ASSESSMENT OF THE ETHICAL IMPLICATIONS OF AI ADOPTION ON PATIENTS IN NAIROBI WEST HOSPITAL, KENYA.

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A RESEARCH PROJECT SUBMITTED TO THE SCHOOL OF COMPUTING AND INFORMATICS IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF BACHELOR OF SCIENCE IN COMPUTER SCIENCE OF GRETSA UNIVERSITY.

OCTOBER, 2025

DECLARATION

STUDENT:

This research project is my original work and has not been presented for the award of a degree or any similar purpose in any other institution.

Signature: _____ Date: 24/10/2025

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ICT-G-4-1957-22

SUPERVISOR:

This research project has been submitted with my approval as university supervisor.

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ABBREVIATION AND ACRONYMS

AI - Artificial Intelligence

IRB – Institute Review Board

NWH – Nairobi West Hospital

PHI - Protected Health Information

OPERATIONAL DEFINITION OF TERMS

Artificial Intelligence (AI): Technology that allows machines to perform tasks like humans, such as diagnosing illnesses or managing patient data.

Data Security: Protecting digital health data from unauthorized access or cyber threats, ensuring patient information stays safe.

Deontological Ethics: Ethics focused on following moral rules and respecting patients' rights, like privacy and consent.

Healthcare Equity: Fair access to quality healthcare for everyone, regardless of location or background, which AI aims to support.

Patient Privacy: The right of patients to control who accesses their personal health information, especially when using AI systems in healthcare.

Telemedicine: Using technology for remote healthcare, allowing doctors to consult with patients in distant or underserved areas.

ABSTRACT

The adoption of Artificial Intelligence in medicine has largely transformed the sector. The integration of more advanced machines and algorithms has facilitated more accurate and early diagnosis of illnesses and also smoothened the treatment process. The adoption of AI has had some impacts on patients. This study addresses some of the issues such as patient privacy, and data security, and also discusses the potential and future of AI concerning issues like healthcare availability and equality in underprivileged areas. This research aims to engage patients to present the impacts of the application of AI within the healthcare system in Nairobi West Hospital in Kenya since they are the ones who are affected directly by the adoption of AI systems and make further recommendations for the ethical use of AI in the health sector. Some of the important objectives are to evaluate how the adoption of AI has affected patients in terms of patient privacy, data security, and healthcare equity and accessibility. Three hypotheses were formulated to support the study's objectives, with each hypothesis tested through statistical analysis. The study employed a systematic random sampling method, drawing a sample of 110 patients who have interacted with AI systems in the hospital. A descriptive research design was used, and structured questionnaires were administered to ensure comprehensive and valid responses from all participants.

CHAPTER ONE: INTRODUCTION

Introduction

This section introduces the research subject and states the purpose and objectives of the study. It also covers the hypothesis of the study.

1.1 Background to the Study

Artificial Intelligence is one of the most anticipated emerging technologies that many industries including healthcare expect to affect. AI can be described as creating systems as well as applications that work like the human brain, for instance in analyzing symptoms, planning treatment, or patient handling. The advancement of AI technology led to the integration of the technology in various disciplines among them being medicine.

This increase in use is more so because AI is quite friendly, time-saving, simple, and efficient when performing tasks. Due to the capability of collecting and analyzing large amounts of data and adapting and improving through the data analyzed, AI has introduced new methods and approaches that are now transforming the healthcare system. The health care system of Kenya is facing several challenges some of which include scarcity of human resources in the health sector, poor accessibility to health facilities particularly in rural areas, and constrained resources. This can be helpful in the above scenario through assisting the health workers, relieving them of routine tasks, analyzing large volumes of medical data as well as decision making. For example, there exist AI-based diagnostic instruments and applications that help diagnose diseases such as cancer in its early stages. Also, by making use of artificial intelligence in telemedicine, medical services can be taken to remote areas of the country.

The reason for the adoption of AI in the healthcare sector is multi-faceted because it leads to enhanced healthcare outcomes, effective healthcare policymaking, and overall efficiency in the healthcare sector. It has been established that AI can assist health professionals in investigating various factors within health data to assist them in making informed decisions and thereby, develop better and more directed techniques in health care practices.

However, several concerns come with the adoption of AI in the medical field in Kenya and also Nairobi West Hospital. First, there is patient privacy. Typically, AI systems require access to large data volumes, including sensitive health information. Getting patient data through secure collection, storage, and processing is essential in building trust in AI technologies; the risk that data can be breached or accessed by people unauthorized to see personal health information is very significant, ethically and legally. Moreover, principles of informed consent and patient autonomy have to be kept (Beauchamp & Childress, 2013), meaning the usage of patients' information must properly and transparently be communicated.

The AI algorithms learn from the data that is fed into them and this data is often biased in one way or the other to reproduce biases that already exist in the healthcare system. Looking at these factors, if not well controlled, they can lead to injustices in the treatment. This bias might affect patients in the treatment process whereby they make assumptions based on the biased information hence affecting the patient treatment process.

If AI democratizes healthcare access, it risks deepening existing inequalities. Since most urban areas in Kenya, for example, NWH, have good infrastructure and better resources,

the advancement of AI is most likely to be implemented there, leaving other rural areas far behind.

1.2 Statement of Research Problem

The increased use of AI in healthcare such as diagnostic tools and telemedicine has transformed the Kenyan medical sector in the provision of healthcare services. This adoption might impact patients in issues to do with patient privacy, protection of their data, and healthcare equity (Murdoch, 2021).

The purpose of this research was to discuss how the adoption of AI in Nairobi West Hospital has affected patients. The implications were limited to patient privacy, data protection, and healthcare equity. By addressing these implications, a better adoption method was developed.

1.3 Purpose of the Study

The purpose of this study was to conduct an exploratory analysis to evaluate the ethical implications of AI adoption on patients in Nairobi West Hospital. This research aimed to establish the tendency for patient privacy data security, and healthcare accessibility with the use of AI and make recommendations for its proper utilization that can enhance the technology to be able to benefit all patients, as well as, protect their rights and privacy.

1.4 Conceptual Framework

The adoption of AI in NWH has had implications for the patients. The main focus of this study was on the issues below that make up the variables of the research. They included:

- Independent variables: AI technology adoption.
- Dependent variables: Patient privacy, data security, healthcare equity.

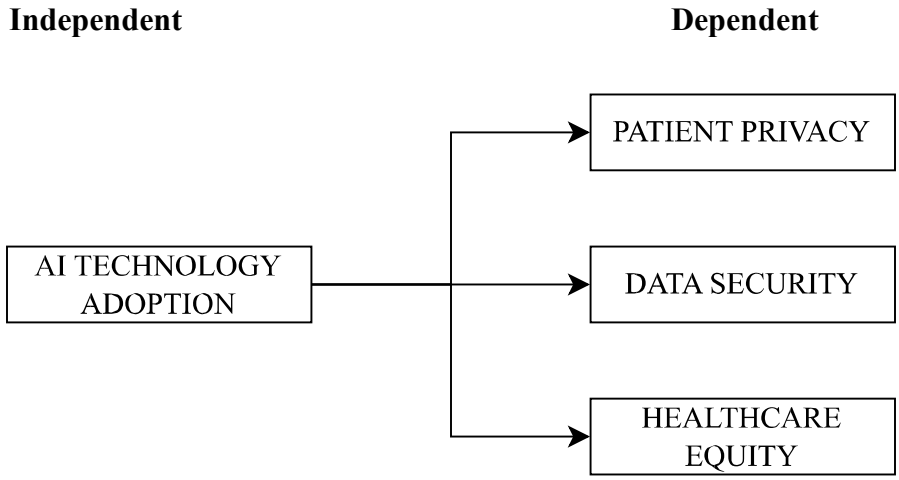

Figure 1: Conceptual framework

1.5 Research Questions

I. How does advancement in artificial intelligence in the health sector impact patients' privacy in Nairobi West Hospital?

