PERCEPTIONS OF GASTROENTEROLOGISTS AND ENDOSCOPISTS ON ARTIFICIAL INTELLIGENCE: A QUALITATIVE STUDY

Jibran Umar Ayub Khan[1], Tanweer Khan[1], Sidra Mahmood[1], Adnan Inayat[1], Syed Abdul Ahad Ali Shah[1], Azhar Zahir Shah[2]

ABSTRACT

Background: Artificial intelligence (AI) is transforming various medical fields, including gastroenterology, by enhancing diagnostic precision and procedural efficiency. Despite its potential, the integration of AI into clinical practice faces several challenges. Little attention has been given to artificial intelligence in gastroenterology though it is a speciality with a lot of innovative diagnostic and therapeutic procedures.

Objective: To explore the perceptions of gastroenterologists and endoscopists on artificial intelligence

Methodology: This study was conducted in main teaching hospitals of Peshawar and interviews were taken from 8 consultant gastroenterologists well versed in their fields Qualitative study design with interpretative phenomenology analysis (IPA) as methodology was used. Well informed consent was taken from the participants. Participants were explained the purpose of the study. Semi-structured interviews were conducted in offices of the consultants and did last approximately 30 min each. Answers will be recorded by note taking or audio taping. Interview was taken until a theoretical saturation was achieved and that there were no new concepts emerging from additional interviews.

Results: While there was a growing interest in AI, its practical implementation in clinical settings was limited. Over reliance on artificial intelligence will lead to reduction in critical thinking and brain storming abilities of trainees. AI was viewed as having both positive and negative impacts on medical training. Positive aspects include improved diagnostic accuracy, enhanced procedural efficiency, and streamlined research capabilities. Key challenges to AI implementation included financial constraints and a lack of awareness. The high cost of AI software and hardware, coupled with limited budgets, posed significant barriers to adoption.

Conclusion: In conclusion, while there is a growing interest in AI among gastroenterologists, significant challenges remain in terms of implementation and adoption. Addressing these challenges will require a multi-faceted approach, including financial investments, targeted training programs, and a supportive regulatory environment.

Keywords: Gastroenterology, Endoscopists, Perceptions

INTRODUCTION

Artificial intelligence is the ability of computers to execute functions which are normally performed by humans as they require learning, critical thinking and problem solving.

[1] MMC General Hospital Kabir Medical College Peshawar
[2] Sardar Begum Dental College Peshawar

Address for Correspondence
Dr. Sidra Mahmood
Department of Medicine, MMC General Hospital Kabir Medical College, Peshawar, Pakistan
sidra687@gmail.com

There are many studies in the past that have successfully explained the impact of artificial intelligence in various clinical disciplines and gastroenterology is not an exception. [1]There is massive advancement in AI mainly due to drastic development of computer systems poised to meet the modern day needs and allowing deep learning. [2]It has moulded the public opinion and there is a greater self belief in AI as the most complicated tasks or queries can be tackled with ultimate ease.[3]

There are many regulatory approved AI systems available in most of the developed countries for detection of colonic polyp, grading the different stages of carcinomas, identification of dysplasia in Barrett's oesophagus, guiding the best treatment protocols, automated interpretation of difficult images, assessing the severity of inflammation in diseases such as ulcerative colitis. [4]There has been a greater

emphasis on non endoscopic artificial intelligence tools for diagnosis of the disease and its timely treatment .[5]

Despite the growing body of evidence supporting AI applications in gastroenterology, its adoption in clinical settings remains suboptimal. The lack of standardized guidelines, financial constraints, and insufficient training contribute to this slow integration. There are quite complex procedures ranging from simple dilatation of oesophageal strictures to bands ligation of varices.[6]Artificial intelligence has been found to be very instrumental in evaluation of hepatic fibrosis , differentiating between compensated and decompensate liver cirrhosis , diagnosing hepatic masses and even the preoperative evaluation as well as assessment of hepatocellular cancer patient.[2]Evidence is there about the prosperous application of artificial intelligence to endoscopy .At present most of the randomized controlled trials and other benchmark human studies do strongly advocate the use of artificial intelligence in endoscopy and thereby prompting the gastroenterologists to apply it to their clinical practice .[7] But despite the availability of artificial intelligence, its adoption in the clinical practice has not been very vigorous and is still under scrutiny by the experts. [8]

