sought the participants' consent to record the interviews, and the recordings were transcribed. The interview transcripts were coded and analyzed using a thematic analysis approach. Thematic analysis allows the researcher to look for themes from the research results and determine the relationship between these themes (Kiger and Varpio 2020). Two researchers (AA, BB) conducted researcher triangulation in which each researcher conducted open coding of the interview transcripts and then discussed the results of the open coding. Previously, the researchers conducted bracketing and reflection to minimize the influence of the researchers' perceptions on the research results to reduce research bias (Cypress 2017). All of these approaches were carried out to ensure the rigor and validity of the research. The results of the data analysis were then presented descriptively, supported by tables and interview quotes from the participants. Privacy and confidentiality of participant data were maintained throughout the coding and analysis of results. This was done through writing code and storing results in a password-protected folder, secured only to the researchers.

Results

Participant Demographic Data

Table 1 presents the characteristics of the participants. There were twenty-five participants (fifteen men and ten women) aged 27–65 years who worked in health care and handled emergency cases. The participants had various specialization

Table 1 Participants' characteristics

Participant	Age	Sex	Occupation	Region
P01	65	Male	Plastic Surgeon	Jakarta
P02	27	Female	General practitioner	Surabaya, East Java
P03	40	Male	Emergency Specialist	Malang, East Java
P04	49	Male	Urologist	Samarinda, East Kalimantan
P05	51	Female	Paediatric	Surabaya, East Java
P06	48	Female	Anaesthesiologist	Samarinda, East Kalimantan
P07	43	Male	Surgeon	Surabaya, East Java
P08	37	Male	Anaesthesiologist	Yogyakarta
P09	55	Male	General practitioner	Tangerang, West Java
P10	42	Male	Emergency Specialist	Malang, East Java
P11	49	Male	General practitioner	Tuban, East Java
P12	60	Male	Urologist	Mojokerto, East Java
P13	38	Male	General practitioner	Manado, North Sulawesi
P14	52	Female	Internist	Surabaya, East Java
P15	45	Male	Neurologist	Sidoarjo, East Java
P16	44	Male	Paediatric	Surabaya, East Java
P17	42	Male	General practitioner	Kediri, East Java
P18	43	Female	General practitioner	Jakarta
P19	40	Female	General practitioner	Surabaya, East java
P20	47	Female	Internist	Sidoarjo, East Java
P21	41	Male	Anaesthesiologist	Jakarta
P22	42	Female	Neurologist	Jakarta
P23	50	Female	Internist	Padang, West Sumatera
P24	43	Male	Orthopaedic	Surabaya, East Java
P25	44	Female	Obstetrician and gynaecologist	Manado, North Sulawesi

backgrounds and came from various regions in Indonesia with different geographical conditions, cultures, and values in life. The demographic diversity enriches research data because varied culture influences many aspects of life, including perceptions about technology in health care.

This study found four spectrums of AI integration in doctor clinical autonomy based on doctors perceptions of the role of AI in emergency healthcare services.

(1). AI as a tool or a doctor's assistance

Participants said that AI is a doctor's assistant who will help doctors work faster.

> "We think about the concept, and we are like having an assistant, so our concept will be worked on by AI, our assistant, more easily" (P03).

This finding is interesting because the concept comes from the doctor that while AI is the party that works on the doctor's concept, the results of AI's work

depend on the concept created by the doctor, and AI does not deviate from the doctor's concept. Participant P04 said something else:

> "We have to interpret all the data. I believe in my ability to interpret holistically. I think that will also happen to AI. It will be able to help improve the data, but I am the one who interprets it. I am the boss, and AI is my assistant."

Participant P04 argued that AI presents data, processes it, and doctors interpret the results of the AI's work. Participants believe in their interpretation abilities, so they do not hand over the interpretation results to AI. A similar statement was expressed by participant P08, who said that AI carries out orders while the one giving the orders is the doctor, so the person in charge remains the doctor.

