The Effect of Artificial Intelligence Applications on Quick Decision-Making in Government Hospitals in Al Madinah Al Munawarah

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Abstract: The study aims to identify the effect of artificial intelligence applications on quick decision-making in government hospitals in Al Madinah Al Munawarah. The researcher used the descriptive approach with the analytical method in order to achieve the objectives of the study. The study population consists of doctors, nursing staff, and technical and administrative staff in government hospitals in Al Madinah Al Munawarah in Kingdom of Saudi Arabia, who number (6897) according to the statistics of the year 1445 AH. The sample size was (364) of doctors, nursing staff, and technical and administrative staff in government hospitals in Al Madinah Al Munawarah in Kingdom of Saudi Arabia. As for the research results, it is clear that the total score for the first dimension, "Application of Fuzzy Logic Systems", came at an average of (2.26), with a percentage of (50.5%), which is a low percentage according to the study tool. As for the second dimension, "Implementing expert systems", the average was (2.64), with a percentage of (52.7%). The third dimension, "Application of neural network systems", had an average of (2.33) and a percentage of (46.6%), which is a low percentage according to the study tool. The fourth dimension, "The role of artificial intelligence on quick decision-making", came with an average of (4.31), and a percentage of (86.2%), which is a very high percentage according to the study tool. As for

the challenges dimension, the total score for the dimension “Challenges of applying artificial intelligence” was at an average of (3.51), with a percentage of (70.2%), which is a high percentage according to the study tool. The study recommended providing training and education, developing technological infrastructure, investing in cloud-based artificial intelligence solutions, and continuous evaluation and improvement.

Keywords: artificial intelligence - government hospitals - decision-making - government hospitals.

أثر تطبيقات الذكاء الاصطناعي على سرعة اتخاذ القرار في المستشفيات الحكومية بالمدينة المنورة

الملخص: تهدف الدراسة إلى التعرف على أثر تطبيقات الذكاء الاصطناعي على سرعة اتخاذ القرار في المستشفيات الحكومية بالمدينة المنورة. واستخدم الباحث المنهج الوصفي مع المنهج التحليلي لتحقيق أهداف الدراسة. يتكون مجتمع الدراسة من الأطباء وطاقم التمريض والطاقم الفني والإداري في المستشفيات الحكومية بالمدينة المنورة بالمملكة العربية السعودية والبالغ عددهم (6897) حسب إحصائيات عام 1445هـ. وبلغ حجم العينة (364) من الأطباء وطاقم التمريض والطاقم الفني والإداري في المستشفيات الحكومية بالمدينة المنورة في المملكة العربية السعودية. أما بالنسبة لنتائج البحث يتضح أن الدرجة الكلية للبعد الأول "تطبيق نظم المنطق المضبب" جاءت بمتوسط (2.26) وبنسبة مئوية (50.5%) وهي نسبة متدنية وفقا لنتائج البحث. إلى أداة الدراسة . أما البعد الثاني "تطبيق النظم الخبيرة" فقد بلغ المتوسط (2.64) وبنسبة مئوية (52.7%). أما البعد الثالث وهو "تطبيق أنظمة الشبكات العصبية" فقد حصل على متوسط (2.33) وبنسبة مئوية (46.6%) وهي نسبة منخفضة حسب أداة الدراسة. أما البعد الرابع وهو "دور الذكاء الاصطناعي في سرعة اتخاذ القرار" فقد جاء بمتوسط (4.31)، وبنسبة مئوية (86.2%)، وهي نسبة عالية جداً بحسب أداة الدراسة. أما في بعد التحديات فقد جاءت الدرجة الكلية لبُعد "تحديات تطبيق الذكاء الاصطناعي" بمتوسط (3.51)، وبنسبة مئوية (70.2%)، وهي نسبة عالية حسب أداة الدراسة. وأوصت الدراسة بتوفير التدريب والتعليم، وتطوير البنية التحتية التكنولوجية، والاستثمار في حلول الذكاء الاصطناعي السحابية، والتقييم والتحسين المستمر.

