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"A descriptive study to assess the knowledge level healthcare providers regarding the role of artificial intelligence in patient care in selected primary health care centres at Kanpur, UP."

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ABSTRACT

Artificial Intelligence (AI) is transforming healthcare by improving diagnostic accuracy, streamlining patient care, and enhancing clinical decision-making. However, the knowledge level of healthcare providers regarding AI's role in patient care remains underexplored, particularly in primary healthcare settings.

This descriptive study aims to assess the knowledge level of healthcare providers in selected primary health centres in Kanpur regarding AI in patient care. A structured questionnaire was used to collect data from 100 healthcare providers. Descriptive and inferential statistical analysis was conducted. Findings indicate that 60% of healthcare providers possess moderate knowledge, 25% have a high level of understanding, and 15% have minimal awareness of AI applications in healthcare. A significant association was observed between AI knowledge levels and factors such as professional experience ($\chi^2 = 11.32$, $p < 0.05$) and access to AI-related training programs ($\chi^2 = 13.76$, $p < 0.05$).

The study highlights the need for targeted AI training programs for healthcare providers in rural settings to enhance AI integration in patient care.

Keywords: Artificial Intelligence, Patient Care, Healthcare Providers, Knowledge Assessment, Primary Health Centres

INTRODUCTION

The integration of AI in healthcare has gained momentum worldwide, offering opportunities to improve diagnosis, treatment planning, and patient management. AIdriven tools assist healthcare providers by predicting diseases, enhancing medical

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imaging analysis, and streamlining administrative tasks. However, the successful implementation of AI requires healthcare providers to have adequate knowledge and training. In rural healthcare settings, a gap exists in AI awareness, leading to potential underutilization of available AI-driven technologies.

This study seeks to assess the knowledge level of healthcare providers regarding AI applications in patient care at selected primary health centres in Kanpur. The findings will contribute to designing effective training programs to enhance AI literacy among healthcare professionals.

NEED FOR THE STUDY

Artificial Intelligence (AI) is revolutionizing healthcare globally, offering advancements in diagnostics, treatment planning, and operational efficiencies. In India, the AI healthcare market is projected to achieve a remarkable Compound Annual Growth Rate (CAGR) of 40.6%, reaching $1.6 billion by 2025. As of August 2024, over 80% of pharmaceutical and life sciences companies in India have adopted AI, reflecting a significant shift towards technological integration in healthcare.

Despite this rapid adoption, challenges persist, particularly in rural healthcare settings. A study conducted at a tertiary care teaching hospital in South Gujarat revealed that while 87.2% of doctors expressed interest in learning about AI applications in healthcare, only a fraction had applied AI in their practice, indicating a gap between interest and practical implementation. Additionally, a study assessing healthcare professionals' perspectives on AI in Pakistan highlighted the need to understand local concerns, expectations, and experiences regarding AI adoption, underscoring the importance of contextual studies in different regions.

In rural areas like Kanpur, Uttar Pradesh, the integration of AI into patient care faces unique challenges, including limited resources, inadequate infrastructure, and a scarcity of trained personnel. Assessing the current knowledge levels of healthcare providers in these settings is crucial to identify educational gaps and develop targeted training programs. This approach ensures that AI tools are effectively utilized to enhance patient outcomes, reduce healthcare disparities, and improve overall service delivery in underserved regions.

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By focusing on the knowledge level of healthcare providers regarding AI in patient care within selected primary health centres in Kanpur, this study aims to bridge the gap between technological advancements and practical application. The findings will inform policymakers and educators in designing interventions that promote AI literacy, ultimately leading to a more efficient and equitable healthcare system in rural India.

STATEMENT OF THE PROBLEM

A Descriptive Study to Assess the Knowledge Level of Healthcare Providers Regarding the Role of Artificial Intelligence in Patient Care in Selected Primary Health Centres at Kanpur, UP.

OBJECTIVES

1. To determine the socio-demographic distribution of healthcare providers in selected primary health centres.
2. To assess the knowledge level of healthcare providers regarding AI applications in patient care.
3. To analyse the association between knowledge levels and factors such as professional experience, training, and access to AI resources.