(2). AI as a co-pilot

On the other hand, a participant (P10) considered AI to be a co-pilot for doctors. He said,

> "AI has a specific role in medical services, for example, converting the patient's history conducted by the doctor into the medical record. The doctor and AI have different roles, but the doctor remains the one in charge."

P24 said that AI's role as a co-pilot is as follows:

> "Treating emergency patients requires teamwork. When AI has a specific role, not just as a doctor's assistant, patient care will be completed more quickly."

From the participants' opinions, it was assessed that to speed up patient care, AI should be given tasks that can complement doctors, so AI should be given the authority to do certain things, with a specific role in medical services. AI can be a doctor's working partner that works alongside the doctor, not only carrying out the doctor's orders, but also being part of a team that has specific tasks.

(3). AI as a discussion partner for doctors and used as a second opinion

A different statement was conveyed by a participant who said that:

> "Now I read the results of the tool reading first, then I decide whether I agree or not. In the past, I determined the diagnosis first. So, the tool now has better interpretation results than before, which I can trust. I no longer think about the patient's diagnosis alone because I have a discussion partner." (P13)

P13 uses AI to help him make better diagnoses.AI can make diagnoses and can be used in medical practice, and he used AI as a second opinion.

A participant expressed her hope that AI will help her work faster than having to consult a specialist doctor, which takes longer.

> "If medical devices can immediately make a diagnosis, it will speed up our work, because if we consult a specialist, it takes longer. Yes, I hope it can help me a lot." (P19).

Participants considered AI to be a discussion partner and even a place for doctors to consult, which was faster than consulting a senior doctor or a manual reference. In this spectrum, AI is positioned as a more intellectual party than the previous two spectrums, so that it can provide additional considerations as a second opinion to doctors without replacing the doctor's role as a decision maker.

(4). AI as an enhancer of a doctor's opinion

Another statement said by P21,

> "AI helps me gain greater trust from patients. I provide explanations based on my medical knowledge, then I show the patient that AI supports the same conclusion. This is only to reinforce that my explanation is correct. I am not worried about being wrong, because AI's knowledge comes from doctors, so it supports the doctor's expertise"

This participant's opinion is interesting, as AI doesn't help speed up or streamline doctors' work, but rather helps them gain reinforcement or validation for their recommendations, allowing patients to trust them more. Participants noted that patients often seek recommendations from AI before consulting their doctor, so when AI supports a doctor's opinion, the doctor gains more trust from the patient.

These four spectrums of doctor perceptions regarding the role of AI influence whether doctor autonomy in healthcare is placed absolutely or shared with AI. Table 2 describes these four spectrums of doctor perceptions.

Despite having different perceptions regarding the role of AI in healthcare integration, participants shared the same opinion regarding the responsibility of doctors towards healthcare services.When there are any mistakes when doctor uses AI in making a diagnosis, the doctor is responsible because the doctor is a person in charge of the service. All participants stated that doctors can't be replaced by AI. The doctor is responsible for determining the patient's final diagnosis, as said by P10.

> "The doctor does not need to follow AI, especially if the doctor feels that AI has been misinterpreted. Responsibility for service remains in the hands of the doctor."

Discussion

The differences in doctors' perceptions of the role of AI in healthcare, depicted in four spectrums, bring different applications, including different ethical impacts.

Potential Degradation of Doctor Autonomy and Risk of Violation of the Principles of Beneficence and Non-maleficence

The role of AI as an assistant/tool, a co-pilot, a consultant/discussion partner, and a doctor's opinion enhancer carries ethical implications related to doctor autonomy

Table 2 The Role/Position of AI in determining medical decision in doctors' perception

Role of AI	The Description of AI's role	The responsibility in decision making
Assistant's doctor	AI helps work on the doctor's concept AI makes the doctor's work easier by order	AI works on doctor's order The doctor holds full responsibility
Co-pilot for doctor	AI has specific duties, not only by order	There is a division of roles or tasks with doctor The doctor holds primary responsibility
Consultant or discussion partner	AI gives a second opinion to make better decision for doctor	The doctor is the validator of AI's work The doctor can use the AI's interpretation or not
Reinforcement of the doctor's opinion	AI's opinion can support doctor's opinion so the doctor can build greater patient trust	AI is a supporting system for gain greater trust from patients The doctor is the primary decision-maker and source of opinion

and the principles of beneficence and non-maleficence. The different ethical analyses are illustrated in Table 3:

A feared negative impact of AI use is the doctor's dependence on it, thereby degrading their autonomy. Although the doctor remains the final decision-maker or validator, this validation can become merely a formality because they have already placed their full trust in AI. When a doctor's intellect is no longer utilized optimally for analysis, it has the potential to degrade the doctor's function (Klingbeil et al. 2024). By modifying Faden and Beauchamp's autonomy theory (Faden and Beauchamp 1986), there are at least two parameters that can be used to assess the position of a doctor's autonomy when a healthcare service is assisted by AI:

a. Doctors' understanding of their own abilities and the capabilities of AI

Doctors must understand the AI assisting them before using it, including the capabilities it can perform. If doctors perceive the AI's capabilities as superior to their own, they will tend to become increasingly dependent on it. Conversely, if doctors are aware of the AI's capabilities but also understand that they possess superior ethical judgment and empathy that AI lacks, they will remain confident in making their decisions. Doctors' self-confidence affects the independence of doctors so that they do not depend on technology including AI (Purwadianto et al. 2012).

b. Doctors' goals or hopes of using AI assistance

Doctors' hopes for using technology, including AI, are certainly to bring greater benefits to patients (beneficence) and reduce the risk of errors through more precise and effective diagnosis and therapy (nonmaleficence). If these hopes stop at AI accelerating or easing doctors' tasks in implementing these principles of beneficence and nonmaleficence, the potential for a decline in doctor autonomy is greater. Doctors will tend to maximize AI's use and even allow it to make its own decisions as long as their hopes/goals are achieved (Klingbeil et al. 2024). However, if doctors still prioritize the patient's interests (patient-centered care), which means also considering every aspect that affects the patient's condition, then the doctor will continue to play the role of validator or decision-maker, thus retaining a significant amount of autonomy.

This image illustrates these two aspects (Fig. 1):

Upon deeper reflection, when a doctor's autonomy is degraded, their dignity also suffers, as they lose their inherent function and identity as those responsible for healthcare service (Sihlahla et al. 2023; Varkey 2021). The goal of technology should be to enhance human dignity, not degrade it (Desai and Kapadia 2022).

The Focus of Services Potentially Shifts Only to Cure, Not Care

The next ethical impact is a shift in the essence of healthcare, focusing solely on achieving healing, without any consideration or humanity. Doctors' reliance on AI can potentially reduce human touch because AI interpretations are based only

Table 3 The impact of spectrum of AI position in medical service on ethical principles

Role of AI	Autonomy Doctor	Beneficence and Non-maleficence Principles
Tool or Assistant's doctor	The doctor still holds primary responsibility for determining the patient's diagnosis. Doctor has complete autonomy in making decisions	Doctor also has full authority to use AI or not, according to benefit and risk. However, in terms of time and effort efficiency, it may not be significantly different from conventional methods. The benefits of speed of service don't significantly impact patients
Co-pilot for doctor	Doctors' autonomy is reduced, but they still retain control. Their position could be threatened if AI makes mistakes that escape their oversight	Doctors and AI work simultaneously so patients receive faster service but are at risk of harm if AI makes a mistake
Consultant or discussion partner	Doctors' autonomy is further diminished if every decision requires prior consultation/discussion with AI. Moreover, if the AI's opinion is wrong, the doctor bears the consequences	Patients benefit from more precise services because decisions are discussed by doctors and AI, but it may take longer
Reinforcement of the doctor's opinion	Doctors can lose confidence when AI opinions do not support their own, resulting in a loss of autonomy as they tend to trust AI opinions more	Patients have greater confidence in their doctors' opinions because they are reinforced by AI. On the other hand, patients lose trust in their doctors because they lack independence in providing their opinions. The doctor-patient relationship can be strengthened or weakened