II. How does AI adoption in medicine impact data security within the healthcare sector at Nairobi West Hospital?

III. How does AI adoption affect healthcare accessibility and equity in Nairobi West Hospital?

1.6 Objectives of the Study

1.6.1 General Objective:

To assess how the adoption of AI in Nairobi West Hospital, Kenya has impacted patients.

1.6.2 Specific Objective:

I. To find out how AI adoption in medicine has affected patients' privacy in Nairobi West Hospital.

II. To find out how AI adoption in medicine affects data security in Nairobi West Hospital.

III. To find out how AI technology adoption in medicine has affected healthcare equity and accessibility in Nairobi West Hospital.

1.7 Hypotheses of the Study

H_0 There is no significant effect of AI adoption on patients' privacy in Kenya.

H_1 There is no significant effect of AI adoption on data security in medicine in Kenya.

H_2 There is no significant effect of AI technology adoption on healthcare equity and accessibility in Kenya.

1.8 Significance of the Study

The importance of this study was to enable the various stakeholders who are in the Kenyan healthcare sector to have some information concerning AI. Healthcare providers can understand how to incorporate AI properly and protect the privacy of their patients as well as their data. It should also assist policymakers and regulators in coming up with proper regulations that can create a favorable environment. Citizens benefit from enhanced healthcare access, balance, and privacy. Healthcare professionals will be equipped with information on how to use artificial intelligence in a better way to address the issues of the patients. Industry participants such as AI developers and tech companies will be notified to provide AI solutions that have passed through a standard that is beneficial to the patients.

1.9 Delimitations or Scope of the Study

This research was conducted in the field of healthcare, particularly in Nairobi West Hospital, Kenya, focusing specifically on the ethical implications of AI adoption on patients. Extensive knowledge in this study comprised of patient privacy, protection of

data, healthcare equity, and regulatory considerations. This limited the scope of this study to these areas and enabled the study to delve deeper and provide more information on the few and very relevant areas to the topic of this study, that is, the impacts of AI adoption on patients in Nairobi West Hospital.

1.10 Limitations of the Study

I. Limited access to the latest and comprehensive data.
II. Time and resource constraints for extensive field research.
III. Rapid advancements in AI technology potentially outpacing the study's timeframe.
IV. Potential biases in the perception of AI in healthcare by the respondents.

1.11Assumptions

The assumptions of the study are:

I. Participation and providence of accurate information was done willingly.
II. The data available and to be accessed for analysis was sufficient and representative of the current situation of artificial intelligence in NWH.
III. The technological infrastructure needed for data collection, storage, and analysis was effective throughout the study period.
IV. Patients expressed their concerns about the adoption of AI technologies in the healthcare sector in NWH openly.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter reviewed existing studies on the ethical implications of AI adoption on patients in Nairobi West Hospital, Kenya. In seeking to address the study objectives outlined earlier in chapter one, it evaluated issues such as patient privacy, data security, equity in healthcare, and the views of patients. The inclusion of theoretical frameworks supporting the research was also crucial.

2.2 Review of Literature

This involved examining existing works of literature such as research and publications on the topic. This was to aid in a comprehensive dig into the topics.

2.3 The Concept of AI Technology Adoption in Medicine and Healthcare

AI adoption in healthcare integrates a wide array of AI technologies into clinical practices which enable advanced data analysis and automation. AI encourages more accurate diagnosis and more potent treatment planning and patient management. Large datasets are analyzed to give early and accurate diagnoses. Artificial Intelligence may be used to carry predict disease outbreaks through analysis, integrated into surgeries, and also to provide personalized treatment plans.

AI can be applied in Kenya to address challenges within the healthcare industry including; limited access to health facilities, shortage of medical personnel, and resource limitations. Diagnostic tools that are based on artificial intelligence may be useful for the early diagnosis of diseases, while telemedicine platforms offer services for the expansion of healthcare services in remote areas (Anawade et al., 2024). However, the

incorporation of Artificial Intelligence in the health sector has impacts on patients in specific health centers.

2.4Patient Privacy

The incorporation of AI in healthcare systems brings about new challenges in the area of patient privacy, and therefore, there is a need to discuss the ethical issues and the policies surrounding the use of AI in healthcare. Diagnostic algorithms and patient monitoring systems are some of the AI systems that require large datasets with PHI. Preserving the patient's identity is important since AI systems has access to the data.

Studies show that AI might be a threat to the privacy of patients. Jiang et al. (2017) explain the risks of data leakage due to unauthorized access to AI systems. Furthermore, anonymization methods are crucial to reduce the probability of data re-identification while allowing data use for AI purposes (El Emam & Arbuckle, 2013).

Manson & O'Neill (2007) argue consent should be acquired from the patients before using their data in AI systems. Legal instruments like Kenya's Data Protection Act of 2019 offer direction on how PHI should be protected with the key principles being transparency and accountability in data processing.

The legal issues of AI in patient privacy are not the only ethical concerns. Beauchamp & Childress (2013) focus on autonomy and confidentiality, asking healthcare providers and developers of AI systems to respect patients' rights in technological advancement. Some real-life scenarios show how some of the positives of AI technology can be masked by the invasion of patients' privacy (Powles & Hodson, 2017). Some countries globally

have been able to implement AI in their healthcare while avoiding privacy concerns and can serve as a guideline to Kenya and other countries (Park et al., 2020).

2.5 Data Security

AI adoption brings about risks in data security which required thorough evaluation. Artificial Intelligence systems require large amounts of data and in this case, patient data which needs to be handled well to prevent data breaches that may result from attacks or system failures. This affects the confidentiality and integrity of the system (Gerke et al., 2020).

It is important to ensure that patient data is protected to avoid being accessed by unauthored personnel. Confidentiality is one of the most important principles of medical ethics. Scholars have noted that encryption, secure access controls, and security audits are critical elements of cybersecurity that must be implemented to protect the patient's data (Price, 2019). There should also be the aspect of transparency in the use of data.

2.6 Healthcare Equity and Accessibility and AI

AI adoption provides an opportunity to enhance healthcare equity but at the same time can pose a danger to healthcare equity. Through telemedicine and remote diagnosis, services can be accessed by people in the rural areas. Research conducted indicates that AI can help in the diagnosis of diseases and forecasting epidemics hence preventing them (Wahl et al., 2018).

However, facilities with more advanced facilities and infrastructure are likely to adopt AI more easily as compared to those in rural areas that do not have the infrastructure. A review of the literature indicates that AI faces challenges such as poor physical facilities,

a shortage of skilled professionals, and limited funding in rural settings (Mesko et al., 2018).

2.8 Theoretical Framework(s)

The theoretical framework for this study was anchored on the following theories that help in understanding the ethical issues arising from the use of AI in healthcare. The two theories illustrated include Utilitarianism and Deontological Ethics.

According to the utilitarianism theory developed by Jeremy Bentham and further developed by John Stuart Mill, the main aim is to bring the greatest amount of happiness to people and minimize harm. In the context of the current research on the ethical implications of AI to patients, this theory was relevant for assessing the effectiveness of various AI technologies for improving patient status and general organizational performance. With a view of applying the principles of utilitarianism, it is possible to evaluate whether AI technologies are beneficial in increasing diagnostic accuracy, as well as the effectiveness of treatment and organization of operations. AI technologies can handle large volumes of data hence increasing the likelihood of accurate diagnosis and treatment and increasing the quality of patients' lives. Like common sense, utilitarianism also has to account for the possible drawbacks, including data leaks or prejudiced AI programs. Avoiding bias and following proper data protection measures are in line with utilitarianism because the ultimate aim is to minimize suffering.

