

Exploring the Role of AI Tools in Enhancing Productivity among Public Health Professionals

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Abstract:

Background: In recent years, Artificial Intelligence (AI) has emerged as a transformative force across various sectors, including public health. With growing demands, limited resources, and increasing data complexity, public health professionals often face challenges in timely decision-making and efficient service delivery. Integrating AI tools into routine practices offers a promising solution to enhance productivity, improve accuracy, and streamline workflows.

Method: This article adopts a qualitative and analytical approach to explore the impact of AI tools on the productivity of public health professionals. It examines the role of machine learning algorithms, natural language processing, decision-support systems, and predictive analytics in public health settings. The study also analyzes existing literature, reports, and real-world applications to assess the scope and limitations of AI adoption in the field.

Result: Findings indicate that AI tools significantly improve efficiency in data management, patient diagnosis, epidemic tracking, and administrative operations. Automation of repetitive tasks reduces manual burden, enabling professionals to focus on critical interventions. However, ethical considerations, data privacy concerns, and limited technical training among health professionals present notable barriers to full-scale implementation.

Conclusion: AI has the potential to revolutionize public health productivity when effectively integrated into the healthcare infrastructure. A collaborative approach involving technical experts, healthcare workers, and policymakers is essential to harness the full benefits of AI while mitigating associated risks. As AI continues to evolve, its responsible and strategic use can redefine the future of public health.

Keywords: Artificial Intelligence, Public Health, Productivity, AI Tools, Healthcare Innovation, Machine Learning

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Introduction:

In an increasingly data-driven world, public health systems require advanced technological solutions to manage evolving challenges such as pandemics, chronic disease burdens, and strained resources. Artificial Intelligence (AI) is ready to transform how public health professionals work—by automating routine tasks, enabling predictive modeling, and facilitating data-informed decisions. McMillan-Wilhoit (2025) has documented how public

health staff already informally use AI tools like ChatGPT to write reports, draft policies, and streamline administration, even in the absence of formal support.¹

Case studies also highlight AI's capacity to convert complex data into actionable care strategies. For example, Saldana (2024) described a predictive model using socio-epidemiological data to forecast HIV incidence with approximately 80% accuracy, enabling targeted public health interventions.² Likewise, Olawade et al. (2023) reviewed AI applications in disease surveillance and outbreak prediction, showing notable gains in real-time response and resource

planning.³

AI tools are also accelerating clinical and public health decision making. Bangash et al. (2024) found that technologies such as chatbots, predictive models, and imaging algorithms improve diagnostic accuracy, engage patients remotely, and reduce workforce burden.⁴ Similarly, Alenezi et al. (2024) reported that nurses who received training in AI and technology integration experienced significant improvements in productivity and workflow efficiency.⁵

However, adoption barriers remain significant. Research by Kasaye et al. (2025) in resource-limited settings reveals that professionals often report lack of infrastructure, digital literacy, and privacy training as major obstacles.⁶ Concerns about ethical governance, AI bias, and transparency are underscored by critical analyses such as Vitale & Shipton (2024) and Jungwirth & Haluza (2023).⁷ ⁸ Additionally, in developing nations, Zuhair et al. (2023) emphasize that high costs, connectivity issues, and workforce training gaps limit AI implementation despite its potential.⁹

With growing reliance on AI, this article examines how AI tools enhance productivity in public health—highlighting applications, benefits, and challenges, while offering practical recommendations for responsible adoption.

Material and Methods:

This quantitative, cross-sectional study explored the role of artificial intelligence (AI) in enhancing productivity among public health professionals. The questionnaire was newly developed for this study, reviewed by academic supervisors to ensure face and

content validity, and pilot-tested on 15 public health trainees to assess clarity, comprehensibility, and reliability before deployment. It was distributed electronically through institutional and professional networks.

The target population included public health professionals, policymakers, AI developers, engineers, NGO researchers, and healthcare trainees. Inclusion criteria required basic digital literacy and an active role or interest in public health. Participation was voluntary, with informed consent obtained. Ethical approval was granted by the relevant academic committee. The minimum required sample size was calculated using the formula $n = Z^2 \cdot p(1-p)/d^2$ with $Z = 1.96$, $p = 0.5$, and $d = 0.08$, yielding approximately 150 participants, which was achieved.

