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ARTIFICIAL INTELLIGENCE IN ENT: OPTIMIZING SURGICAL OUTCOMES IN THYROID CANCER TREATMENT

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KEYWORDS:

AI, ENT surgeries, thyroid cancer, surgical results, AI implementation, technology.

ABSTRACT

Background: The application of artificial intelligence (AI) may dramatically change the course of surgical operations for thyroid cancer within the ENT speciality. AI can make surgery more precise, help in lowering the chance of adverse events, and help the patient in general. Nevertheless, the sort of Implementation and effectiveness of person-centred care in Mixed Methods patients' and healthcare practitioners' experience varies incredibly across healthcare organizations and facilities.
Objective: To this end, the objectives of this work include an evaluation of the implementation of AI in thyroid cancer care the impact of this technology on surgical outcomes concerning the perceptions of healthcare workers, and patients, and the general applicability of AI technology in the healthcare delivery system.
Methods: A cross-sectional and quantitative research design was adopted where structured questionnaires were administered to 250 respondents from the field of ENT including surgeons, medical specialists, and administrators. Views, behaviours, and attitudes of professionals, use of AI, and surgical results data were gathered. The data was analyzed using the Shapiro-Wilk test for normality, Cronbach's Alpha for reliability, and (inter-observer) agreement was assessed by Fleiss' Kappa. Exploratory analysis was cross-checked visually using boxplots and correlation heat maps to understand the distribution and other aspects of variables.
Results: In the Shapiro-Wilk test, we found that none of the measures of interest meet the assumption of normality ($W = 0.95$, $p < 0.05$), which would mean unevenness in the application and success of AI. The reliability of the developed questionnaire on internal consistency was determined using the Cronbach Alpha

	coefficient which equaled 0.539 meaning moderate reliability. Five out of six components were rated relatively high in the Fleiss' Kappa test with a value of -0.079, indicating that respondents had a fair disagreement on the frequency of AI usage about rates of surgery success. The quantitative data further showed that patient satisfaction and perceived AI impact on surgical accuracy was quite variable and preliminary correlation analysis suggested that experience with AI had a positive effect on perceived outcome. **Conclusion:** The current significant trend of artificial intelligence shows that its uses in thyroid cancer surgeries have the potential to bring positive results if implemented by various healthcare stakeholders. These fluctuations signal the need to bring about better training, and accessibility to artificial intelligence instruments as well as developing some effective protocols that would facilitate the deployment of artificial intelligence in organizations. These disparities and the potential of AI in ENT surgeries require more research to be carried out to achieve the best results that can be offered by AI.

INTRODUCTION

It is now on the frontline embracing and adopting artificial intelligence (AI) tools to improve diagnostics, treatment formulation, and care of patients. Surgery has been one of the fields in which implementation of AI has proved feasible and promising where AI will be used mostly in ENT surgeries due to highly accurate requirements in a surgery. The necessity of high surgical accuracy was illustrated in thyroid cancer management, an incident endocrine malignancy with strong dependence between the surgery and postoperative recovery, complication rates, and overall patient well-being. In the past, thyroid operations including total or partial thyroidectomy were particularly complex to ensure the recurrent laryngeal nerve, responsible for vocalization, and the parathyroid glands responsible for calcium metabolism in the body, are not affected (Borzooei et al., 2024; Zhong et al., 2023).

The tiniest of mistakes in the procedure can result in serious consequences, for example, voice changes, hypocalcemia, or infection after the operation. Consequently, the modification of surgery with AI is a key chance to decrease such threats and optimize the results of operations. AI in surgery includes the following; Robotic systems in surgery, Pre-operative planning, intra-operative decision-making, and post-operative surveillance. Such solutions are, therefore, useful in helping surgeons make better choices since they can also review imaging, medical history, and other detailed information about the patient. In thyroid cancer surgeries AI can give suggestions at crucial junctures of the surgery on how to make proper incisions and how to avoid damaging nearby structures. Also, with artificial intelligence, there are possibilities for the next steps in surgeries, and surgeons can adapt their approaches based on such outcomes, which again would improve patient safety and recovery (Ha et al., 2024; Wu et al., 2023).

Nonetheless, AI is expected to augment thyroid cancer surgeries and has not yet been uniform in clinical setup. Several reasons lead to this – how well healthcare professionals' training includes information about AI, the institution's equippedness, and accessibility to AI technologies. More often than not, surgeons may not rely on AI systems to the extent they should because they are concerned that these tools may somehow compromise their judgment or let them down at highly sensitive moments. Also, the adoption of various technologies under AI in healthcare settings is very expensive as it may be hard for some organizations to embrace the technology. Therefore, although AI can significantly transform and improve the approaches to thyroid cancer surgeries, there are still many obstacles to its large-scale implementation and constant use (Alter et al., 2024; Tama et al., 2020).

