https://doi.org/10.1038/s44294-025-00113-8

Beyond no harm: Advancing research on artificial intelligence for sexual and reproductive health and rights

Tigest Tamrat, Rohit Malpani, Sara Mengistu, Anja Kovacs, Yu Zhao, Anuj Kapilashrami, Allan Maleche, Sameer Pujari, Andreas Reis & Lale Say

Artificial intelligence (AI) is increasingly being explored to enhance access to health information and services. To guide the responsible use of AI in sexual and reproductive health and rights (SRHR) and beyond, high-quality, ethical research is essential. Drawing on a comprehensive scoping review on AI in SRHR, we present illustrative examples from published literature to underscore the need for meaningful research on the use of AI to advance SRHR.

Background

Artificial intelligence (AI) is increasingly being explored to enhance access to health information and services[1]. In particular, digital tools and AI offer opportunities to overcome the stigma associated with seeking and accessing sexual and reproductive health (SRH) information and services, an area often deemed as sensitive[2–5]. At the same time, the use of AI in SRH raises concerns about the social norms and the legal context, such as restrictive laws and stigma, that shape access and delivery of SRH services--collectively referred to as sexual and reproductive health and rights (SRHR)[6].

To guide the responsible use of AI in SRHR and beyond[7], high-quality, ethical research is necessary. However, studies may be falling short on ethical conduct, which can subsequently undermine equity, quality, and access to services when these interventions are implemented in practice. Furthermore, research on the use of AI for health-related purposes requires additional scrutiny due to its evolving nature and challenges related to monitoring use after introduction; for example, there have been cases of third-party data sharing of fertility monitoring applications, which later compromised individuals' access to services[8].

Drawing on a comprehensive scoping review and technical brief on the use of AI in SRHR[6,9], we present illustrative examples from published literature to underscore the need for meaningful research on AI in SRHR to pave the way towards applied responsible use[1,10,11] These considerations were inspired by the broader literature on clinical ethics, which includes non-maleficence, beneficence, and justice[12]. While not exhaustive, these considerations aim to complement broader guidelines for AI research that emphasize scientific rigor[13–15], by highlighting additional dimensions that warrant attention.

Considerations for advancing ethical research in AI and SRHR

Consideration 1-- Do no harm. While "do no harm" is a foundational principle[10], research on the use of AI in health, and particularly on SRHR, requires looking beyond immediate outputs and reflecting on the potential long-term impact on individuals. For example, one study used deep learning to detect sexual orientation from facial images[16], which could endanger individuals, particularly in settings where same-sex relations may be criminalized. While the study openly acknowledges that the findings threaten individuals' privacy and safety, this was not deemed sufficient to prevent the study from being conducted[16]. Other examples include studies that aim to detect gender-based violence, intended to inform response and service provision, using survivors' speech patterns and physiological conditions extracted from biomedical sensors[17,18]. In one of these studies, the authors evaluated the performance of the fear recognition system, which they propose to embed into a wearable device linked to responders or law enforcement agencies[17]. However, these tools and systems may not be geared to respect sensitivity and cultural contexts in which survivors of violence experience such fears and acts, where careful attention is needed on disclosing results, not only for judgment, but also for mitigation measures and risks to future violence. Other examples include studies that utilize machine learning algorithms to predict unintended pregnancy or the likelihood of pregnancy termination to inform future policy[19–21]. While the use of AI to classify pregnancy status may be argued for programmatic monitoring, it must balance the risks of stigmatization and intensifying surveillance at the individual level on abortions. Furthermore, biases in data or design may deepen existing inequalities or provide spurious findings that have the potential for harm.

Consideration 2--Beneficence and social value. In addition to preventing harm, researchers have the burden of proof on demonstrating the added value of the AI systems and tools and the potential for outcomes that can benefit society. As such, there is a need to examine if the proposed AI interventions advance equitable access to health services in light of resource use. However, access to the plethora of data sources and the novelty of AI methods have attracted the temptation for data-driven AI research in areas that may not offer social value. For example, one study employed artificial neural networks to predict the level of "death anxiety" among people living with HIV[22]. The study was framed to assess linkages with social support and distress tolerance, but also raises questions on the necessity of such research. Another example includes using AI-assisted ultrasounds to predict differences in fetal brain functions between sexes[23] or to assess the duration and frequency of fetal yawns[24], where the societal benefits are

questionable, particularly in light of broader maternal health issues that could benefit from these technological advances.