METHODOLOGY

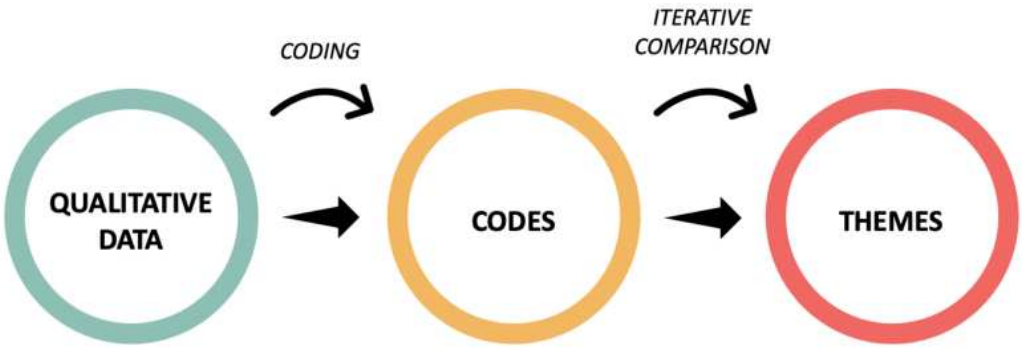
The study was conducted over a six-month period from ST July to December 2024. The sample size (8 participants) was determined based on thematic saturation, where no new concepts emerged from additional interviews.

The sample size of eight participants was determined based on thematic saturation, meaning that interviews continued until no new concepts emerged. This ensures that the study captured a comprehensive range of perspectives without unnecessary redundancy.

After approval from ethical research committee of MMC General Hospital Peshawar, the study was started. Well informed consent was taken from the participants. Qualitative study design with Interpretative Phenomenology Analysis (IPA) used as a methodology and Engagement theory with I+E=O model as conceptual framework. The participants who were appropriate as target group (gastroenterologists both male and female) were selected via survey .6-8 participants were recruited or till the data saturates. Participants were selected via purposive sampling and included gastroenterologists working in tertiary care hospitals in Peshawar. Informed consent was obtained before interviews, and the study was approved by the ethical research committee. Data collection continued until theoretical saturation was achieved, meaning no new themes emerged from additional interview. The inclusion criteria were gastroenterologists working in different tertiary care hospitals of Peshawar .Those that were not consenting to participate were excluded from the study. Participants were explained the purpose of the study. Semi-structured interviews were conducted in the offices of the consultants lasting approximately 30 min each. Answers were recorded by note taking or audio taping. Interview was taken until a theoretical saturation was achieved and no new concepts emerged from additional interviews. The data analysis was done according to the six steps approach of thematic analysis:

1- Familiarizing with the data
2- Initially generating codes
3- Searching for themes
4- Reviewing the themes
5- Defining the themes
6- Write up

Thematic analysis was done by coding and examining the data to identify the broad themes and patterns.



RESULTS

Participants generally perceived artificial intelligence (AI) as a computer-based system capable of performing tasks traditionally requiring human intelligence. This understanding was particularly evident in the context of medical image analysis, with specific examples cited, such as AI-powered tools for polyp detection and classification during colonoscopy. Despite a growing interest in AI, its practical application in clinical settings remained limited. Most participants had been introduced to AI concepts through workshops and training sessions rather than direct clinical use.

AI was viewed as having both positive and negative impacts on medical training. Positive aspects include improved diagnostic accuracy, enhanced procedural efficiency, and streamlined research capabilities. On the positive side, AI-powered tools were recognized for their potential to enhance learning by helping trainees identify lesions and refine their endoscopic skills. They were also seen as efficient, capable of streamlining the training process by automating routine tasks and providing immediate feedback. However, concerns were raised about overreliance on AI, with fears that it might lead to a decline in critical thinking and problem-solving abilities. Participants also highlighted the risk of dependency on AI algorithms, which could impede the development of independent clinical judgment.

Key challenges to AI implementation included financial constraints and a lack of awareness. The high cost of AI software and hardware, coupled with limited budgets, posed significant barriers to adoption. Furthermore, many healthcare professionals lacked a comprehensive understanding of AI's potential benefits and limitations, underscoring the need for targeted educational initiatives to address this knowledge gap.

Participants emphasized the importance of workshops and training programs to enhance awareness and build the skills required for effective AI use. Additionally, AI was recognized as a powerful tool for streamlining research processes, such as literature review and data analysis. By automating repetitive tasks, AI could enable researchers to focus on more creative and innovative aspects of their work.