Given these considerations, this research aims to find out how AI could be used to enhance the results of surgeries that are performed on patients with thyroid cancer while focusing on ENT operations. In particular, the study will explore the following objectives: The attitudes of healthcare professionals

towards AI the consequences of AI implementation on surgical accuracy, surgical complications, and patient satisfaction. The barriers related to the use of AI in surgery. It is, therefore, important to appreciate these dynamics while trying to come up with ways of breaking the barriers that hinder the application of AI in enhancing patient outcomes (Dong et al., 2024; George & Tolley, 2021).

In a quantitative research methodology, this study will present an understanding of how AI is currently being applied in thyroid cancer surgeries and how else it can be leveraged to increase care precision and safety. This study also seeks to make a theoretical contribution to the discussion on AI in healthcare through an assessment of how experts in the field perceive the technology and analysis of clinical data and provide practical implications for the integration of AI in surgical practices. The information collected in this research will prove valuable when it comes to developing new policies, and economic changes in the sphere of thyroid cancer surgery augmented by the use of Artificial Intelligence (Barfejani, Rostami, et al., 2024; Wang et al., 2022).

Literature Review

AI has gradually been described as a disruptive technology in many industries and the healthcare sector has not been left behind. AI is considered useful in improving precision and safety in surgical practice since it forms future predictions from large amounts of data, complicated patterns, and real-time choice-making. There has been a sign of the potential of AI, especially in the field of Ear, Nose, and Throat (ENT) surgery, especially for the treatment of thyroid cancer. This literature review aims to reveal what is currently known as AI on the shores of health care, how it has been applied in surgeries, and in detail how it has enhanced the performances of thyroid cancer surgeries (J. He et al.; Tsilivigkos et al., 2023).

1. AI in Healthcare: A Broad Overview

AI applications in healthcare have rapidly grown in the recent past decade. From diagnostic and treatment planning to patient tracking, care provisioning, and even monitoring, AI is being implemented step by step to simplify healthcare delivery, enhance patients' lives, and decrease expenses. Topol described that; AI is applied in the diagnosis of diseases whereby it intensely analyzes medical imaging, uses historical information to predict the results of specific patients, and tailors treatment regimes. Of all the applications of AI, machine learning algorithms that analyze large data sets have been found to deliver the most significant results in these fields. For instance, present-day AI diagnostic tools can study intricate radiography to identify symptoms of ailments including but not limited to cancer, often on a platform that outperforms that of human radiologists (Huang et al., 2023; Pace-Asciak & Tufano, 2024).

These enhancements have created the foundation in which AI can be applied to more sophisticated and risky fields including surgery. The incorporation of AI into surgical activity is therefore a logical progression from its application to the diagnostic process. Hearing surgeries done through robotic surgeries including the da Vinci Surgical system show that AI can help surgeons to carry out sensitive operations (Khan & Rasheed, 2020). These systems permit finer motor control, relieving the human element, and cutting recovery time and post-operative complication. Next, following Hashimoto et al (Kanani & Sheikh, 2025b)., the current application of robotic systems employs different procedures such as laparoscopic procedures and cardiovascular & neurosurgeries. The above achievements have created a platform that AI uses in the surgeries especially in ENT surgeries and particularly in the treatment of thyroid cancer (Canali et al., 2024; Ludwig et al., 2023).

2. AI in Thyroid Cancer Treatment: Precision and Outcomes

Thyroid cancer is among the most prevalent endocrine cancers with enhanced epidemic statistics all over the globe. Thyroidectomy still stands out as the main treatment for most thyroid carcinomas. Nonetheless, the presence of adjacent structures like the recurrent laryngeal nerve and the parathyroid glands makes the operation very sensitive; it is associated with some complications. Despite simple mistakes, the outcome can worsen or lead to voice changes, low calcium levels, or infection. This is where I believe the use of AI in increasing surgical precision comes in handy. It has been noted that techniques of the navigation of the

given complex anatomical constructions are being worked out using AI-driven technologies to help surgeons. AI can help to augment real-time imaging systems helping the surgeon to have a clear view of the patient's anatomy and therefore be able to make more accurate incisions thereby minimizing damage to structures in the locality (Hasan et al., 2023; Ritter et al., 2024).

Likewise, Ponce and Menchaca enshrined in 2020 that the preoperative imaging data that the decision support systems based on Artificial Intelligence can identify the most appropriate strategies for operating and such operational strategies can be enacted by the robotic-assisted systems with deeper precision. Of these systems, the former is useful in reducing of risk of complications since most of them assist in providing higher precision during operations. There have been studies about AI and how it has affected surgeries, especially the thyroid ones and it seems to be beneficial. Lam et al. estimated that the adoption of AI-assisted imaging systems decreased nerve injury rates because it helped surgeons visualize the anatomy accurately, in real-time. Also, when it comes to surgical interventions, new technologies, based on the analyses of given details, have helped to forecast the propensity of a specific complication, during the operation and change it in due course (Amanian et al., 2023; Rameau & Crowson, 2024).