1.Introduction

The process of developing administrative and technical systems is one of the most important pillars of health care in Kingdom of Saudi Arabia. Hospitals in Kingdom of Saudi Arabia are considered an essential pillar for providing health care to citizens and residents. To ensure the quality and efficiency of this care, the development of administrative and technical systems plays a prominent and vital role. Effective administrative systems allow the hospital to be managed in a more organized and effective manner. Smooth internal operations are one of the main goals, and the introduction of advanced technologies can contribute to improving patient registration processes and medical file management, leading to reduced errors and improved patient experience (Al Alwan, 2020: 942). The role of technical development is not limited to administrative systems only, but also extends to advanced medical technology. Investing in modern medical equipment and devices enhances hospitals' ability to provide advanced medical services and accurate diagnosis, which leads to improving the level of health care provided. Another important aspect is that the development of administrative and technical systems can reduce administrative and operational costs. Thanks to automation and improvements in processes, resources can be saved and financial waste reduced, which contributes to enhancing the sustainability of hospitals and their ability to provide high-quality health services (Ajam, 2018: 96). The important technological developments that these hospitals are witnessing include the role of artificial intelligence is a key element in improving health services and developing medical care. Artificial intelligence is considered a powerful tool used to analyze huge medical data and has many applications in Saudi hospitals. There are many roles that artificial intelligence can play, such as helping doctors analyze medical images with high accuracy, which contributes to accelerating the diagnosis process and increasing accuracy in detecting diseases, analyzing patient data and providing personalized recommendations and personalized treatment based on that data, which enhances the effectiveness of treatment, as well as improving stock management and determining future needs for medicines and medical supplies. Patient experiences can also be customized using artificial intelligence, by improving appointment systems and providing accurate and smooth medical information. Artificial intelligence also has strong contributions to analyzing medical data to guide research and discover new and effective treatments.

Integrating smart technology such as artificial intelligence in Saudi hospitals contributes significantly to providing high-quality health services and enhances efficiency and effectiveness in health care provided to patients (Florea & Radu, 2019:381), since quick and effective decisions are one of the most important factors that determine the success of hospitals in providing excellent health services and meeting the needs of patients. In Kingdom of Saudi Arabia, the importance of this aspect is significantly increasing due to the quick development and great momentum in healthcare. Therefore, speed in decision-making represents an urgent challenge for Saudi hospitals in order to provide distinguished health services. But by using advanced technology and taking full advantage of big data, the decision-making processes can be improved and accelerated and overall healthcare enhanced.

2.The Study Problem

The Saudi health system is witnessing a noticeable increase in the number of cases and patients benefiting from health care, which places great pressure on hospitals to make quick and effective decisions. Health management also faces challenges in analyzing big data and using it to make strategic decisions that affect the efficiency of services, as technology is developing very quickly, including smart solutions that contribute to improving health care, but this requires quick decisions to be made regarding the adoption and integration of these technologies into the hospital environment.

Accordingly, the problem of the current study can be defined in the following question: "What is the effect of artificial intelligence applications on quick decision-making in government hospitals in Al Madinah Al Munawarah?"

3.Study Questions:

This study will seek to answer the following questions:

- What is the reality of applying fuzzy logic systems that affect quick decision-making in government hospitals in Kingdom of Saudi Arabia?
- What is the reality of implementing expert systems that affect quick decision-making in government hospitals in Kingdom of Saudi Arabia?

- What is the reality of applying neural network systems that affect quick decision-making in government hospitals in Kingdom of Saudi Arabia?
- What is the role of artificial intelligence on quick decision-making in government hospitals in Kingdom of Saudi Arabia?
- What are the challenges of applying artificial intelligence techniques that affect quick decision-making in government hospitals in Kingdom of Saudi Arabia?

4.Objectives of the Study:

- Determining the reality of applying fuzzy logic systems that affect quick decision-making in government hospitals in Kingdom of Saudi Arabia.
- Determining the reality of implementing expert systems that affect quick decision-making in government hospitals in Kingdom of Saudi Arabia.
- Determining the reality of applying neural network systems that affect quick decision-making in government hospitals in Kingdom of Saudi Arabia.
- Determining the role of artificial intelligence on speedy decision-making in government hospitals in Kingdom of Saudi Arabia.
- Determining the challenges that hinder the application of artificial intelligence technologies and that affect quick decision-making in government hospitals in Kingdom of Saudi Arabia.

5..Importance of the Study:

First: Theoretical Importance:

1. The study contributes to understanding how artificial intelligence technologies affect decision-making processes in hospitals, paving the way for improving health care and making it more effective.
2. The study contributes to analyzing the efficiency of applying artificial intelligence techniques in decision-making, which enables hospitals to identify the most effective tools and techniques in accelerating decision processes.
3. The study contributes to directing administrative and strategic decisions in hospitals to further adopt artificial intelligence technologies, which creates impactful changes in workflow and health care.

4. The study is an opportunity to expand scientific knowledge and development in the field of health care, which contributes to the production of new knowledge that benefits medical practices.
5. Providing the necessary support to make future decisions regarding investment in artificial intelligence technologies and directing efforts towards the most effective and sustainable aspects.