The questionnaire comprised two sections: one assessing knowledge of AI in public health, and the other evaluating attitudes toward its adoption. Operational definitions: (i) *Role of AI* – perceived usefulness of AI tools in improving efficiency, decision-making, and resource management; (ii) *Knowledge* – awareness of AI principles, applications, limitations, ethics, and technologies; (iii) *Attitude* – perceptions, willingness, and openness toward AI adoption. Items were rated on a 5-point Likert scale from “Strongly disagree” to “Strongly agree.”

A total of 150 valid responses were collected and automatically recorded in an Excel sheet. Data were cleaned, coded, and analyzed using descriptive statistics (frequencies and percentages). While data collection is ongoing, this preliminary dataset provides early insights into awareness and attitudes toward AI among public health stakeholders.

Result and Analysis

Table 1. Health professionals' knowledge toward artificial intelligence (AI) utilization in public health, 2025 (N=150)					
Variables	Strongly disagree N (%)	Disagree N (%)	Neutral N (%)	Agree N (%)	Strongly agree N (%)
I am familiar with the basic concepts and principles of AI in healthcare.	21 (14.0%)	33 (22.0%)	32 (21.3%)	42 (28.0%)	28 (18.7%)
I understand the potential applications of AI in improving patient care and outcomes.	20 (13.3%)	15 (10.0%)	21 (14.0%)	57 (38.0%)	39 (26.0%)
I am aware of the limitations and challenges associated with implementing AI in healthcare settings.	15 (10.0%)	27 (18.0%)	12 (8.0%)	45 (30.0%)	51 (34.0%)
I am knowledgeable about the ethical considerations and privacy concerns related to the use of AI in healthcare.	21 (14.0%)	15 (10.0%)	24 (16.0%)	63 (42.0%)	27 (18.0%)
I am familiar with the different types of AI technologies used in healthcare, such as machine learning and natural language processing.	12 (8.0%)	24 (16.0%)	30 (20.0%)	57 (38.0%)	27 (18.0%)

Table 1 presents the responses related to participants’ knowledge about AI, including familiarity with its concepts, applications, limitations, ethical considerations, and technological aspects. Overall, responses indicated a moderate to high level of awareness. Nearly half of the respondents (46%) stated familiarity with basic AI principles, while 70% agreed that AI has the potential to improve patient outcomes. Regarding limitations and challenges, 64% acknowledged awareness, suggesting a developing understanding of AI’s practical constraints. Ethical and privacy concerns were recognized by 60% of participants, although 24% admitted to lacking knowledge in this area. Furthermore, 56% reported familiarity with specific AI technologies like machine learning and natural language processing, though 24% disagreed and 20% remained neutral—indicating room for further education.

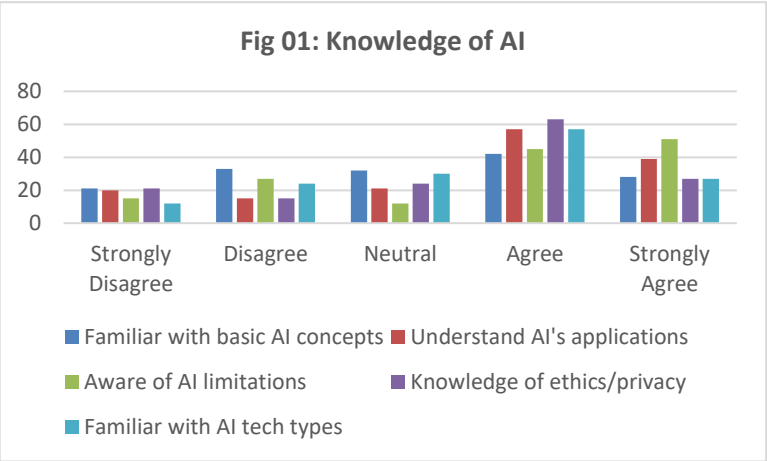
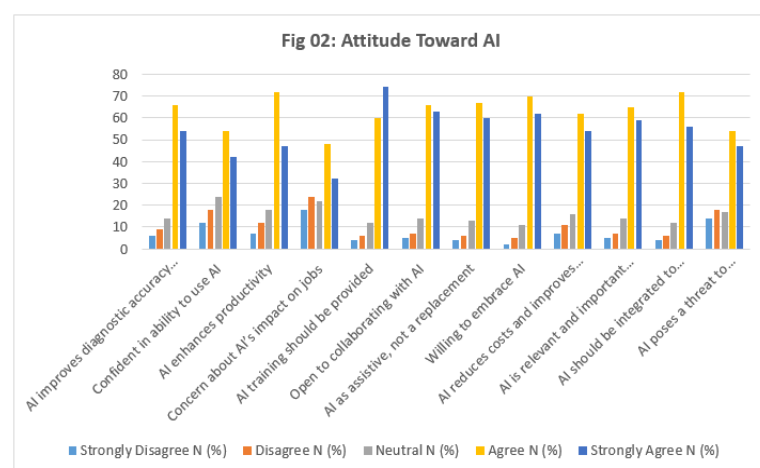