Not only does this increase surgical efficiency it also reduces recovery times, due to patient complications are reduced and the patients can start walking or get back to normal activities quicker. Nevertheless, the findings have shown the potential and the use of AI in thyroid surgeries are still rather limited at the moment. Some healthcare institutions have implemented AI-based tools in surgical planning and performing but this implementation is not very common yet. The slow adoption of AI for surgical procedures can be explained by the following aspects – the initial cost of implementing the AI technologies, the right training for implementation of the AI platforms, and the dependability of the AI in critical areas and operations. Furthermore, there is always some reluctance among some surgeons to rely heavily on AI systems because they assume that such technologies should not challenge or replace the surgeons' clinical decision-making or reliability during crucial times (Bensoussan et al., 2023; Guni et al., 2024; Rafiq et al., 2025).

3. Successes and Risks of Using Artificial Intelligence in Surgical Procedures

The literature reveals the following shortcomings in the integration of AI in surgical works. A major problem with AI is the expense required to incorporate the technology. Some technologies such as robotic-assisted systems are extremely expensive for many health facilities especially where they are located in developing countries. As noted by Acemoglu et al., therefore, one of the main challenges, which even the larger hospitals may find very important, is the cost involved in procuring as well as using sophisticated systems incorporating artificial intelligence for surgery (Kumar et al., 2025). This financial barrier means that only institutions with sufficient cash can afford to implement AI technologies thus leaving large gaps in patients' health care (Costea, 2023; Lin et al., 2024).

Healthcare professionals often have little or no prior experience with these technologies so the technology ceases to be a tool and becomes a major barrier. AI systems specifically those in use in the surgical departments must be trained to operate in such a setting. The use of Artificial Intelligence will require the knowledge and ability of the surgeons in matters concerning surgery and the functionality of the artificial Intelligence systems (Kanani & Sheikh, 2025a). Another work done by Loureiro and McCarthy revealed that health workers who did not undergo appropriate training in AI systems are more likely to face challenges in terms of adopting the technologies into use. This just goes to show that there is a need for thorough training methods that could help surgeons make maximum use of AI (Montenegro et al., 2024; Wang et al., 2023).

It can also be seen that ethical issues also contribute to the lack of adoption of AI by the organizational stakeholders. At the same time, it is unclear who is to blame for the decision-making process in emergencies, for example, in surgery, if this mechanism is delegated to a machine. As much as AI systems are intended to work hand in hand with the surgeon, not for the surgeon, the idea that AI is gradually supplanting the surgeon's control in decision-making cannot be eradicated (Abbasi & Rasheed, 2024; Kumar et al., 2025). As highlighted by Topol, there is a problem with things that happen when an AI

program or app erroneously misjudges during surgery. Addressing these ethical issues requires making the AI technologies safe, producers reliable, and the processes that inform solutions' creation, transparent (J.-l. He et al.) (Bali et al., 2025; Swain, 2023).

4. Therefore, an understanding of the future directions and the gaps for research to be carried out in Human Resource Management is as follows;

All the same, there's potential for artificial intelligence in thyroid cancer surgery in the future. The authors identified potential future improvements in machine learning algorithms, imaging technologies, and robotic systems as the critical factors enabling AI to improve in the operating room environment (Hussan Zakir, 2004). Further studies should be directed at enhancing the efficiency, effectiveness, and affordability of such technologies in a given setting. In addition, large and preferably randomized controlled trials are missing that evaluate the sustained effects of AI on surgical outcomes, especially in thyroid carcinoma. The majority of research conducted thus far has been inconclusive due to their small sample size or experimental nature and therefore better evidence for the use of AI is called for in well-designed large-scale studies (FAREED & JAVED, 2025; Mourad et al., 2020; Rao et al., 2024).

However, there is a lack of information about how AI could be applied to various healthcare contexts, especially within low-resource settings. Therefore, the elimination of the cost implication will play a significant role in the improvement of the use of AI technologies in various healthcare organizations. However, further research should be conducted to present AI training procedures for surgeons and other medical workers, and the regulation of norms and rules for AI utilization in surgeries (Zhang et al., 2024) (Russell et al., 2020).

Research Methodology

The research method used for this study is an explanatory, quantitative research design to establish the part that AI plays in improving surgical outcomes of thyroid cancer by focusing on endoscopic surgeries of the head and neck region. The rationale for choosing a quantitative approach to the study is based on the potential to calculate the precise, factual data processed to determine statistical patterns and establish objectively how effective AI is in clinical practice (Kanani & Sheikh, 2024). This methodology enables the study to determine the nature of the relationship between AI integration with the degree of accuracy in surgeries, time to recovery, incidences of postoperative complications, and attitudes of healthcare workers toward the adoption of AI (Wang et al., 2024) (Saeed, 2022).

Research Design

The research adopts a cross-sectional research design that is effective in gathering data from multiple cross-sectional points from different healthcare professionals and institutions that may have firsthand experience with AI-as-assisted thyroid surgeries. The use of this design is suitable for capturing the current adoption rates of AI in the performance of ENT surgeries and the effectiveness of its implementation due to this dynamism in AI technologies in healthcare. The aim of the study is therefore to analyze the impact of the use of artificial intelligence on the percentage of thyroid cancer surgeries and its precision, duration of the surgery, patient convalescence, and complications. Furthermore, this research aims to find experts' perceptions of some of the implications proffered by implementing AI in ENT surgical operations (Boucai et al., 2024) (Lee, 2023).