Second: Practical Importance:

1. Artificial Intelligence technologies enable massive amounts of medical data to be analyzed quickly and accurately, making it easier for decision-making based on accurate insights.
2. Artificial intelligence can help doctors analyze medical images and clinical data, speeding up diagnostic processes and increasing their accuracy.
3. Using AI analytics, personalized treatment plans can be provided to each patient based on their information and medical history.
4. Smart applications can create significant savings in the time and effort it takes for decision-making, which contributes to increasing work efficiency.
5. Speed of decision and appropriate intervention can improve the patient's experience within the hospital and increase his satisfaction.

6.Terminology of Study

Artificial Intelligence (AI)

The European Commission (2018:3) defines the term Artificial Intelligence (AI) to "systems that display intelligent behavior by analyzing their environment and taking actions – with a certain degree of autonomy – to achieve specific goals". Laird (et al., 1987:6) defined artificial intelligence (AI) as "the ability of a digital computer or computer-controlled robot to perform tasks commonly associated with intelligent beings". Russell and P. Norvig (2009: 16) defined artificial intelligence (AI) as "a branch of computer science that focuses on building and managing technology that can learn to independently make decisions and perform actions on behalf of humans".

7.Decision-Making:

Qureshi (2020: 872) defined decision-making as "the process during which an individual or group identifies the options available to them and chooses one of them to take the final step or decision". This work includes many steps such as collecting necessary information, analyzing data, and evaluating different options before making the final decision".

8.Methodology:

The descriptive approach will be used using the analytical method to describe the phenomenon that is the subject of the study and analyze its data and the relationship between its components.

9.Study Population:

Nursing staff, doctors, technical and administrative staff in government hospitals in Al Madinah Al Munawarah

10.Study Sample:

A random sample of 6897 nurses, doctors, technical and administrative staff will be selected.

11.Limits of the Study:

Place Limits: The study will be conducted in government hospitals in Al Madinah Al Munawarah.

Time limits: The study will take place during the year 1445 AH - 2023 AD.

Human Limits: The study will be conducted on nursing staff, doctors, and technical and administrative staff.

12.Tool of the Study:

The questionnaire will be used to obtain the necessary primary data. The questionnaire was designed to find out the effect of artificial intelligence applications on quick decision-making in government hospitals in Al Madinah Al Munawarah.

13.Review of Literature:

Al Sardiya's study (2022) entitled: "The degree to which school principals in Mafraq Governorate use artificial intelligence applications and their relationship to the quality of administrative decision-making"

The study aimed to identify the degree to which school principals in Mafraq Governorate use artificial intelligence applications and their relationship to the quality of administrative decision-making, and to reveal the influence of the following variables: gender, years of experience, and academic qualification on that. To achieve the objectives of the study, the descriptive correlational survey method was used. The study sample consisted of (365) male and female teachers from Mafraq Governorate schools during the first semester of the 2021/2022 academic year. They were selected by a simple random method. To achieve the study objective, a questionnaire consisting of (43) items was developed, and the validity and reliability of the tool was confirmed. The study findings showed that the degree to which school principals in Mafraq Governorate used artificial intelligence applications from the point of view of teachers was moderate, and that the quality of administrative decision-making was moderate. The results also showed that there were no statistically significant differences at the level of significance ($\alpha = 0.05$) in the areas of the measure of the use of artificial intelligence applications by school principals in Mafraq Governorate and the areas of the measure of the quality of administrative decision-making due to the variables of the study (gender, practical experience, and academic qualification). The results also showed that there is a positive, statistically significant correlation between the degree to which school principals in Mafraq Governorate use artificial intelligence applications and its fields and the quality of administrative decision-making. In light of the study findings, the researcher recommended several recommendations, including training school principals on artificial intelligence applications in order to raise the quality of administrative decision-making in schools in Mafraq Governorate, the necessity of preparing effective plans to train and qualify all school principals and teachers to apply artificial intelligence applications.

Saleh's study (2022) entitled: "Proposed procedures for developing the decision-making process in educational departments using expert systems as an application of artificial intelligence"

The study aimed to develop the decision-making process in educational departments using expert systems as an application of artificial intelligence. To achieve this goal, the study relied on the descriptive approach, and also relied on the questionnaire as a data collection tool. The study consisted of three dimensions, in addition to the part related to defining the study's problem, questions, and methodology. The first dimension included the theoretical and intellectual foundations of expert systems as one of the applications of artificial intelligence in educational administration, while the second dimension included the role of expert systems in the decision-making process and the third dimension included proposed procedures to develop the decision-making process in educational departments in Minya Governorate using expert systems as an application of artificial intelligence.