According to deontological ethics, actions, and decisions are right or wrong based on the principles that govern them. This theory supports patient rights, privacy, and autonomy in the use of AI in the healthcare delivery system. From a deontological perspective, ethics in AI systems should embrace patients' right to privacy with elements like consent

and clear communication on the utilization of AI. This theory also requires compliance with ethics that cannot be violated, such as justice and non-maleficence, to guarantee that the application of AI does not harm any patient category. This study uses deontological ethics because it lays down a guideline of right and wrong but with emphasis on the rights of patients and ethical considerations when developing and deploying AI systems by healthcare providers and developers.

Integrating the two frameworks, the utilitarianism and deontological approach to ethics enables one to capture all the ethical implications of AI adoption to patients. While utilitarianism is outcome-oriented, and the general good is paramount, deontological ethics are principles and duties-oriented.

2.9 Summary of Identified Gaps in the Reviewed Literature

The literature review suggested that there were various ethical implications of AI adoption to patients in NWH, Kenya that remained understudied. There was inadequate literature especially as it pertains to the Kenyan context concerning patient privacy and data security concerns. Also, there is a lack of specialized regulations and recommendations. These gaps must be filled to ensure that AI is implemented responsibly in Kenya.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter presented the methods used in the study to establish the ethical implications of AI adoption on patients in Nairobi West Hospital, Kenya. It addressed the research design, study area, target population, sampling techniques, and data analysis.

3.2 Research Design

In this study, a descriptive research design was used, which allowed for a detailed examination of the various implications of AI implementation in healthcare. The research was both quantitative and qualitative, with structured questionnaires.

3.3 Study Area

This research study was done in Nairobi West Hospital, in Nairobi, Kenya. This selection of study area guaranteed a systematic analysis of the ethical implications of AI adoption on patients in Nairobi West Hospital.

3.4 Target Population

The target population of this study was Nairobi West Hospital in Nairobi. The hospital has a bed capacity of 150 patients, and the main focus of this research was inpatients since they are the ones who are most likely to interact with the AI systems when compared to outpatients. Also, inpatients tend to have more knowledge of how the data is being handled in the hospital and can give accurate responses since they interact with the systems almost daily for the period of time they are in the hospital. This necessitated an accurate and more precise population.

3.5 Sampling Techniques

Purposeful and systematic random sampling was employed to provide a diverse and random sample of the patients in the hospital. Thus, this methodology guaranteed a more rigid framework for generating data regarding the ethical implications of AI adoption to patients in NWH. This also ensured that the results are not biased in any way.

3.6Sample Size

The Yamane formula was used for sample size calculation:

$n = N / (1+N(e)^2)$

Where:

- n = sample size
- N = population size (150)
- e = acceptable margin error (0.05 for ±5%)

Using the formula:

$n = 150 / (1+150(0.05)^2) = 109.09$

=110

3.7Measurement of variables

Variable	Measure/indicator	Measurement scale	Question number
AI Technology Adoption	Interaction with AI systems.	Likert scale	Section 2
Patient Privacy	Privacy concerns and comfortability with AI accessing healthcare data.	Likert scale	Section 3
Data security	Concerns about personal data security.	Likert scale	Section 4
Healthcare Equity	Improvement of healthcare access.	Likert scale	Section 5

Table 1: Measurement of variables

3.8 Research Instruments

This survey research employed a structured questionnaire to effectively administer quantitative data from patients in Nairobi West Hospital. The use of the structured self-administered questionnaire also helped to increase the consistency and reliability of findings and covers such variables as the adoption of AI technologies in healthcare, patient information, data protection, and healthcare inequality, so that comprehensively evaluates the ethical implication of AI adoption in Nairobi West Hospital.

3.9Reliability of Measure

To address the issue of reliability, the questionnaire was pre-tested and re-tested where the same questionnaire was administered several times to the same respondents or group. A pilot test was also conducted to review and iron out any possible imprecision or vagueness that were likely to be identified before the main study.

3.10 Data Collection Techniques

Data collection involved the administration of a structured questionnaire to the targeted patients in Nairobi West Hospital. The participants completed the questionnaire online and self-completed the questionnaire to ensure high response rates. The questions in the

questionnaire were also structured in a way that allowed respondents to answer them honestly and frankly since their identity was kept anonymous. All responses were treated with confidentiality, and only the researcher was able to access the collected data.

3.11 Data Analysis

Hypothesis	Hypothesis test	Statistical model
H_0 There is no significant effect of AI adoption on patients' privacy in Kenya.	ANOVA	Descriptive statistics
H_1 There is no significant effect of AI adoption on data security in medicine in Kenya.	ANOVA	Descriptive statistics
H_2 There is no significant effect of AI technology adoption on healthcare equity and accessibility in Kenya.	ANOVA	Descriptive statistics

Table 2: Data analysis

The data was analyzed using a combination of techniques appropriate for each of the research objectives formulated. Methods to be used included independent samples t-test, and ANOVA test. The findings were illustrated using tables of correlation coefficients and results of tests conducted. The use of graphical analysis included the use of pie charts, bar, and line graphs to show trends and distribution patterns. Text was used for interpretation.

3.12 Logistical and Ethical Consideration

Logistical considerations facilitated the effective implementation of the research by getting access to the data required and ensuring the availability of tools for research.

Issues of ethical consideration were upheld to the highest standards including issues to do with informed consent, confidentiality, and voluntary participation of the participants. The study was conducted per the principles of the IRB and ethical approval was sought.

CHAPTER FOUR: FINDINGS AND DISCUSSIONS

This chapter provides results and analysis of the research conducted on the ethical concerns of AI implementation in Nairobi West Hospital, Kenya. The findings of this study respond to the research questions and hypotheses that were presented in Chapter One which focused on analyzing how AI's implementation influences patient privacy, data security, and healthcare equity in NWH. The chapter is organized sequentially and provides both descriptive and inferential statistics that enable the analysis of the study objectives.

4.1 Demographic Information

4.1.1 Response Rate

A total of 110 questionnaires were issued. The response rate was 84% of the total targeted respondents with 92 of the questionnaires being filled out and returned. 18 questionnaires were not filled and were not returned as shown in the table below

Variable	**Frequency**	**Percentage**
Filled and returned	92	84%
Not returned	18	16%
Total	110	100%