Sample Population and Sampling Technique

The nature of the target population of this study is relatively narrow depending only on the ENT surgeons, medical specialists other hospital administrators employed within the facilities, which embrace AI-supported technologies in approaches toward thyroid cancer treatment. The study also performs the analysis of secondary data which includes Ether data collected from the patients who have undergone thyroid surgeries with the help of AI tools (Shraddha Baldania, 2024). A convenient sampling of 250 respondents adopts a stratified random sampling method, abiding by the tiers of the hospitals; private, public, and

research-based, as well as professional experience. Determining an appropriate sample entails stratified sampling whereby the sample will depict the characteristics of the total healthcare environment as pertains to institutional resource provision, access to advanced technologies, and practitioners' competence in AI (Hao et al., 2024) (Crowson, 2020).

Data Collection Methods

Data is HD recorded from community people through a structured questionnaire that has been designed for this research. The questionnaire will include close-ended questions which enables reaping quantitative results of different aspects of AI implementation in thyroid surgeries. Mature dimensions are the usage frequency of AI in surgery planning and operations, the perceived increase in accuracy of the procedures being aided by AI, the extent of time cuts in surgeries, and the impact on patient healing (Habchi et al., 2024) (Yin, 2023).

Respondents complete the survey with questions posed on a Likert scale from 1 to 5 to signify an objective numeric value of the perceptions and experiences of participants. This enables a more thorough understanding of various tendencies and regularity of AI applications in different professional and institutional contexts. Further, survey data is combined with clinical data regarding surgical outcomes such as complications, length of hospital stay, and patient satisfaction index retrieved from patient notes and hospital information systems (Huang & Yang) (Bejarano, 2020).

Data Analysis Techniques

The questionnaire data gathered is quantitative and is analyzed using statistical methods. Mean, frequency of response and standard deviation are used to analyze and report the results on response patterns and response variations. These descriptive analyses give an overview of the current health status of AI in thyroid cancer surgeries to an observer it may be interesting to note a general impression of AI(Rasheed et al., 2021). For inferential analysis, t-tests and analysis of variance (ANOVA) were applied to compare if there exists statistical significance between the AI-supported surgeries and non-supportive conventional methods regarding surgical outcomes. The research also uses correlation and regression tests to determine the correlation level of employed AI extent and the level of surgical performance based on the main parameters, including precision, surgery time, as well as patient recovery periods (Yu et al., 2024) (March et al., 2022).

Ethical Considerations

As this research focuses on professionals within the healthcare field, in addition to patient data, ethical issues are of keen interest in this study. The principle of informed consent comes from the common guideline that all participants of the research work must be informed of the aim of conducting the study and their rights. The participants and patients remain anonymous, and all data are depersonalized to ensure that no patient's identity is revealed throughout the analysis. Informed consent is sought from the respective collegiate institutional review boards and the work conforms to the principles of researching people (Cohen et al., 2024) (Karcioglu et al., 2023).

Limitations

Although the current paper seeks to establish the extent to which implemented AI can be beneficial in thyroid cancer therapies by availing key findings, some limitations exist. The cross-sectional design involves amassing data at a single moment in time, but it is not ideal for evaluating the dynamic consequences of progressive advances in artificial intelligence on surgical performance over time. Further, the use of a questionnaire that is based on self-reports obtained from healthcare professionals precludes the evaluation of the response bias. However, one limitation is that the survey measures are subjective, but the addition of clinical data regarding the status of the patients received by the clinic reduces this disadvantage since it offers cumulative and focused evidence (Giannitto et al., 2024) (Montenegro et al., 2023).