Table A: Thematic Analysis of Gastroenterologists And Endoscopists Perceptions

Themes	Subtheme	SUPPORTING QUOTE
Comprehension of Artificial Intelligence	Concept Definition	A computer based innovation that gives you logical answers to any queries with adequate explanation
Applications of AI	Utility	The application of artificial intelligence has been widely used in endoscopy and colonoscopy for detection of polyp
Positive Training Impact	Implications	It can aid in training the residents in endoscopy and help in recognition of lesions
Negative Training Impact	Cons/Demerits	Over reliance on artificial intelligence will lead to reduction in critical thinking and brain storming abilities of trainees
Implementation Hinderences	Financial Hurdles	Lack of funds and logistic support are obstacles for smooth application of artificial intelligence Lack of awareness of faculty is a worry
Promotion Efforts	Workshops	The faculty development workshop will help in smooth sailing of this endeavour
Research Applications	Streamlining Research	Artificial intelligence can serve as a bench mark for trainees to explore their areas of interest

DISCUSSIONS

There has been lack of clear guidelines considered as main obstacles to its implementation. This has called for brain storming by experts in the National Health Service in the United Kingdom for avoiding a two tier system and catastrophe of already

available resources. There are priorities for British Society of Gastroenterology Task force to identify the research priorities and formulate guidelines for adoption of AI in clinical practice.[9]

Liver transplantation has been the crus of attention of all the gastroenterologists across the world as it's a life saving treatment for end stage liver disease. [10]The management of liver transplant patient is very complex due to difficult diagnosis, laboratory findings, imaging studies and developing an appropriate treatment plan. [11]The clinical decision making in such patients can be greatly helped by data driven approach via artificial intelligence .[12]Some of the examples are deciding the fitness of candidates for liver transplant on the basis of useful data and improving the liver transplant outcomes. [13]

In addition the use of artificial intelligence in qualitative research as major resource, methodological and analysis tool has been highly valuable .It can enable the researcher to process the large amount of data, extracting meaningful insights and automate repetitive tasks. It has also accelerated the pace of scientific discovery and improves net the quality of research to a colossal extent. Still the use of artificial intelligence in research hasn't been widely encouraged. In our context it helpful detection and classification of polyps, malignancies diagnosing Helicobacter pylori infection, gastric inflammation , inflammatory bowel disease, gastric cancer, oesophageal carcinoma , and pancreatic and liver lesions.[14]

We as gastroenterologists are greatly impressed by recently published literature and application of guidelines in our local context.15 The use of artificial intelligence in this innovative speciality in which there are so many interventions has been explored, although there is no scarcity of expertise. Unleashing the potential of this in Pakistan will require a pragmatic and collaborative approach but most importantly the stakeholders need to be convinced as there are conflicting results. 16Before application of any innovative technology like artificial intelligence, the perceptions of experts in the field need to be explored .There have been surveys In United Kingdom on the perceptions of gastroenterologists which identified some of the perceived benefits, challenges and barriers to its application in clinical practice. But our clinical practice is entirely different and rather more challenging and therefore the perceptions of gastroenterologists and endoscopists need to be explored for establishing a task force which can identify the priorities and given best suggestions about adoption of artificial intelligence in our health care. 17 Despite growing global advancements in AI applications for gastroenterology, there remains a significant gap in Pakistan-specific research on this subject. The lack of local studies underscores the urgent need for context-specific guidelines to facilitate AI integration in clinical practice. Developing tailored frameworks would help address region-specific challenges such as resource limitations, regulatory constraints, and variations in disease prevalence.

Moreover, this study has certain limitations. The small sample size and restriction to tertiary care hospitals in Peshawar limit the generalizability of findings to other healthcare settings. Additionally, the absence of an AI training intervention prevents a direct evaluation of how structured education influences perceptions of AI adoption. Future research should explore larger, multi-centre studies incorporating AI training programs to gain deeper insights.

While the study highlights the benefits and challenges of AI adoption, alternative perspectives should be considered. Some experts argue that AI could complement, rather than replace, clinical decision-making, enhancing rather than diminishing human expertise. Furthermore, concerns regarding overreliance on AI could be countered by emphasizing the role of AI as an assistive tool rather than a replacement for critical thinking. Addressing these counterarguments would provide a more nuanced understanding of AI's potential in gastroenterology.

CONCLUSION

In conclusion, although there is increasing interest in AI among gastroenterologists, substantial challenges persist in its implementation and widespread adoption. [18]Overcoming these obstacles will necessitate a comprehensive strategy, encompassing financial investment, specialized training initiatives, and a conducive regulatory framework.[14]

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