

01. Title: Artificial Intelligence Ethical Awareness and Academic Integrity Among Medical Students at the University of Khartoum: A Cross-Sectional Study 2025

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Background: Artificial intelligence (AI) integration in medical education offers significant opportunities but introduces critical ethical risks regarding data privacy and academic integrity. In conflict-affected settings like Sudan, infrastructural disruptions often lead students to rely on informal learning pathways rather than structured institutional training. There is currently limited evidence regarding the ethical readiness of medical students in such high-pressure environments. This study aimed to evaluate AI ethical awareness and academic integrity among University of Khartoum medical students and to identify demographic and behavioral predictors of awareness.

Methods: An institutional cross-sectional study was conducted in 2025 at the Faculty of Medicine, University of Khartoum, involving active students in Years 3–6. A sample of 349 was achieved using convenience sampling with quota targeting. Ethical awareness was measured using the validated 32-item AI-EAAI scale ($\alpha = 0.94$). Data analysis included non-parametric tests and multiple linear regression ($P < .05$). Ethical approval was obtained (COMMED 2025-96-32).

Results: Participants ($N=349$) had a mean age of 22.85 years and were predominantly female (69.3%). The median (IQR) total AI-EAAI score was 4.16 (3.80–4.52), indicating high overall awareness. Domain analysis showed the highest awareness in "Privacy and Data Protection" (median 4.67) and the lowest in "Transparency" and "Fairness" (both median 3.80). Females scored significantly higher than males ($P = .013$), with no significant differences across academic years ($P = .474$). Regression analysis ($R^2 = 0.112$, $P < .001$) identified female gender ($\beta = .151$, $P = .006$), younger age ($B = -0.090$, $P = .008$), informal AI exposure ($B = 0.110$, $P = .004$), and usage of ChatGPT ($B = 0.301$, $P = .036$) or Gemini ($B = 0.177$, $P = .005$) as significant positive predictors of awareness.

Conclusion: Medical students show high ethical sensitivity, particularly in privacy and accountability, yet gaps remain in transparency and fairness. Awareness is primarily driven by informal, self-directed learning rather than formal curricula. These findings underscore the urgent need to integrate AI ethics into formal medical education to ensure comprehensive ethical competence among future physicians.

Key Words: Artificial Intelligence; Education, Medical; Students, Medical; Ethics.

Figure or Table:

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Figure 1. Heat map visualizing the distribution of median AI ethical awareness scores across six academic batches and six ethical domains. The intensity of the green color represents higher awareness levels, highlighting "Privacy and Data Protection" as a consistent strength and "Transparency" and "Fairness" as areas for targeted educational intervention.

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