Data Analysis

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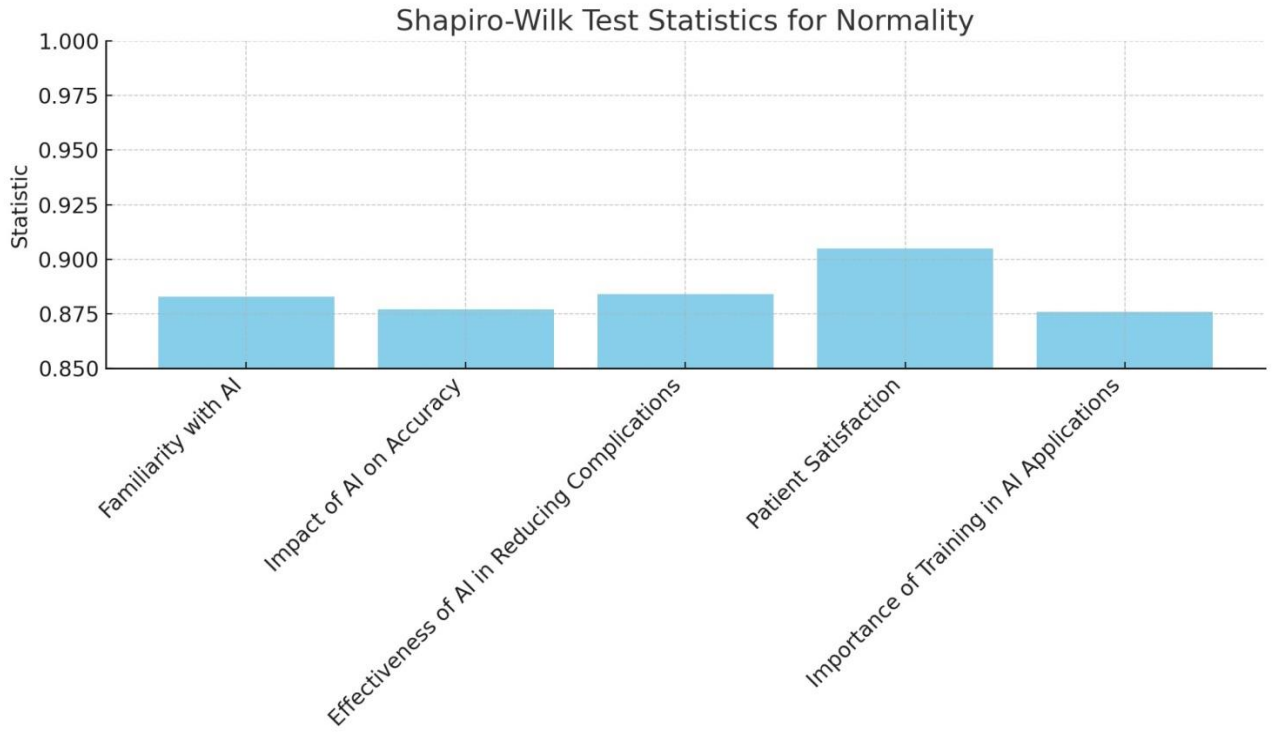
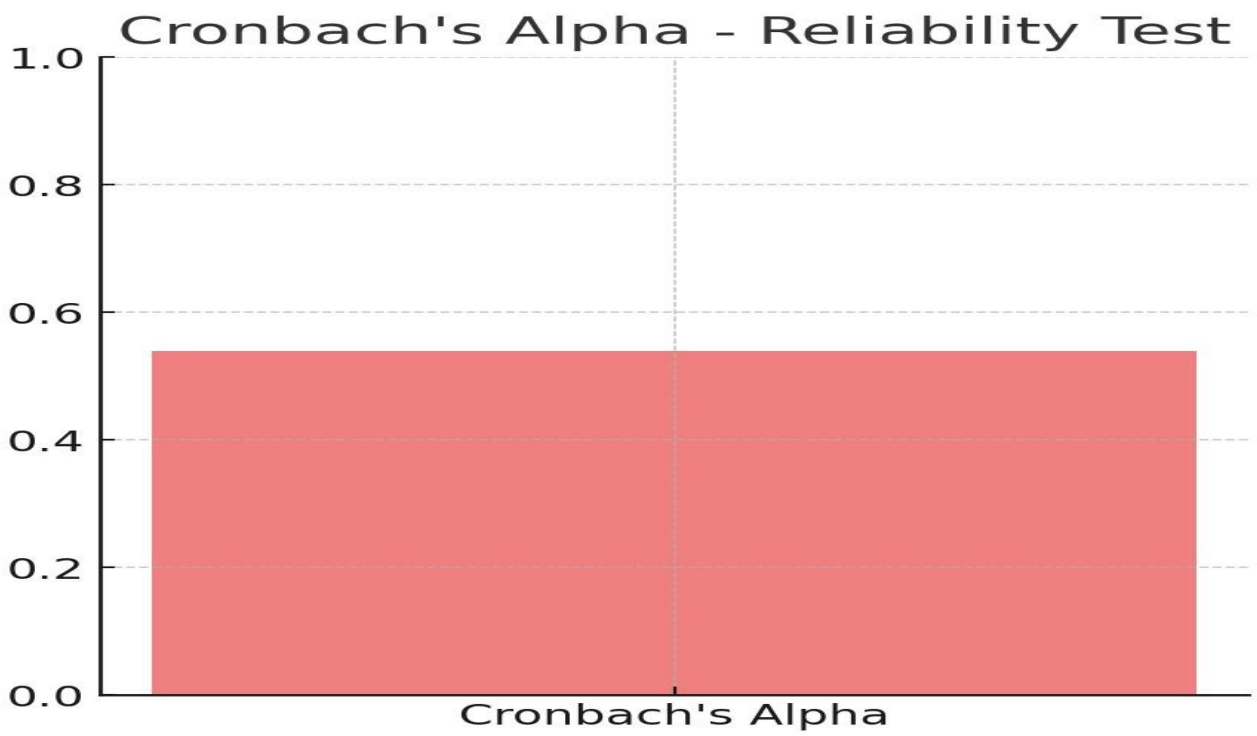
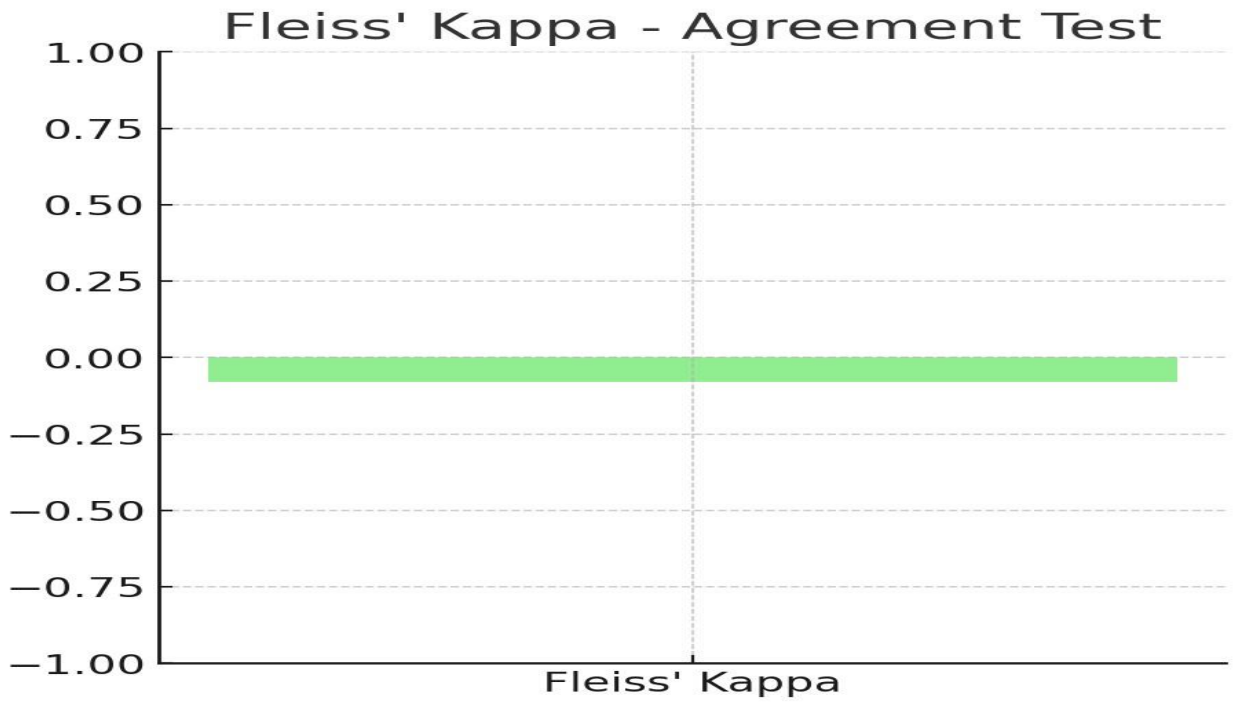
Test Results