Table 3: Response rate

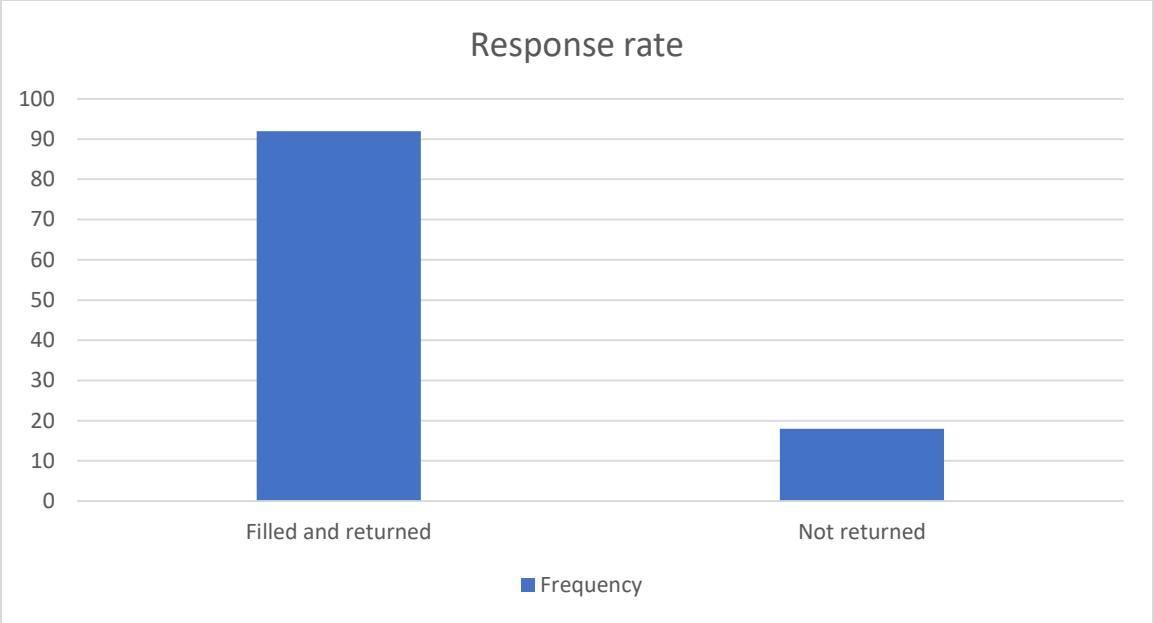

Figure 2: Response rate

4.1.2 Gender

The sample was predominantly male, with 54 respondents (58.7%) being male and 36 (39.1%) being female, while a small portion, 2 respondents (2.2%), preferred not to disclose their gender.

Gender	**Frequency**	**Percentage**
Male	54	58.7%
Female	36	39.1%
Prefer not to say	2	2.2%
Total	92	100

Table 4: Gender response rate

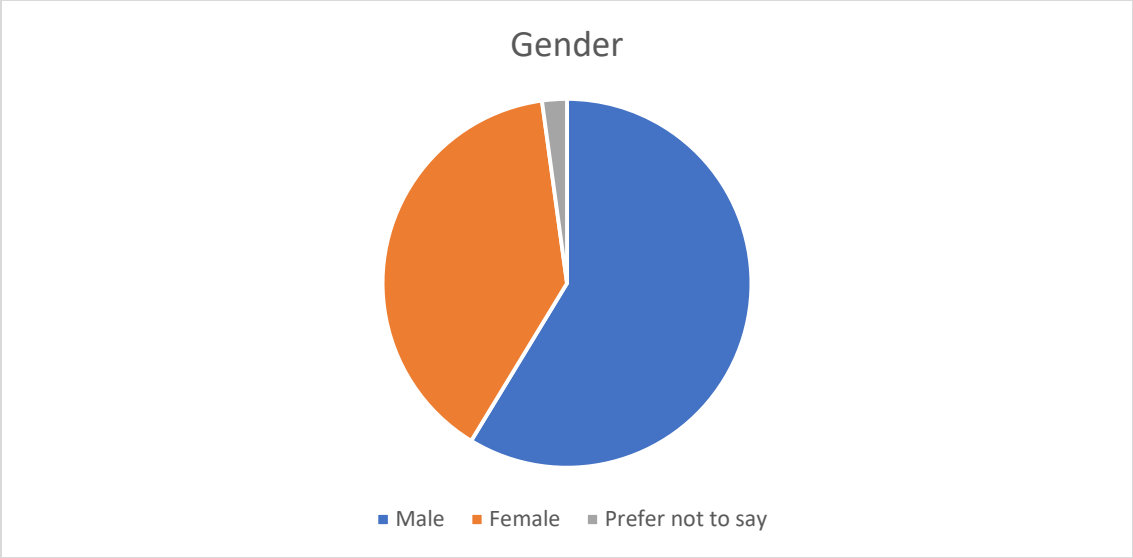

Figure 3: Gender response rate

4.1.3 Age Bracket

The study sought to determine the age of the respondents. The findings established that the respondents spanned a range of age groups, though most fell within the 26–35 bracket (41.3%, n=38), indicating that the survey reached a relatively young adult population. Other age groups included those aged 18–25 (23.9%, n=22) and 36–45 (21.7%, n=20), while a smaller segment (13.0%, n=12) were 46 years or older.

Age	Frequency	Percentage
18 – 25	22	23.9%
26 – 35	38	41.3%
36 – 45	20	21.7%
46 and above	12	13.0%
Total	92	100%

Table 5: Age bracket

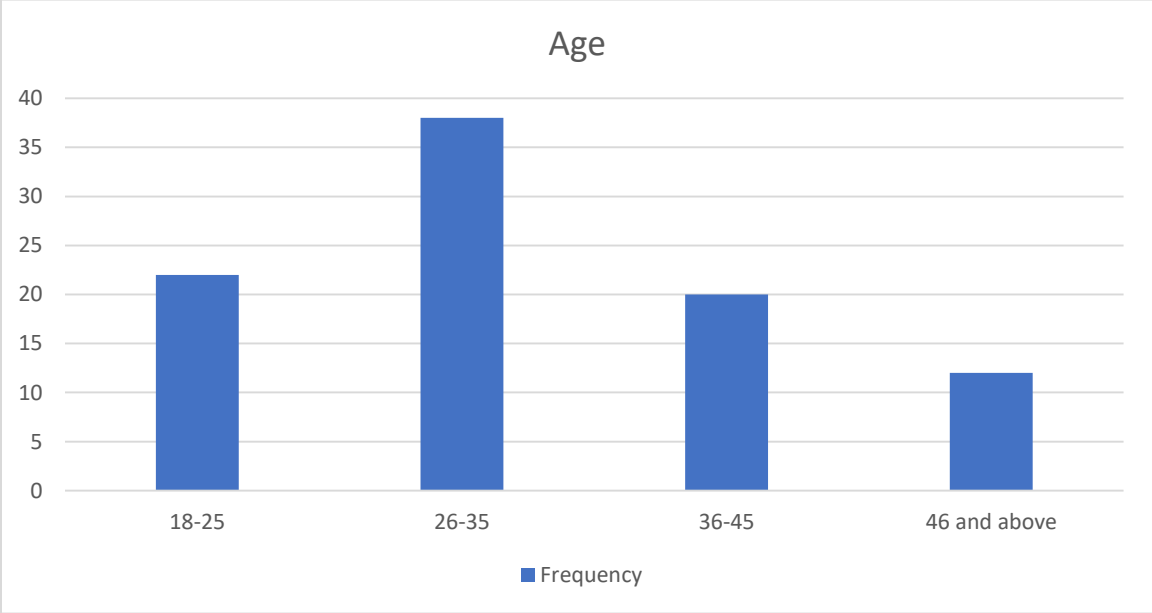

Figure 4: Age bracket

4.1.4 Familiarity with AI Systems

Familiarity with AI technology in healthcare was notably high among participants, with 43.5% (n=40) describing themselves as “very familiar” and 56.5% (n=52) as “somewhat familiar.” No respondent indicated they were “not familiar at all,” highlighting that this group had a baseline understanding of AI, making them suitable for assessing its impact on healthcare services.