Consideration 3 – Data governance. Research on AI and SRHR raises additional considerations for the acquisition and management of data[25], particularly considering recent backlash on commercial data use from fertility monitoring applications[26]. In one study, researchers conducted a manual review of patients' electronic health records and applied natural language processing (NLP) algorithm to identify transgender populations by a combined search of key terms and billing codes[27]. Researchers' rationale was to provide targeted care; however, the data mining from electronic medical records, particularly for issues related to marginalized populations, may exceed the consent participants may have originally provided for re-use of such data. Other examples include the use of an AI chatbot to ease the burden of disclosing sexual violence and allay survivors' possible fears of judgment in disclosing to a human[28]. While these interventions aim to protect women, critical reflection is needed early in the design process on the ethics and data governance, including the repercussions of third-party data sharing. Moreover, existing consent processes may be inadequate for AI-based research and implementation, particularly in contexts where individuals face barriers, such as limited access to information, lower literacy levels, or concerns about surveillance. This also raises critical questions about the extent to which participants genuinely understand how their data will be used and the associated risks, particularly in cases involving potential secondary or commercial uses of data. As such, data protection regulations and redress mechanisms should be reviewed to consider limitations on the use, repurposing, and sharing of health data, including those generated outside traditional medical settings[6].

Conclusion

Research on AI in SRHR, and health more broadly, is opening opportunities to harness AI to improve access to information and quality of service provision. At the same time, these studies exemplify the imperative for robust ethical standards, particularly since research is intended to guide real-world implementations that carry consequences for individuals and their well-being. Moreover, these published studies reflect only a fraction of ongoing practices, demonstrating the need for broader transparency, identification of ethical issues, and the establishment of effective data governance and recourse mechanisms. While the use of AI in health offers immense opportunities to expand access to information and enhance service quality, the rapid pace of technological advancement, rise in commercial interests, and increasing experimentation on data highlight the need for stronger safeguards and accountability measures. These measures are essential not only to uphold ethical standards in research contexts but also for the implementation of AI systems and tools that minimize harms and can lead to positive impact.

Data availability

No datasets were generated or analysed during the current study.

Tigest Tamrat[1] ✉, Rohit Malpani[2], Sara Mengistu[1], Anja Kovacs[3], Yu Zhao[4], Anuj Kapilashrami[5], Allan Maleche[6], Sameer Pujari[4], Andreas Reis[2] & Lale Say[1]

[1]UNDP/UNFPA/UNICEF/WHO/World Bank Special Programme of Research, Development and Research Training in Human Reproduction (HRP), Department of Sexual, Reproductive, Maternal, Child, Adolescent Health and Ageing, World Health Organization, Geneva, Switzerland. [2]Science for Health, World Health Organization, Geneva, Switzerland. [3]Consultant: Research & advice on feminism, technology & the digital society, Port Luis, Mauritius. [4]Department of Data, Digital Health, Analytics and AI, World Health Organization, Geneva, Switzerland. [5]School of Health and Social Care, University of Essex, Essex, United Kingdom. [6]Kenya Legal and Ethical Issues Network on HIV and AIDS (KELIN), Nairobi, Kenya.
✉e-mail: tamratt@who.int

Received: 25 June 2025; Accepted: 10 November 2025;
Published online: 24 November 2025