HYPOTHESIS

H1: There is a significant association between the knowledge level of healthcare providers and socioeconomic factors such as professional experience, training, and access to AI resources.

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METHODS AND MATERIALS

Research Approach:

In this study, the research approach used isdescriptive research approach **Research Design:**

This study used descriptive research design as the research design.

VARIABLES

- **Dependent Variable:**

  The dependent variable used in this study was Knowledge level of healthcare providers regarding AI in patient care.

- **Independent Variables:**

  The present study used Professional experience, AI training exposure, sociodemographic factors as independent variables.

POPULATION

Target Population:

In this study, the target population comprises of healthcare providers (doctors, nurses, and medical officers) in selected primary health centres in Kanpur

SAMPLE SIZE:

Sample size for the present study were100 healthcare providers from selected primary health care centres of Kanpur.

SAMPLING TECHNIQUE:

In this study Convenient sampling was used as the sampling technique.

SAMPLING CRITERIA Inclusion criteria

- Healthcare providers working in selected primary health centres in Kanpur

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- Providers willing to participate in the study and give informed consent
- Those who have at least six months of clinical experience

Exclusion criteria

- Healthcare providers with no patient care responsibilities
- Providers unwilling to participate

METHODS OF DATA COLLECTION

Data were collected using a structured questionnaire consisting of two sections:

1. Socio-Demographic Data: Age, gender, professional role, years of experience, and prior AI training.
2. AI Knowledge Assessment: 20-item questionnaire assessing awareness, understanding, and perceived usefulness of AI in patient care.

RESULTS AND FINDINGS

Section A:

Findings related to Socio-Demographic Distribution

- 50% of participants were aged 30-50 years.
- 65% were male, 35% were female.
- 60% had over five years of professional experience.

Section B:

Findings related to the Knowledge Level of AI in Patient Care.

Knowledge Level	Frequency (n)	Percentage (%)
Low	15	15%
Moderate	60	60%
High	25	25%

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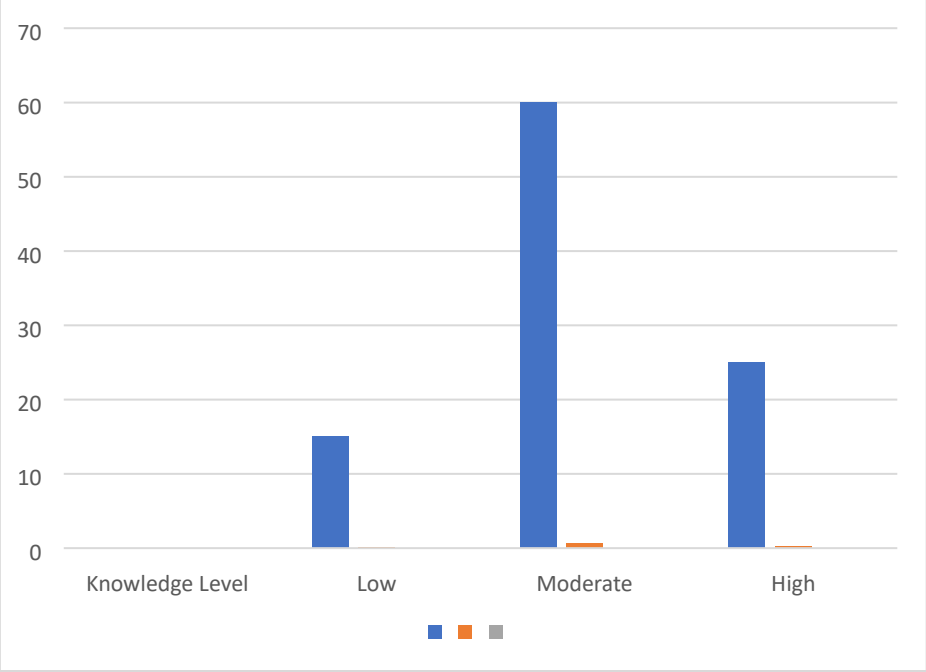
Findings related to the Knowledge Level of AI in Patient Care.