	Frequency	Percentage

Very familiar	40	43.5%
Somewhat familiar	52	56.5%
Not familiar at all	0	0.0%
Total	92	100

Table 6: Familiarity with AI systems

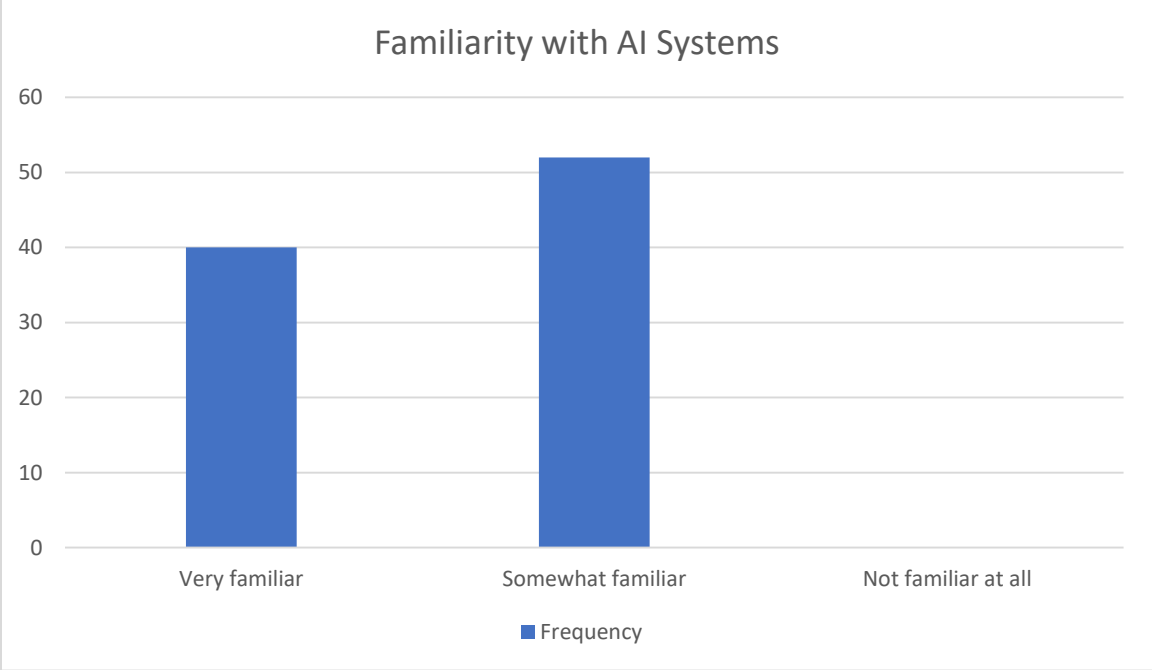

Figure 5: Familiarity with AI systems

4.2 AI Adoption

4.2.1 Interaction with AI Systems

Table 4.2 sheds light on respondents' interactions with AI systems within the hospital setting. Every respondent (100%) reported having interacted with AI systems at Nairobi West Hospital, affirming that the sample was composed of individuals directly familiar with AI's role in healthcare. Among those who had used AI, diagnostic tools, such as imaging analysis, were the most commonly encountered (45.7%, n=42). This was

followed by patient monitoring systems, used by 32.6% (n=30) of respondents. A smaller subset had interacted with appointment scheduling tools (13.0%, n=12) and treatment planning support systems (8.7%, n=8).

Noticed or interacted with AI systems	**Frequency**	**Percentage**
Yes	92	100%
No	0	0.0%
Total	92	100

Table 7: Interaction with AI system

4.2.2 Helpfulness of AI Systems

The research also sought to investigate the helpfulness of AI systems in healthcare and the responses were largely positive. Nearly half (45.7%, n=42) found AI to be "very helpful" in their treatment experience, while 28.3% (n=26) described it as "somewhat helpful." A few respondents held a "neutral" stance (15.2%, n=14), indicating neither benefit nor dissatisfaction, while 10.9% (n=10) found the AI systems "not helpful." These results revealed a generally favorable outlook on AI's contribution to improving patient care and facilitating interactions with hospital services.

Helpfulness of AI systems	**Frequency**	**Percentage**
Very helpful	42	45.7%
Somewhat helpful	26	28.3%
Neutral	14	15.2%
Not helpful	10	10.9%
Total	92	100

Table 8: Helpfulness of AI systems

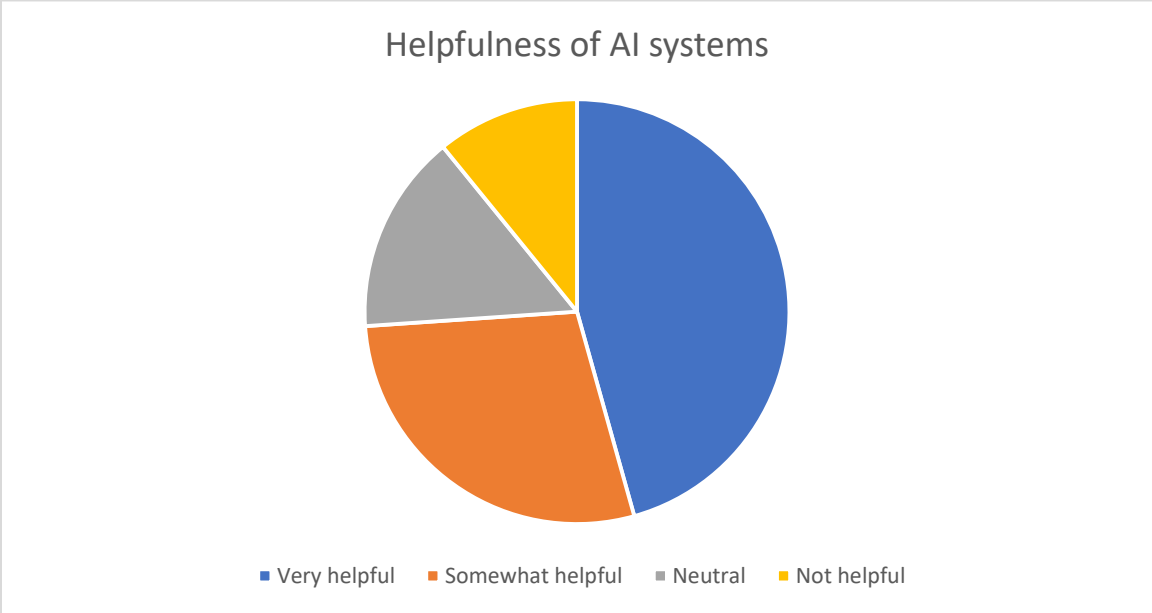

Figure 6: Helpfulness of AI systems

4.3 Patient Privacy

4.3.1 Comfort with AI Accessing Health Information

Table 9 explores the comfort levels of respondents regarding the access that AI systems have to their personal health information. Over half of the respondents (58.7%, n=54) reported feeling "somewhat comfortable" with AI handling their health data, while a smaller portion (15.2%, n=14) expressed they were "very comfortable." A segment of participants remained neutral (10.9%, n=10), while a further 15.2% (n=14) felt "somewhat uncomfortable," underscoring a range of sentiments on data privacy.

Comfort with AI accessing health information	**Frequency**	**Percentage**
Very comfortable	14	15.2%

Somewhat comfortable	54	58.7%
Neutral	10	10.9%
Somewhat uncomfortable	14	15.2%
Total	92	100