Table 2 explores participants’ attitudes toward AI integration in healthcare systems. A strong majority (80%) agreed that AI could improve diagnostic accuracy and patient outcomes, while 79.2% believed it would enhance healthcare efficiency and productivity. Confidence in adapting to AI tools was expressed by 64%, although 20% felt unsure. Notably, 89.6% emphasized the need for formal AI training, highlighting a consensus on educational preparedness.

Variables	Strongly disagree N (%)	Disagree N (%)	Neutral N (%)	Agree N (%)	Strongly agree N (%)
I believe that AI has the potential to significantly improve diagnostic accuracy and patient outcomes in healthcare.	6 (4.0%)	9 (6%)	14 (9.3%)	66 (44.0%)	54 (36.0%)
I am confident in my ability to adapt to and effectively use AI technologies in my clinical practice.	12 (8.0%)	18 (12.0%)	24 (16.0%)	54 (36.0%)	42 (28.0%)
I feel AI can enhance the efficiency and productivity of healthcare delivery.	7 (4.7%)	12 (8.0%)	18 (12.0%)	72 (48.0%)	47 (31.3%)
I am concerned about the potential impact of AI on the job market for healthcare professionals.	18 (12.0%)	24 (16.0%)	22 (14.7%)	48 (32.0%)	32 (21.3%)
I believe that proper training and education on AI should be provided to healthcare professionals.	4 (2.7%)	6 (4.0%)	12 (8.0%)	60 (40.0%)	74 (49.3%)
I am open to collaborating with AI systems and algorithms to make clinical decisions.	5 (3.3%)	7 (4.7%)	14 (9.3%)	66 (44.0%)	63 (42.0%)
I perceive AI as a tool that can assist healthcare professionals rather than replace them.	4 (2.7%)	6 (4.0%)	13 (8.7%)	67 (44.7%)	60 (40.0%)
I am willing to embrace and adapt to changes brought about by AI in healthcare.	2 (1.3%)	5 (3.3%)	11 (7.3%)	70 (46.7%)	62 (41.3%)
I believe that AI can contribute to reducing healthcare costs and improving resource allocation.	7 (4.7%)	11 (7.3%)	16 (10.7%)	62 (41.3%)	54 (36.0%)
I perceive AI as a relevant and important area of knowledge for my healthcare profession.	5 (3.3%)	7 (4.7%)	14 (9.3%)	65 (43.3%)	59 (39.3%)
I feel that AI should be integrated into the healthcare system to enhance patient care.	4 (2.7%)	6 (4.0%)	12 (8.0%)	72 (48.0%)	56 (37.3%)
I believe AI poses a threat to the health professionals' assistance function.	14 (9.3%)	18 (12.0%)	17 (11.3%)	54 (36.0%)	47 (31.3%)

Additionally, 86.4% welcomed collaboration with AI systems in clinical decisions, and 88.8% saw AI as an assistive rather than a replacement tool. Willingness to adopt AI-driven changes was also high (90%), and 81.6% believed in its potential to reduce healthcare costs. Despite these positive perceptions, 57.6% voiced concern about AI's possible impact on the healthcare job market. These findings reflect a strong openness to AI, tempered by caution about workforce implications.

These findings reflect strong optimism and readiness among healthcare stakeholders to embrace AI in public health, while also pointing to the need for structured training, ethical oversight, and workforce planning to



address emerging challenges.