The study findings indicate that the majority of healthcare providers (60%) possess a moderate level of knowledge regarding AI in patient care, suggesting a basic understanding but a need for further training and exposure. A smaller proportion (25%) demonstrated a high level of AI knowledge, indicating that some professionals are well-versed in AI applications and their potential benefits in healthcare. However, 15% of the respondents exhibited a low knowledge level, highlighting a critical gap that could hinder the effective implementation of AI-driven healthcare solutions. These results emphasize the need for structured AI training programs and awareness initiatives to enhance AI literacy among healthcare providers, ensuring its optimal integration into rural healthcare settings.

Section C:

Findings related to Association Between AI Knowledge and demographic factors

Variable	Chi-Square Value (χ^2)	p-value	Significance

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Professional Experience	11.32	< 0.05	Significant
AI Training Exposure	13.76	< 0.05	Significant
Age	5.89	> 0.05	Not Significant

The study found that professional experience and access to AI training significantly influence knowledge levels, while age showed no significant association.

NURSING IMPLICATIONS

Nursing Practice:

The integration of AI in healthcare presents a transformative opportunity for nursing practice, enabling more efficient patient monitoring, predictive analytics, and personalized care planning. Nurses play a crucial role in implementing AI-driven technologies such as electronic health records (EHRs), clinical decision support systems, and AI-assisted diagnostics. However, without adequate knowledge and training, nurses may struggle to utilize these advancements effectively. Therefore, regular AI competency training should be integrated into nursing practice to enhance their ability to interpret AI-generated insights and apply them in clinical decisionmaking. Additionally, nurses should be encouraged to develop digital literacy skills to work seamlessly with AI-powered tools, ultimately improving patient safety and healthcare outcomes.

Nursing Education:

To bridge the knowledge gap, nursing education programs must incorporate AIrelated coursework to familiarize students with emerging technologies in patient care. AI-based simulations, virtual reality training, and digital health platforms should be integrated into nursing curricula to provide hands-on experience with AIdriven

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healthcare solutions. Continuous professional development programs should be implemented to keep practicing nurses updated on the latest AI advancements. Workshops, certification programs, and interdisciplinary collaborations with technology experts can help nurses build confidence in AI applications, enabling them to leverage its full potential in clinical settings.

Nursing Administration:

Healthcare administrators must prioritize AI integration within nursing workflows by providing the necessary infrastructure, training, and policies to support AI-based healthcare initiatives. Administrators should ensure that nurses have access to AI tools such as automated documentation systems, patient monitoring applications, and predictive analytics to improve efficiency and reduce workload. Additionally, healthcare facilities should develop guidelines and ethical frameworks for AI utilization, addressing concerns related to data privacy, patient confidentiality, and the reliability of AI-driven recommendations. Nursing leadership should also foster a culture of continuous learning and innovation, encouraging nurses to actively participate in AI research and implementation projects.

Nursing Research:

Further research is needed to evaluate the effectiveness of AI in improving patient outcomes, optimizing nursing workflows, and enhancing clinical decision-making. Studies should explore the barriers and facilitators of AI adoption among nurses, identifying strategies to increase acceptance and utilization. Research can also focus on the long-term impact of AI-driven interventions on patient satisfaction, healthcare accessibility, and nursing efficiency, particularly in rural healthcare settings. Evidence-based insights gained from nursing research will be instrumental in shaping policies and best practices for AI integration in healthcare.

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LIMITATIONS

- The study was limited to selected primary health centres in Kanpur, reducing generalizability.
- Self-reported data may introduce response bias.
- The study did not assess AI implementation challenges in detail.

RECOMMENDATIONS

1. Introduce AI training programs in rural healthcare centres.
2. Promote awareness campaigns about AI applications in patient care.
3. Conduct longitudinal studies to evaluate AI's impact on healthcare outcomes.
4. Integrate AI education into medical and nursing curricula.

CONCLUSION

The study highlighted that, while most healthcare providers have a moderate understanding of AI in patient care, professional experience and AI-related training significantly influence knowledge levels. To bridge the knowledge gap, healthcare institutions must implement structured AI training programs, ensuring that healthcare providers in rural areas can effectively integrate AI technologies to improve patient outcomes.

By enhancing AI literacy among healthcare professionals, rural healthcare settings can leverage AI-driven innovations to provide better patient care and bridge healthcare disparities.

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