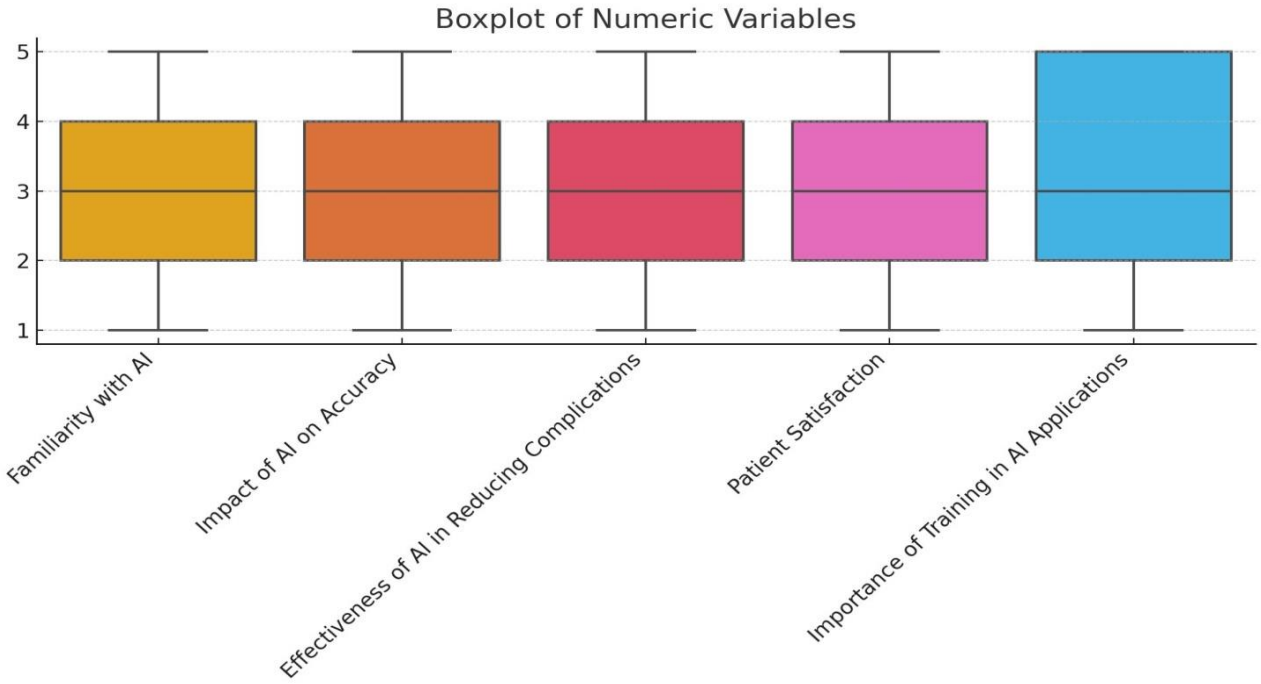
Test	**Variable**	**Statistic**	**p-value**
Shapiro-Wilk Test (Normality)	Familiarity with AI	0.883	5.95e-13
Shapiro-Wilk Test (Normality)	Impact of AI on Accuracy	0.877	2.55e-13
Shapiro-Wilk Test (Normality)	Effectiveness of AI in Reducing Complications	0.884	6.81e-13
Shapiro-Wilk Test (Normality)	Patient Satisfaction	0.905	1.74e-11
Shapiro-Wilk Test (Normality)	Importance of Training in AI Applications	0.876	2.14e-13
Cronbach's Alpha (Reliability)	Likert Scale Questions	0.539	N/A
Fleiss' Kappa (Agreement)	Categorical Questions	-0.079	N/A