Discussion:

While the study aimed to explore the role of AI in enhancing productivity, the data collection primarily focused on knowledge and attitudes rather than direct

measurement of AI's practical impact in healthcare public health. He argues that while AI can streamline settings. This creates a partial misalignment between data analysis, early warning systems, and disease objectives and outcomes. However, since knowledge surveillance, its effectiveness depends heavily on and attitude strongly influence adoption and effective ethical deployment. Our results similarly reveal that utilization, these measures provide an indirect but although 60% of participants acknowledged ethical meaningful reflection of AI's potential role. Future concerns, nearly a quarter lacked adequate knowledge studies should incorporate behavioral or practice-based in this area—pointing to a critical area for intervention¹¹. variables to directly assess the impact of AI on In terms of clinical application, Jeyaraj and Narayanan healthcare productivity. (2023) and Al Kuwaiti et al. (2023) provide evidence of

The findings of this study indicate that public health AI's benefits in diagnostics, patient monitoring, and professionals hold generally positive attitudes and administrative functions. These studies suggest that AI moderate knowledge regarding the use of artificial enhances operational efficiency and reduces errors, intelligence (AI) tools in enhancing productivity. which supports our finding that over 80% of While most participants were familiar with basic AI respondents believe AI improves productivity and principles and acknowledged its potential benefits— diagnostic accuracy^{12 13}. Yet both studies also highlight such as increased efficiency, improved diagnostic the absence of large-scale evaluations and standardized accuracy, and better decision-making—significant frameworks, a limitation that our participants indirectly gaps persist, particularly in ethical awareness and echoed through their mixed confidence levels in AI hands-on experience. usage.

These results align with the broader literature on AI's Gender and role-based differences in AI adoption, as transformative potential in healthcare. For instance, AI noted in our analysis of Table 2, were consistent with Naqbi et al. (2024) highlight how generative AI tools, patterns observed by Alowais et al. (2023). Their particularly large language models and chatbots, systematic review found that engagement with AI tools significantly improve productivity in knowledge- is often higher among professionals in analytical or intensive sectors, including healthcare. These tools not clinical decision-making roles, such as researchers and only reduce manual workload but also enhance the clinicians, compared to administrative staff. This quality of outputs through automation, content reinforces the need for role-specific AI training modules generation, and real-time support. However, they also that cater to the diverse skill sets within the healthcare caution against ethical pitfalls such as AI bias and system¹⁴.

over-reliance on automation, echoing the concerns From a workforce perspective, Hazarika (2020) raised by several participants in our study¹⁰. discusses how AI helps reduce stress by automating

The ethical dimension is further emphasized by repetitive tasks, allowing healthcare workers to refocus Krisberg (2024), who underscores the need for on patient-centered care. Our study supports this transparency and governance in AI adoption within finding, with 81.6% of participants believing AI reduces

workload and enhances resource efficiency. However, seen as a supportive tool that strengthens human Hazarika also warns of challenges such as professional expertise and enables more effective, data-driven public liability, loss of human connection, and the need for health systems.

ethical guardrails—all of which align with the caution expressed by respondents regarding AI's impact on healthcare jobs and interpersonal aspects of care¹⁵.

Lastly, although this study presents early insights based on a limited sample (n=150), it contributes to a growing body of evidence supporting the responsible integration of AI in public health. However, as Al Kuwaiti et al. (2023) and Alowais et al. (2023) suggest, large-scale, context-specific evaluations are essential to validate these findings and measure long-term impact^{13 14}.

In summary, while AI offers promising opportunities to enhance productivity and decision-making in public health, its successful integration depends on several key factors: comprehensive training, robust ethical frameworks, transparent policies, and contextual implementation strategies. Addressing these issues will be essential for building trust and maximizing the potential of AI in improving health outcomes and workforce efficiency.

Conclusion

Artificial Intelligence (AI) is reshaping public health by improving data management, decision-making, and workflow efficiency. This study shows that public health professionals increasingly recognize AI's role in enhancing productivity, despite varying levels of familiarity. While tools like machine learning and data analytics offer clear benefits, challenges such as limited training and ethical concerns remain. Addressing these gaps through education and infrastructure is essential. Ultimately, AI should be

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