Alwan's study (2020) entitled: "Artificial Intelligence and Crisis Management: A Case Study of the COVID-19 Pandemic Crisis"

This study aimed to identify the most prominent roles of artificial intelligence in crisis management, by applying it to Covid-19virus pandemic crisis in the pre-crisis phase, the crisis response phase, and the post-crisis phase. It also aimed to identify the most prominent challenges, including governance challenges, human and material challenges, technical challenges, and ethical challenges that artificial intelligence faces in managing Covid-19virus pandemic crisis. To achieve these goals, a case study methodology was adopted based on the sequence from the general framework to the specific framework, and information is extracted based on this sequence.

Accordingly, the analysis was based on a matrix consisting of a horizontal dimension and a vertical dimension. The horizontal dimension of the matrix consists of the three stages of the crisis, and the vertical dimension consists of three components: The role of crisis management, the role of artificial intelligence in crisis management, and the role of artificial intelligence in managing Covid-19 crisis.

The study found a set of roles for artificial intelligence in all stages of crisis management, including: predicting crises, activating teamwork, and generating knowledge. The study also found another set of roles for artificial intelligence to manage Covid-19 crisis, including: training, early diagnosis, and evaluating the impact of the epidemic. The study identified the most prominent challenges facing artificial intelligence in managing Covid-19 crisis,

classified into governance challenges, human and material challenges, technical challenges and ethical challenges. In conclusion, the study presented some recommendations drawn from the results.

Al Enezi's study (2020) entitled: "The Effect of artificial Intelligence on the Performance of Organizations: A Case Study of the Primary Health Care Corporation in the State of Qatar" This study aimed to identify the effect of artificial intelligence on the performance of organizations (internal operations, training and growth, auditor satisfaction), and the researcher followed the descriptive analytical approach to conduct this study. The study sample included (130) employees of the Primary Health Care Corporation in the State of Qatar, and the study used a tool developed for this purpose. The study findings showed that the arithmetic averages were very high, high, and medium for the independent dimension (artificial intelligence), and that the arithmetic average for the overall dimension (organizational performance) reached (4.00). The second dimension (training and growth) came in first place, followed in last place by the first dimension (internal processes). The results also showed that the independent variable (artificial intelligence) has a statistically significant effect on the dependent variable (task performance) with its combined dimensions (internal operations, training and growth, and auditors' satisfaction). Based on the study results, the researcher made several recommendations, as follows: It is necessary to pay attention to artificial intelligence applications related to the process of canceling customer electronic subscriptions, and to ensure that they are completed in a quick and easy manner, ensuring attention to the conduct of internal operations in the organization, improving relations between its employees and ensuring their commitment to regulations and laws.

Agam's study (2018) entitled: "Artificial Intelligence and its Implications for High-Performing Organizations: An Exploratory Study in the Ministry of Science and Technology" The study addressed the concept of artificial intelligence and its impact on high-performance organizations. The Ministry of Science and Technology was intentionally chosen to conduct the study and distribute the questionnaire. The study included mid-line managers because they were in direct contact with the topics covered by the study to know the impact of the four types of artificial intelligence that were studied, including: Expert systems, neural networks, genetic algorithms, and intelligent agents influence the ministry's work. To

determine the impact, two main hypotheses and eight sub-hypotheses were developed. A questionnaire was used to collect data. Forty questionnaires were distributed and retrieved in full. They were subjected to the Cronbach Alpha test to determine the validity and reliability of the tool. Arithmetic means, standard deviations, correlation and effect coefficients were used. A set of conclusions were reached, the most important of which is the existence of a significant correlation and the presence of a moral impact of the application of artificial intelligence within the departments investigated in the ministry. The results were consistent with the two hypotheses of the study. The researcher also presented a set of recommendations, the most important of which was the need to expand applications of artificial intelligence and according to the departments' need for each type of artificial intelligence in order to advance the ministry's reality to a better level.

14.Theoretical Framework and Literature of the Study

The Concept of Artificial Intelligence:

Laird et al (1987) defined artificial intelligence (AI) as a field in computer science concerned with creating technological systems and programs that have the ability to perform tasks that usually require human intelligence with the aim of developing systems capable of learning, thinking, making decisions and adapting to situations independently, based on data and analyses. The concept of artificial intelligence includes a wide range of technologies and concepts, including what the study (Pliakos, et.al, 2019) showed in the following:

1. **Machine Learning**: Machine learning allows computer systems to analyze data and gain experience by interacting with the environment and data, without the need for explicit programming.
2. **Artificial Neural Networks**: They depend on imitating the work of neural networks in the human brain to process information and analyze data.
3. **Natural Language Processing**: It allows the computer to understand and analyze human language and interact naturally with texts and commands.
4. **Smart Robotics and Autonomous Systems**: It allows robots and systems to carry out tasks independently without human intervention.
5. **Artificial Thinking**: Seeking to give artificial intelligence systems the ability to make independent decisions based on data and analyses.