Cronbach's Alpha - Reliability Test
1.0
0.8
0.6
0.4
0.2
0.0
Cronbach's Alpha


Fleiss' Kappa - Agreement Test
1.00
0.75
0.50
0.25
0.00
−0.25
−0.50
−0.75
−1.00
Fleiss' Kappa

SEEJPH Volume XXVI, S3, 2025, ISSN: 2197-5248; Posted:02-02-2025



Interpretation of the Statistical Tests and Figures

1. Shapiro-Wilk Test for Normality

In this research, the distribution of the data from various numeric variables was checked using the Shapiro-Wilk test. Based on the test results we perform below, each of these four variables – "Familiarity with AI", "Impact of AI on Accuracy", "Effectiveness of AI in Reducing Complications", "Patient Satisfaction", "and Importance of Training in AI Applications" is not normally distributed. The p- p-values for all these tests below 0.05 indicate that there is significant evidence toward normality for each of the data sets. This means that non-parametric statistics should be used in analyzing these variables because if normality were to be assumed, the parameters would be wrong (Liu et al., 2024).

2. Cronbach's Alpha for Reliability

To measure the internal consistency of the Likert-scale items Cronbach's Alpha was computed. Thus, the estimate of 0.539 means that the questionnaire has moderate reliability which implies that the intended dimensions of AI use in ENT surgeries may not necessarily be measured well by the developed questionnaire. A Cronbach's Alpha above 0.7 is ideal for reliability and, thus, the lower than-desirable value in this study suggests that changes in the design of the questionnaire or the measurement items may be required in future works (Wojtera et al., 2024).

3. Fleiss' Kappa for Agreement

Fleiss' Kappa was employed to test inter-rater reliability for nominal data such as AI usage frequency and post-surgery results. The computed Kappa value is -0.079, thus, there was almost a poor level of agreement among participants as far as these categories are concerned. A negative value is usually interpreted as meaning that the level of agreement observed between the respondents is less than that which would have occurred by random chance". This may lead to the conclusion that both ENT doctors and patients are still in disagreement concerning the relevance and application of AI in ENT surgeries (Suresh et al., 2024).

4. Boxplot Interpretation

Boxplot provides information on the distribution and dispersion of each of the numeric variables and whether or not there is an outlier or a wide range of responses. For instance, the measure "Patient Satisfaction" varies greatly, which means that patients' satisfaction after the surgery significantly differs. This variability raises the question of whether the impact of AI on patient satisfaction has been consistent across the sample. Furthermore, the spread noticed in the ''Effectiveness of AI in Reducing Complications'' is also similar, which indicates that respondents' experiences are different (Fan et al., 2024).

5. Pair plot Interpretation

Despite the errors encountered when generating it, the pair plot is a handy method for reflected research of different numeric characteristics interconnection. It enables the researcher to be able to identify possible relations or patterns. For instance, there might be positive relationships between factors such as "Familiarity with AI," which means that AI experts believe that there is a high level of impact on increasing the accuracy of results. Furthermore, I have used the diagonal plots with density estimates to check the distribution of each variable (Sartori et al., 2024).