Table 9: Comfort with AI accessing health information

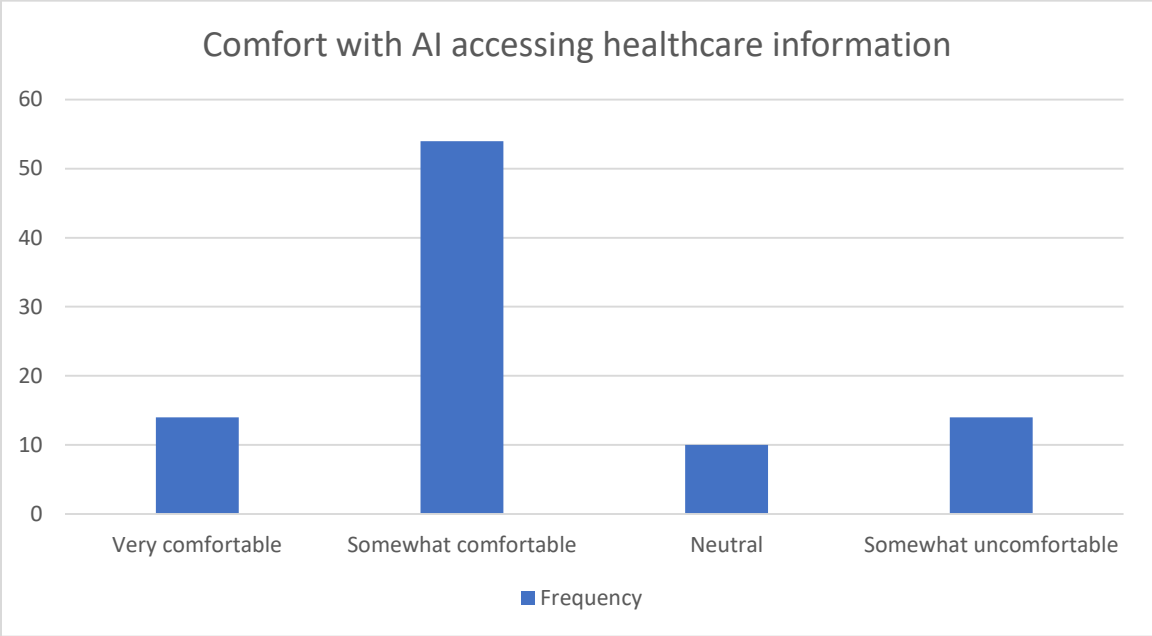

Figure 7: Comfort with AI accessing health information

The table below shows how, according to the questionnaires, the patients responded to privacy concerns due to AI systems. 65.2% indicated that they had concerns while 34.8% indicated that they did not have concerns with their privacy due to AI.

Privacy concerns due to AI systems	**Frequency**	**Percentage**
Yes	60	65.2%
No	32	34.8%
Total	92	100

Table 10: Privacy concerns

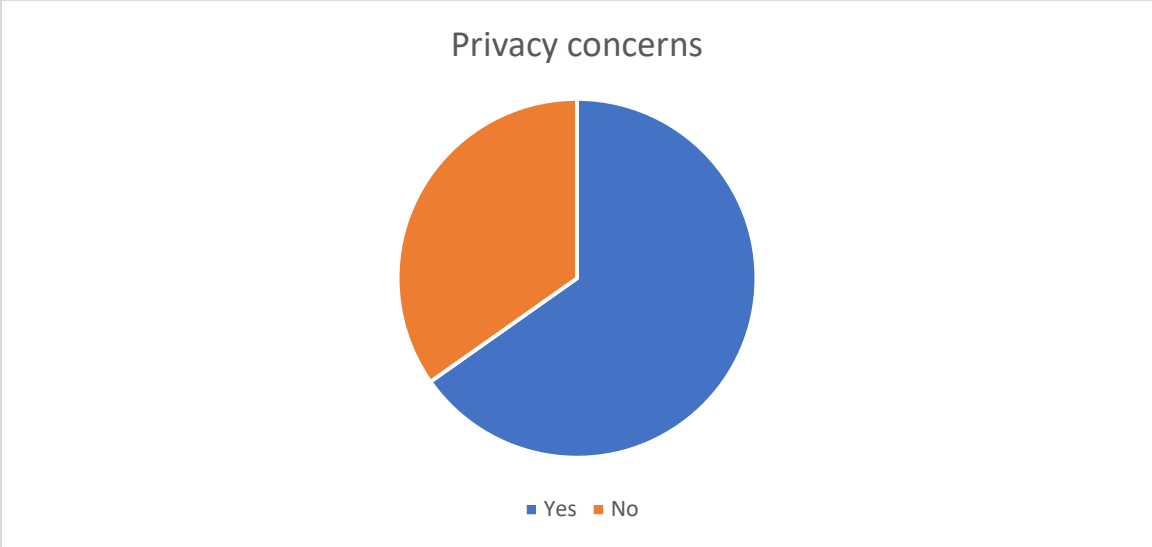

Figure 8: Privacy concerns

4.3.2 Privacy Statements

When rating statements about privacy on a scale from 1 to 5, respondents showed moderate confidence in AI's handling of their data. For instance, the mean score for "I am confident that AI systems in Nairobi West Hospital respect patient privacy" was 3.7, indicating a general but cautious belief in AI's adherence to privacy standards. However, lower scores were seen for statements related to transparency and consent: "I am aware of how my health data is used by AI systems in the hospital" had a mean score of 3.5, while "I am confident AI usage includes my consent for data handling" scored 3.4.

Statement	Mean
I am confident that AI systems in Nairobi West Hospital respect patient privacy.	3.7
I am aware of how my health data is used by AI systems in the hospital.	3.5
I am confident that AI usage at the hospital includes my consent for data handling.	3.4

Table 11: Privacy statements

4.4 Data Security

4.4.1 Impact of Adoption of AI on Data Security

Table 12 provides insight into respondents' concerns regarding data security in the context of AI usage. A significant portion of respondents were either "very concerned" (32.6%, n=30) or "concerned" (45.7%, n=42) about the security of their personal data within AI systems. In comparison, fewer respondents held a "neutral" position (13.0%, n=12), and only a small percentage (8.7%, n=8) were "not concerned."

Concern about personal data security in AI systems	Frequency	Percentage
Very concerned	30	32.6%
Concerned	42	45.7%
Neutral	12	13.0%
Not concerned	8	8.7%
Total	92	100

Table 12: Concern about data security

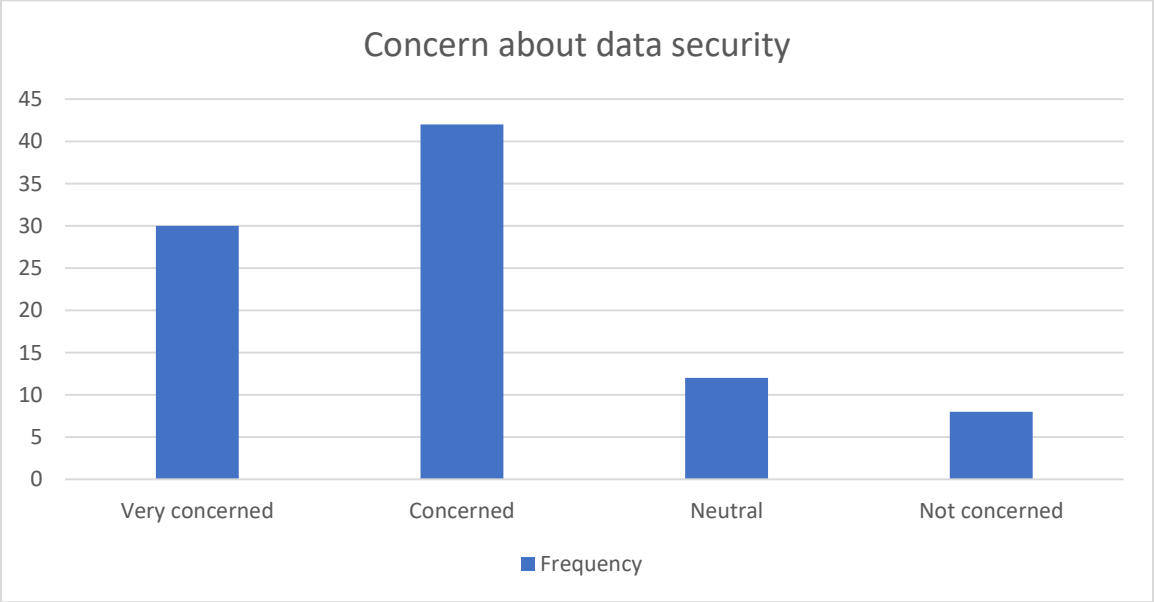

Figure 9: Concern about data security

4.4.2 Data Security Statements

In assessing agreement with statements about data security, respondents expressed moderate confidence. The mean score for "I believe my health information is safe from cyber threats in the hospital's AI systems" was 3.6, suggesting that while respondents generally trusted the hospital's security measures, some unease remained. The statement "I am confident data breaches involving patient data are promptly reported and addressed

by the hospital" scored a mean of 3.4, implying that while respondents believed in the hospital's commitment to managing breaches, there was room for enhanced assurances.