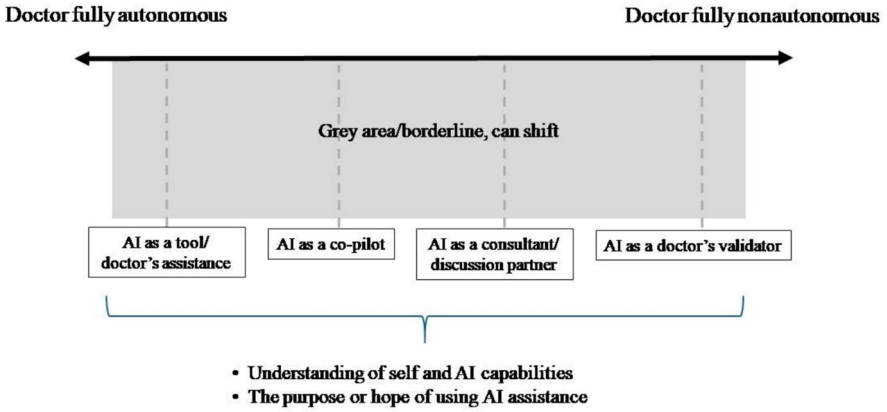

Fig. 1 Spectrum of doctor autonomy based on perceptions of the role of AI in healthcare

on data(Ayorinde et al. 2023). A doctor's responsibility must be accompanied by an understanding that patients are not simply collections of data or programs, but human beings with diverse social, economic, and cultural aspects. Patients are also not emotionless objects requiring therapy solely to achieve a cure. The doctor-patient relationship is based on trust and empathy, which means it can be expressed verbally and nonverbally. With a touch of humanity and empathy, doctors can cure patients not only physically but holistically (Campbell 2017).

Another challenge that arises is that if doctors focus solely on healing as many patients as possible, achieving high cure rates, achieving therapeutic accuracy, and reducing risk or disability, then it is perfectly appropriate for doctors to rely on AI and give it greater autonomy and a greater role in healthcare (Klingbeil et al. 2024). All of these goals are good and align with the principles of beneficence and non-maleficence in medical ethics, even aligning with the broader goals of the national healthcare system. However, the definition of beneficence requires further understanding and analysis. When beneficence is understood more deeply, personalized medicine with empathetic communication is more appropriate (Susilo 2021). A personal approach and communication with empathy and a human touch are fundamental to what patients need, not just curing. It is precisely in this context that the patient's human dignity is more respected and ethical principles are more fully realized. This is what causes AI to be unable to replace the role of doctors, because of the empathy and human touch that patients need.

Indonesia's Culture Influences Doctor-Patient and Doctor-AI Relationships, Requiring a Unique Approach

Indonesia has two major cultural groups: communal and hierarchical (Syah et al. 2022). In communal cultures in Eastern countries, such as Indonesia, human relationships are crucial, including the influence these relationships have on personal decisions

(Ningrum and Missel 2023). A stronger relationship of trust between doctor and patient leads to a stronger recovery, resulting not only in medically appropriate therapy but also in the comfort experienced by the patient through this positive relationship. Whether or not a patient accepts AI is often influenced by their trust in the doctor's recommendations. Patient decisions are also often made not individually, but by family or relatives (relational autonomy) (Claramita et al. 2013a, b). This situation influences doctors' perceptions when assigning AI a role in medical care, namely as a team member. AI can act as a doctor's assistant, co-pilot, consultant, or recommendation enhancer, but as a team, the doctor remains the leader. This is where the challenges of the shift in doctor autonomy and dependence on AI, discussed earlier, emerge.

In a communal culture, medical considerations based on the principles of beneficence and non-maleficence are not sufficient; as long as a therapy is beneficial, it can certainly be used (Wang et al. 2022). Communal-cultured countries like Indonesia, China, and Pakistan, for example, face challenges related to autonomy in decision-making and informed consent. The role of relational autonomy influences patient decisions and their perspectives on doctor recommendations (Lee et al. 2024; Lyu et al. 2024; Memon et al. 2024).