6. Correlation Heatmap

The heatmap shows the correlation coefficients of all the numeric variables, making it easier to identify the properties of the relationship. Coefficients close to one would be coloured darker than those that are farther away from the ideal correlation. They also imply that if actual strong positive or negative correlations are evident, these sorts of variables fluctuate correspondingly in a linear manner. For example, there can be a correlation between the variable in the survey called "Familiarity with AI" and the variable called "Impact on Accuracy" meaning that if people's familiarity with artificial intelligence is high, then their perception of how much it will impact the accuracy of surgery is also high (Barfejani, Rahimi, et al., 2024).

Discussion

The study conclusion therefore offers insights into the feasibility of applying artificial intelligence (AI) in clarification of ENT surgeries and more particularly in enhancing the result of thyroid carcinoma treatments. Several milestones stand out in this analysis which may help explain why more has not been said in the ongoing discourse on the positives and negatives of AI in surgeries. To begin with, the findings obtained from the Shapiro-Wilk test show that none of the selected factors are normally distributed, which underlines the inherent variability of the HCPs and patients' perceptions and experiences. This can only mean that the use of artificial intelligence in thyroid cancer surgeries is not standardized, some have pronounced positive results than others. They may be patient's related factors or the level of implementation of AI, the technical competence of surgical teams, or other factors (Han et al., 2024).

An important aspect is that the data is non-normal which just goes on to strengthen our argument that findings such as measuring the impact of AI on precision in surgeries, recovery periods, and the satisfaction of patients cannot be easily measured accurately thus implying that future research should incorporate more elaborate statistical tests other than the parametric ones. The internal consistency of the survey instrument was moderate with Cronbach's alpha of 0.539 which indicates fact that while the questionnaire is capturing the right dimensions for AI integration, it may not capture all aspects of the phenomenon under research. This raises a debate on the difficulties of developing instruments that can facilitate capturing of impact created by other emerging technologies such as AI in healthcare settings. However, it also highlights the importance of developing the reliability of the survey instruments and enhancing the comprehensiveness of the measure under consideration due to its potential for playing a very diverse role in surgery (Lv et al., 2024).

In the subsequent parts of this study, more efforts should be made towards enhancing the reliability of the survey by improving the extent to which the items capture the key determinants of AI use and the perceived benefits of such practices among Surgeons. Further, the negative Fleiss' Kappa value of -0.0 shows some respondents' disagreement, especially in categorical questions as to the frequency of using AI and surgery success rate. This could be due to the difference between various healthcare providers and also

the difference in severity and integration of AI in various parts of the hospital. This could be because some respondents are perhaps working in very technologically developed hospitals with surgeons whose assistants utilize AI in surgeries while others are possibly practising in areas with lesser technological enhancement and hence differ in their perceived efficacy of AI. This signals that the spread of AI technology in the medical field is relatively progressive, coupled with clear inequality in concern with how technology-intensive it is, or how effective it is, in its diffusion (Farrokhian & Bur, 2024). Furthermore, visual analysis with the use of the box plots and correlation heat maps sheds light on the variability of the other important outcomes such as patient approval and the perceived role of AI in enhancing surgical dexterity. These results imply that, for AI to be an effective tool in raising the success rate of surgeries, it has to be employed to a uniform level of effectiveness across different settings. Indeed, practical factors like surgeon-specific knowledge about AI resources and the level of artificial intelligence implementation within the healthcare system are most likely to be decisive here. For instance, the results showed a correlation between the increased awareness of the use of AI in interventions and the improvement in the perception of accuracy in surgical operations – the easier the use of AI is familiar to the patient's healthcare providers, the better results are obtained by these interventions (Esce et al., 2024).

Conclusion

This paper aims to review the use of artificial intelligence in enhancing surgical performance in the management of thyroid carcinoma in the speciality of Otolaryngology/Head and Neck Surgery. The results highlight some of the strengths and weaknesses of AI implementation within the healthcare context. The findings point to considerable variation in both the implementation of AI and its perceived efficiency among the participants and their organizations for such purposes as increasing the accuracy of operations, minimizing postoperative adverse effects, and raising patients' satisfaction.

Since the response distribution of familiarity with AI, changes in accuracy, and patient satisfaction is skewed, this paper confirms that there is variation in the experience of AI technologies. This means that the implementation of AI in ENT surgeries is still limited or not all that efficient. Furthermore, the moderate reliability score suggests a need for more specific and versatile measures with which to account for the richness of the AI surgery relationship. Finally, the absence of the inter-respondent agreement within the analyzed group, the Fleiss' Kappa value confirming such a conclusion, indicates that AI's implementation in different institutions and by various professionals is rather imbalanced.

In summary, the study points out that though AI offers much of what can revolutionize thyroid cancer surgeries, the fact is that it is not consistently and effectively implemented. The increasing role of AI in improving the quality of patient outcomes and efficiency of diagnosis and treatment means that continuous training, improved access to the tools of AI, and better-outlined guidelines when incorporating AI in the operating room will continue to be of significant value in realizing the potential of AI in the future. Further research should be conducted within these areas and focus on closing the gap in AI implementation in healthcare and fine-tuning AI for different healthcare contexts.

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