Statement	Mean
I believe that my health information is safe from cyber threats in the hospital's AI systems.	3.6
I am confident that data breaches involving patient data are promptly reported and addressed by the hospital.	3.4

Table 13: Data security statements

4.5 Healthcare Equity and Accessibility

4.5.1 Impact of AI Adoption on Access to Healthcare

Table 14 illustrates respondents' perceptions regarding the influence of AI on healthcare accessibility. A plurality of respondents (43.5%, n=40) believed that AI had "somewhat improved access," while 28.3% (n=26) felt that it had "improved access significantly." On the other hand, 16.3% (n=15) observed "no change in access," and 12.0% (n=11) perceived that AI actually "limited access." These mixed responses highlighted diverse experiences and attitudes towards AI's role in promoting equitable healthcare access.

AI impact on access to healthcare	Frequency	Percentage
AI has improved access significantly	26	28.3%
AI has somewhat improved access	40	43.5%
There is no change in access	15	16.3%

AI has limited access	11	12.0%
Total	92	100

Table 14: AI impact on healthcare access

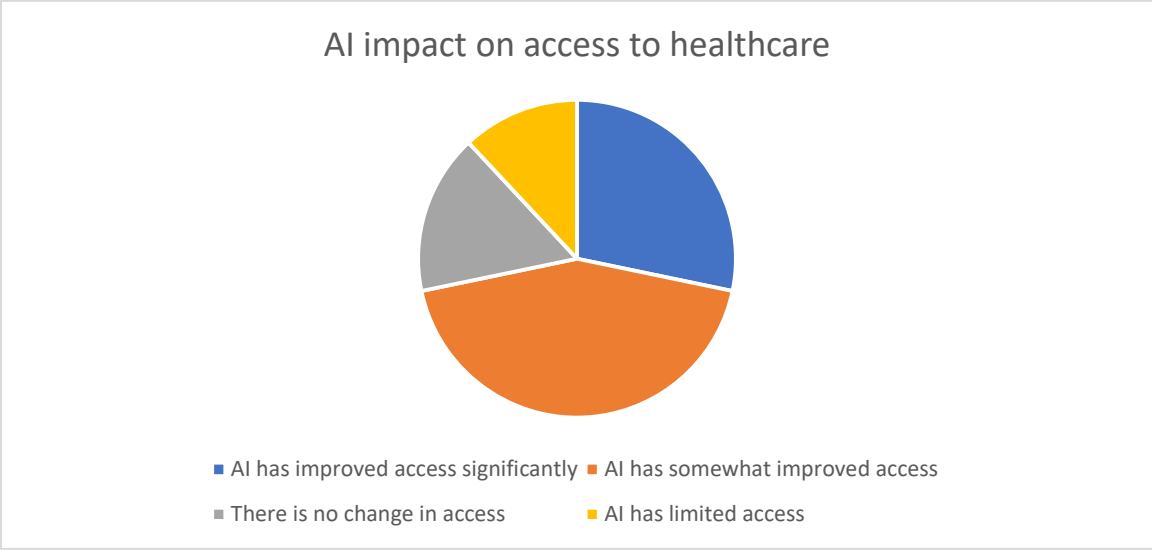

Figure 10: AI impact on access to healthcare

4.5.2 Healthcare Equity Statements

In terms of healthcare equity, the mean scores of respondents' agreement with various statements revealed a cautiously optimistic view. For example, "AI systems ensure fair access to healthcare for all patients" received a mean score of 3.5, suggesting moderate confidence that AI helps promote equal treatment. The statement "I am sure I can access healthcare in both rural and urban areas equally using AI" received a slightly lower mean score of 3.3, reflecting an awareness of ongoing challenges in equal access between urban and rural settings. Finally, the statement "AI usage in the hospital supports a balanced and non-biased healthcare experience" scored a mean of 3.4, signaling that while AI was seen as beneficial, some respondents perceived persistent biases or inequalities in its application.

Statement	Mean
AI systems ensure fair access to healthcare for all patients.	3.5
I am sure that I can access healthcare in both rural and urban areas equally using AI.	3.3
AI usage in the hospital supports a balanced and non-biased healthcare experience.	3.4
I have not observed any difference in treatment quality for different demographics due to AI systems.	3.3

Table 15: Concern about data security

4.6 Correlation Analysis

	AI Adoption	*Patient Privacy*	*Data Security*	*Healthcare Equity*
AI Adoption	1			
Patient Privacy	0.619397747	1		
Data Security	0.594941858	0.484345705	1	
Healthcare Equity	0.388692325	-0.075734827	-0.145420811	1

Table 16: Correlation analysis

4.6.1 Correlation Between AI Adoption and Patient Privacy

The correlation between AI adoption and patient privacy is moderately strong and positive (r = 0.619). This finding suggests that as AI adoption increases within healthcare settings, concerns about patient privacy also tend to rise, indicating a relationship worth further exploration regarding privacy risks.

4.6.2 Correlation Between AI Adoption and Data Security

The positive correlation between AI adoption and data security (r = 0.595) suggests a moderately strong association, where increased adoption of AI corresponds with heightened data security concerns. This shows potential risks related to data security as healthcare facilities increasingly implement AI technologies that handle sensitive information.

4.6.3 Correlation Between AI Adoption and Healthcare Equity

The correlation between AI adoption and healthcare equity is weaker but positive (r = 0.389). This suggests a moderate link, indicating that as AI adoption grows, there may be perceived improvements in healthcare equity. However, the strength of this association is less than those related to privacy and security.

4.7 Hypothesis Test

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	18.13586957	1	18.13586957	45.3313055	1.42476E-05	3.893060776
Within Groups	5.805217391	182	0.400073842			
Total	23.94108696	183				

Table 17: H_0 ANOVA

H_0 There is no significant effect of AI adoption on patients' privacy in Kenya**.** The F-statistic (45.33) is high, and the p-value (0.00001) is less than 0.05. This confirms that AI adoption significantly affects data security, hence rejecting the null hypothesis.

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	14.32347826	1	14.32347826	29.7376378	3.72E-05	3.893060776
Within Groups	6.495652174	182	0.481661601			
Total	20.81913043	183				

Table 18: H_1 ANOVA

H_1 There is no significant effect of AI adoption on data security in medicine in Kenya. The F-statistic (29.73) is large, and the p-value (0.00003) is very small compared to the significance level (0.05). This indicates that AI adoption significantly impacts patient

privacy. This means that the null hypothesis is rejected since AI adoption has a significant effect on data security.

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	2.722663043	1	2.722663043	4.998510712	0.01345073	3.893060776
Within Groups	7.787717391	182	0.544694850			
Total	10.51038043	183				

Table 19: H_2 ANOVA

H_2 There is no significant effect of AI technology adoption on healthcare equity and accessibility in Kenya. The F-statistic (4.99) is moderate, and the p-value (0.013) is less than 0.05, indicating a statistically significant but moderate impact of AI adoption on healthcare equity. Since the F-statistic is smaller than in the first two tests, this confirms that AI adoption has a significant but less strong impact on healthcare equity, so we reject the null hypothesis.

CHAPTER FIVE: SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

5.1 Introduction

In this chapter, the summary of the results of the study on ethical issues arising from the use of AI in NWH specifically in the area of patient privacy, data security, and healthcare equality and access is discussed. Based on the questionnaire data and the subsequent qualitative analysis, the paper identifies the effects of AI in the management of hospital operations, patients' experience as well as the perceived ethical issues related to it.