References

1. World Health Organization. Ethics and governance of artificial intelligence for health: WHO guidance. World Health Organization. https://www.who.int/publications/i/item/9789240029200 (2021).
2. Khosla, R., Mishra, V. & Singh, S. Sexual and reproductive health and rights and bodily autonomy in a digital world. *Sex Reprod. Health Matters* **31**, 2269003 (2023).
3. Pujari, S. et al. Artificial intelligence for global health: cautious optimism with safeguards. *Bull. World Health Organ.* **101**, 364–364a (2023).
4. Nadarzynski, T. et al. Barriers and facilitators to engagement with artificial intelligence (AI)-based chatbots for sexual and reproductive health advice: a qualitative analysis. *Sex Health* **18**, 385–393 (2021).
5. Wasson, E. J., Driver, K., Hughes, M. & Bailey, J. Sexual reproductive health chatbots: should we be so quick to throw artificial intelligence out with the bathwater?. *BMJ Sex Reprod. Health* **47**, 73 (2021).
6. World Health Organization. The role of artificial intelligence in sexual and reproductive health and rights: technical brief. World Health Organization https://www.who.int/publications/i/item/9789240090705 (2024).
7. Sinha, C. An emergent research landscape. *Strengthening health systems through responsible AI*, (2025).
8. Bureau of Consumer Protection. FTC finalizes order with Flo Health, a fertility-tracking app that shared sensitive health data with Facebook, Google, and others. Federal Trade Commission https://www.ftc.gov/news-events/news/press-releases/2021/06/ftc-finalizes-order-flo-health-fertility-tracking-app-shared-sensitive-health-data-facebook-google (2021).
9. Tamrat, T. et al. Exploring the use and implications of AI in sexual and reproductive health and rights: protocol for a scoping review. *JMIR Res. Protoc.* **13**, e53888 (2024).
10. World Medical Association. World Medical Association Declaration of Helsinki: ethical principles for medical research on human beings. *JAMA* **310**, 2191–2194 (2013).
11. Abujaber, A. A. & Nashwan, A. J. Ethical framework for artificial intelligence in healthcare research: a path to integrity. *World J Methodol.* **14**, 94071 (2024).
12. Varkey, B. Principles of clinical ethics and their application to practice. *Med. Princ. Pract.* **30**, 17–28 (2021).
13. Liu, X. et al. Reporting guidelines for clinical trial reports for interventions involving artificial intelligence: the CONSORT-AI extension. *Nat. Med.* **26**, 1364–1374 (2020).
14. Resnik, D. B. & Hosseini, M. The ethics of using artificial intelligence in scientific research: new guidance needed for a new tool. *AI Ethics* **5**, 1499–1521 (2025).
15. Cruz Rivera, S. et al. Guidelines for clinical trial protocols for interventions involving artificial intelligence: the SPIRIT-AI extension. *Nat. Med.* **26**, 1351–1363 (2020).
16. Wang, Y. & Kosinski, M. Deep neural networks are more accurate than humans at detecting sexual orientation from facial images. *J. Pers. Soc. Psychol.* **114**, 246–257 (2018).
17. Miranda, J. A. et al. Fear recognition for women using a reduced set of physiological signals. *Sensors* **21**, 1587 (2021).
18. Reyner-Fuentes, E., Rituerto-González, E., Trancoso, I. & Peláez-Moreno, C. Prediction of the Gender-based Violence Victim Condition using Speech: What do Machine Learning Models rely on? In *Proc. 24th Interspeech Conference* 1768–1772 (International Speech Communication Association, 2023).
19. Ebrahimzadeh, F., Hajizadeh, E., Vahabi, N., Almasian, M. & Bakhteyar, K. Prediction of unwanted pregnancies using logistic regression, probit regression and discriminant analysis. *Med. J. Islam Repub. Iran* **29**, 264 (2015).
20. Tesfa, G. A. et al. Employing machine learning models to predict pregnancy termination among adolescent and young women aged 15-24 years in East Africa. *Sci. Rep.* **14**, 30047 (2024).
21. Rahman, R., Talukder, A., Das, S., Saha, J. & Sarma, H. Understanding and predicting pregnancy termination in Bangladesh: A comprehensive analysis using a hybrid machine learning approach. *Medicine* **103**, e38709 (2024).
22. Asadi, F. & Bakhtiarpour, S. Artificial neural network-based prediction of death anxiety in hiv-positive cases through social support and distress tolerance. *Jundishapur J. Chronic Dis. Care* **11**, e131002 (2022).
23. Wheelock, M. D. et al. Sex differences in functional connectivity during fetal brain development. *Dev. Cogn. Neurosci.* **36**, 100632 (2019).
24. Menin, D., Costabile, A., Tenuta, F., Oster, H. & Dondi, M. Identifying fetal yawns based on temporal dynamics of mouth openings: A preterm neonate model using support vector machines (SVMs). *PLoS ONE* **14**, e0226921 (2019).
25. Ng, M. Y., Kapur, S., Blizinsky, K. D. & Hernandez-Boussard, T. The AI life cycle: a holistic approach to creating ethical AI for health decisions. *Nat. Med.* **28**, 2247–2249 (2022).

26. Punzi, M. C. & Thuis, T. Mapping ethical concerns in algorithm-driven period and fertility tracking technologies. Contraception, in press; https://doi.org/10.1016/j.contraception.2025.110837 (2025).
27. Ehrenfeld, J. M., Gottlieb, K. G., Beach, L. B., Monahan, S. E. & Fabbri, D. Development of a natural language processing algorithm to identify and evaluate transgender patients in electronic health record systems. *Ethn Dis* **29**, 441–450 (2019).
28. Park, H. & Lee, J. Can a Conversational Agent Lower Sexual Violence Victims' Burden of Self-Disclosure? In *Extended Abstracts of the 2020 CHI Conference on Human Factors in Computing Systems* 1–8 (Association for Computing Machinery, 2020).

Acknowledgements
This work received funding from the UNDP/UNFPA/UNICEF/WHO/World Bank Special Programme of Research, Development and Research Training in Human Reproduction (HRP), a cosponsored programme executed by the World Health Organization (WHO).

Author contributions
T.T., S.M., L.S. jointly conceived the idea for this Commentary. TT led the initial drafting. R.M., A.F., S.M., A.K., A.J., A.M., L.S., Y.Z. contributed to writing and critical revision of the manuscript. All authors approved the final version.

Competing interests
The authors declare no competing interests.

Additional information
Correspondence and requests for materials should be addressed to Tigest Tamrat.