In the context of AI assistance in healthcare, considerations must be based on many aspects, such as the patient's socio-economic condition, the patient's family's opinions, the patient's trust in AI, etc. (Wubineh et al. 2023). Therefore, it is important for doctors to discuss AI first with the patient and their family. A more appropriate approach to this communal cultural context is the ethics of care (Blum and Murray 2017), which focuses more on the doctor's holistic attention, the doctor-patient relationship, and considering the patient's family's opinions. In this case, the ethics of care is best combined with classical bioethics principle (Bertens 2011), so that the concepts of beneficence and non-maleficence are tailored to the patient's fundamental needs, and cure is based on care. The principle of respect for patient autonomy is also interpreted more deeply, not simply as individual consent but because of shared decision-making between the doctor, patient, and patient's family, with AI not as a competitor to the doctor, but as part of the medical team (Ammeling et al. 2025). This picture describes the concept of the relationship between doctor-patient/patient's family, and AI in the context of communal culture (Fig. 2).

In hierarchical cultures, differences in social status play a significant role, including in doctor-patient relationships. Doctors are often viewed as having a higher hierarchical position than patients because they possess medical knowledge and skills that patients lack. This culture implies that patients place a high degree of trust, and sometimes even dependence, on doctors when making medical decisions (Claramita and Susilo 2024). Patients tend to defer to their doctors because they believe they know what's best for them. In such situations, doctors face the challenge of treating patients as partners, rather than paternalistically, but this is certainly not easy. The hierarchical mindset fostered by this culture, when doctors are assisted by AI, has several consequences, for example: (a) Doctors use AI as a tool because they feel capable of making their own decisions and feel vulnerable if patients learn that the doctor is assisted by AI. In this case, the AI does not act as a team member; it is truly a tool that operates at the doctor's command. This doctor's self-confidence is not only a manifestation of the doctor's competence but also an implication of a hierarchical

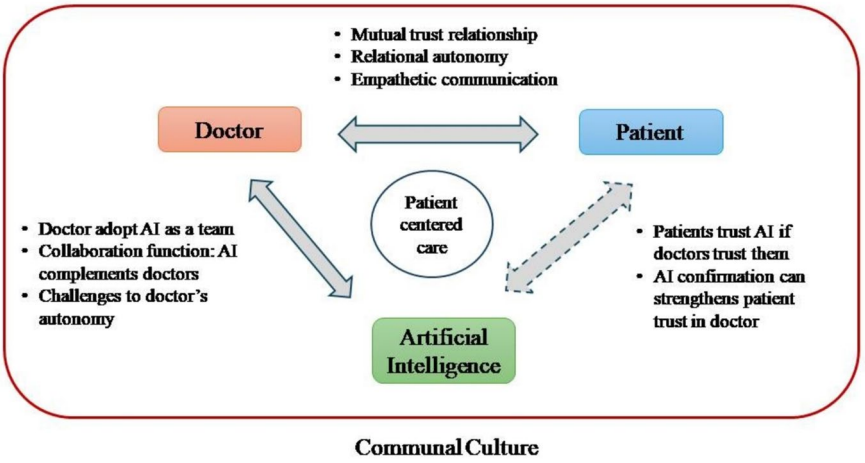

Fig. 2 The relationship between doctor-patient/patient's family, and AI in the context of communal culture

culture. (b) Doctors use AI as a validator or discussion partner to strengthen their opinions, thereby gaining greater patient trust and exerting greater influence/authority over them. As patients increasingly access information, doctors feel compelled to deepen their knowledge and use AI to validate it. Communal and hierarchical backgrounds have distinct influences on the doctor-patient relationship, positioning AI in a unique way. Patients still view doctors as possessing medical knowledge and skills, so whether AI is present or not, doctors remain responsible for the care they provide.