5.2 Summary

Based on the findings of the study, the major ethical concerns in implementing AI in delivering care in NWH are put forth below. AI systems bring better diagnostics for patients, more effective management of patient data, and some potential opportunities to expand the availability of healthcare services including in geographically isolated regions. Nevertheless, the research shows rather serious issues with privacy and data protection among patients combined with diverse views on how AI impacts healthcare equality.

5.2.1 How Does AI Adoption in NWH Impact Patient Privacy?

Given that AI adoption at NWH requires access to patient data, including sensitive health information, for tasks such as diagnostics or patient monitoring. Patients are concerned that there's a potential for data privacy breaches. According to the survey, 65.2 percent of respondents worried about privacy breaches from AI systems. Furthermore, the hospital's adherence to patient privacy was only moderately confident, and current AI implementations may not be sufficiently transparent regarding how their data is used.

The more that AI relies on data to improve functionality, the more the potential for privacy risks exists if that data is mishandled. Accordingly, deontological ethics, which emphasize the respect for the rights of the patients, as well as the rigorous privacy safeguards, informed consent processes, and transparent data use practices are imperative to maintain patient trust.

5.2.2 How Does AI Adoption in NWH Impact Data Security?

The adoption of AI systems in healthcare is dependent on data security. This study shows that many respondents were concerned about the security of their health information in AI systems. With concerns about unauthorized access and possible cyber threats, robust cybersecurity measures such as data encryption, secure access controls, and regular security audits are necessary.

The correlation analysis of the study showed a strong correlation between the adoption of AI and data security concerns. As such, there is a need to implement comprehensive data protection strategies to mitigate risks and comply with Kenya's Data Protection Act of 2019, which is in line with utilitarian ethics that focuses on the collective benefit of secure healthcare data practices.

5.2.3 How Does AI Adoption in NWH Impact Healthcare Access and Equity?

AI can help reduce geographic and resource-based barriers to healthcare access. According to survey responses, 71.8 percent of respondents believe AI has improved or somewhat improved NWH's healthcare accessibility. However, there are disparities since urban settings with more resources are quicker to adopt AI, which could further widen the gap between urban and rural healthcare access.

While AI facilitates remote diagnostics and telemedicine, limited technological infrastructure and resources in rural areas can restrict equitable access. Addressing these disparities requires targeted investment in infrastructure and AI solutions adapted to rural needs, supporting the utilitarian goal of maximizing healthcare access for the greatest number of patients.

5.3 Conclusion

The adoption of AI in healthcare, especially at Nairobi West Hospital (NWH) has a dual impact, that is, it has enhanced diagnostic precision, patient monitoring, and operational efficiency. However, there are still major ethical issues. The biggest issue in terms of patient privacy is that AI needs access to private data, which brings concerns of unauthorized access, and misuse of data. Data security is also important. The fear of breaches, data leaks, and other cyber threats means that there is a need for enhanced cyber security measures. While AI extends healthcare accessibility using tools such as telemedicine, the potential for existing inequities to widen further between urban and rural areas without the right interventions is high hence the right measures should be put in place to ensure a fruitful adoption process.

5.4 Recommendations for Policy Practice

Some recommendations are made to address these ethical concerns. To reassure patients about data handling, NWH should strengthen privacy protocols with clear consent processes, anonymization, and transparent communication. Similarly, investing in cybersecurity, for instance, encryption, secure access controls, and frequent audits is essential to protect patient data. Equitable access should also be a priority, and resources focused on rural areas so that AI does not benefit only urban areas. More trust will come

from transparent patient engagement about the role, safeguards, and transparency around AI in healthcare.

5.5 Recommendations for Further Research

While this study has provided valuable insights into the ethical implications of Artificial Intelligence adoption in healthcare, future research can focus on understanding AI's long-term ethical impacts on healthcare. Longitudinal studies could reveal changes in patient privacy, data security, and accessibility over time, helping institutions adapt policies to meet evolving needs. Comparative studies across hospitals and regions would identify effective practices and shared challenges, informing more standardized ethical guidelines. Additionally, policy frameworks balancing innovation with patient protection are crucial for Kenya, as these can guide AI integration in a way that maximizes benefits while upholding ethical standards, setting a foundation for responsible AI use in the country's healthcare system.

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APPENDICES

Appendix A: Questionnaire

The purpose of this questionnaire is to collect data on the ethical implications of AI adoption on patients in Nairobi West Hospital. The information provided will be used for research purposes only and will be kept confidential.

Section 1: General Information

Please tick where appropriate

1. Kindly indicate your gender:
   a) Male ( ) b) Female ( ) c) Prefer not to say ( )
2. Kindly indicate your age bracket
   a) 18 – 25 ( )
   b) 26 – 35 ( )
   c) 36 – 45 ( )
   d) 46 years and above ( )
3. How Familiar are you with AI Technology in Healthcare?
   a) Very familiar ( )
   b) Somewhat familiar ( )
   c) Not familiar at all ( )

Section 2: AI Adoption

1. Have you personally noticed or interacted with any AI systems in Nairobi West Hospital?
   a) Yes ( )
   b) No ( )

2. How helpful did you find AI systems you interacted with during your treatment?
    a) Very helpful ( )
    b) Somewhat helpful ( )
    c) Neutral ( )
    d) Not helpful ( )

Section 3: Patient Privacy

1. How comfortable are you with AI accessing your health information?
    a) Very comfortable
    b) Somewhat comfortable
    c) Neutral
    d) Somewhat uncomfortable
2. Have you experienced any concerns about privacy due to AI systems at the hospital?
    a) Yes
    b) No
3. Please rate your agreement with the following statements on a scale of 1 to 5 (1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree)

No.	Statements	1	2	3	4	5
1	I am confident that AI systems in Nairobi West Hospital respect patient privacy.					

2	I am aware of how my health data is used by AI systems in the hospital.					
3	I am confident that AI usage at the hospital includes my consent for data handling.					

Section 4: Data Security

1. How concerned are you about the security of personal data in AI systems
   a) Very concerned
   b) Concerned ( )
   c) Neutral ( )
   d) Not concerned ( )
2. Please rate your agreement with the following statements on a scale of 1 to 5 (1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree)

No.	**Statements**	**1**	**2**	**3**	**4**	**5**
1	I believe that my health information is safe from cyber threats in the hospital's AI systems.					
2	I am confident that data breaches involving patient data are promptly reported and addressed by the hospital.					

Section 5: Healthcare Equity and Accessibility

1. In your own opinion has AI impacted access to healthcare?
   a) AI has improved access significantly
   b) AI has somewhat improved access
   c) There is no change in access
   d) AI has limited access
2. Please rate your agreement with the following statements on a scale of 1 to 5 (1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree)

No.	Statements	1	2	3	4	5
1	AI systems ensure fair access to healthcare for all patients.					
2	I am sure that I can access healthcare in both rural and urban areas equally using AI.					
3	AI usage in the hospital supports a balanced and non-biased healthcare experience.					
4	I have not observed any difference in treatment quality for different demographics due to AI systems.					

Section 6: Overall Experience and Recommendations

1. How satisfied are you with the implementation of AI in Nairobi West Hospital?
   a) Very satisfied ( )

b) Satisfied ( )

c) Neutral ( )

d) Dissatisfied ( )

e) Very dissatisfied ( )

2. What do you consider the primary ethical concerns in using AI for healthcare at Nairobi West Hospital?

a) Privacy of the patients ( )

b) Security of patient data ( )

c) Healthcare equity ( )

d) Transparency in AI operations ( )

e) Other: ……..

Appendix B: Work Plan Table

Activity	**Timeline**
Project proposal	June, 2024
Proposal presentation	July, 2024
Data collection	August, 2024
Data analysis	September, 2024
Final draft	October, 2024
Final project presentation	November, 2024