The Need of Knowledge about Ethics of Care and Empathetic Communication for Doctor

Because of the importance of ethics of care and empathetic communication, in responding to the use of AI in healthcare, doctors need not only be equipped with knowledge about AI, but also with the knowledge and skills training to apply ethics of care and empathetic communication in everyday healthcare services (Melenko 2021; Silverman et al. 2013). Empathetic communication is not just a discussion between doctor and patient, but also the doctor's concern to explore the patient's perception, about their hopes, concerns, next plans, from the patient's perspective. Claramita et al. modified the Calgary-Cambridge Model in the context of Indonesian and Southeast Asian culture with the GID (Greet, Invite, Discuss) Method. Empathy and connection color the entire doctor-patient relationship, there is an exploration of the patient's condition from a medical and non-medical perspective (the patient's perception), and a discussion between the doctor and patient with the starting point of the patient's perception (Claramita and Susilo 2024). All these efforts certainly involve not only the role of doctors, but also must be supported by the government through a good healthcare system and clear ethical guidelines, so that the presence of AI in healthcare will strengthen healthcare services (Astuti 2021); (Nash et al. 2023).

An AI System that Accommodates Indonesian Culture and Facilitates an Empathetic Doctor-Patient Relationship

The medical decision-making process in Indonesia involves families, therefore we propose designing an AI system that incorporates family considerations. For example, in the treatment recommendation feature, there should be space for patient, family, and psychosocial and cultural considerations, in addition to medical data (Sauerbrei et al. 2023) AI can help doctors make treatment recommendations based not only on medical indications but also on various factors influencing the patient's condition, including family factors.

The AI system should also be designed to help doctors develop their reasoning skills, even enhancing their critical thinking and empathy (Adus et al. 2023). AI analysis or responses should not provide immediate answers to doctors but rather trigger deeper analysis and help them identify data that need to be confirmed through feedback questions from the AI.

Conclusions and Recommendation

AI can provide benefits to medical services, particularly in emergency care, such as speeding up services and increasing precision, but it poses ethical challenges. Doctors' considerations in using AI should not only consider the benefits gained or minimized medical risks, but also consider whether AI's assistance will further enhance the dignity of doctors and patients or actually dehumanize humanity. Patients are analyzed not only with data, but also with the human touch and empathy of doctors. Whatever the role of AI in healthcare, doctors must remain responsible and validators. Doctors' perceptions of the role and position of AI influence the goals of AI-assisted healthcare, whether prioritizing cures or maintaining care. Especially in Indonesia's communal culture, the role of AI cannot be separated from the doctor-patient-AI relationship in empathic communication. Basic ethical principles are not enough to accommodate these ethical challenges. Therefore, doctors must be equipped with knowledge and skills, not only about technology, but also about the ethics of care and empathic communication, supported by the government which guarantees an adequate health service system. In addition, AI must be designed to adapt to local Indonesian culture so that Indonesian doctors can still interact with patients and families in an empathetic and professional manner.

Limitation of the Study

This study has a limitation because of being conducted online for some participants and therefore participants required stable internet connection and a device that they could log in with. Participants were also not differentiated how long to use AI, so they could not be analyzed based on differences in experience using AI.

Acknowledgements We would like to express our gratitude to the Ministry of Higher Education, Science, and Technology of the Republic of Indonesia, the Institute for Research and Community Service of the University of Surabaya, and all participants in this research.

Author Contribution All authors contributed to the study conception and design. Material preparation, data collection and analysis were performed by Hwian Christianto and Ervin Dyah Ayu Masita Dewi. The first draft of the manuscript was written by Hwian Christianto and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

Funding This research received funding from the Ministry of Higher Education, Science, and Technology of the Republic of Indonesia in 2025.

Data Availability Participant data is confidential and cannot be provided or disclosed. Participant data can only be disclosed if there is a compelling legal need.

Declarations

Ethics Approval and Consent to Participate This study has obtained ethical approval from the Research Ethics Committee of the University of Surabaya with Ethical Clearance Certificate Number 366/KE/V/2024 and Number 591.a/KE/VII/2025. The participants gave informed consent before the study was conducted with adequate explanation. The researcher also maintained the anonymity and confidentiality of the researcher's data during the research and until the publication of the research results.

Consent for Publication All participants agreed that the results of this study would be published in the journal.

Competing interests The authors declare no competing interests.

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