6. **Narrow and General Artificial Intelligence AI**: Narrow artificial intelligence focuses on solving a specific task, while general intelligence aims to outperform systems in a wide range of tasks in a human-like manner.
7. **Self-adaptation and continuous improvement**: Artificial intelligence allows systems to adapt to the changing environment and continuously improve their performance.

Artificial Intelligence is a developing field that generates a lot of interest and is used in various industries such as medicine, business, industry, and technology.

15.Areas of Using Artificial Intelligence in Saudi Hospitals

Artificial intell00igence is considered one of the modern tools that enhance innovation and improve health services in Saudi hospitals, and Alwan's study (2020) showed the areas of use of artificial intelligence in this context:

1. **Diagnosis of diseases:**

- **Medical image analysis**: Artificial intelligence is used to analyze medical images such as X-rays and MRI to diagnose diseases with high accuracy.
- **Clinical data analysis**: Artificial intelligence can be used to analyze patient data and medical records to identify factors associated with diseases and provide accurate treatment guidance.

2. **Improving Health Care Services:**

- Personalize care: Artificial intelligence helps direct medical care for each patient based on their health records and surrounding factors.
- Improving r0eception and emergency operations: It can be used for forecasting, early reporting of emergency situations and better prioritization.

3. **Resource Management and Planning:**

- Providing administrative efficiency: Artificial intelligence can be used to analyze performance data and effectively use resources such as medical beds and clinical beds.

- Forecasting needs: It helps in analyzing data to predict future needs for resources and medical devices.

4. **Development of Treatments and Medicines:**

- Research and development: Artificial intelligence can be used to analyze genetic data and clinical studies to develop effective treatments and medicines.
- Personalization of treatments: It can be used to customize medical treatments to the needs of specific patients.

5. **Personal Care and Communication with Patients:**

- **Healthcare applications**: Applications can be developed that facilitate communication between doctors and patients and provide personalized health advice.
- **Medical Robots**: Using robots to assist in medical care and provide assistance in certain medical procedures.

16.Requirements for Applying Artificial Intelligence in Saudi Hospitals

The application of artificial intelligence in Saudi hospitals requires consideration of several requirements to ensure the success and effectiveness of these technologies. Among these requirements are what Al Enezi's (2020) study explained in the following:

Data and Analysis:

- Reliable and sufficient data: Providing medical data of high quality and sufficient quantity to support artificial intelligence operations.
- Data Analysis: The ability to analyze and use data effectively to obtain accurate insights and guidance.

Technological Infrastructure:

- **Integrated and compatible systems**: The necessity of having a technological infrastructure capable of supporting artificial intelligence applications and integrating them with current hospital systems.

Training and Development:

- **Qualifying Cadres**: Providing training and education for doctors, nurses, and medical personnel on the use of new smart technologies.
- **Continuous Development**: the ability to keep pace with technological developments and continuous updates in the field of artificial intelligence.

Security and Privacy:

- **Data Protection**: Implement security measures and protect patient data and sensitive medical information from hacks and leaks.
- **Compliance with legislations**: Ensuring that the AI application complies with laws, health regulations, and privacy requirements.

Leadership Support and Funding:

- Administrative support: The presence of leadership support that encourages the application and investment in smart technologies.
- Sustainable financing: Allocate a sufficient budget to develop and maintain the hospital's artificial intelligence systems.

Communication and Transparency:

- **Exchange of knowledge and experiences**: Encouraging communication and exchange of knowledge with other hospitals and relevant parties for continuous learning and application of best practices.
- **Transparency**: Establishing artificial intelligence projects in a transparent manner that achieves trust and enhances the effective exchange of information.

Achieving the success of implementing artificial intelligence in hospitals requires considering these different aspects and focusing on meeting technical, operational, legal and human requirements.

17.Challenges Facing the Application of Artificial Intelligence in Saudi hospitals

The use of artificial intelligence in Saudi hospitals is witnessing remarkable progress in improving health care and making medical services more effective and accurate. However,

there are many challenges faced by the application of artificial intelligence, including what Ajam's study (2018) explained in the following:

1. **Infrastructure and Technology:**

- **Technology transformation**: Adopting the technology needed to implement AI can be expensive and require modernization of existing hospital infrastructure.

2. **Data and Privacy:**

- **Data quality**: Providing high-quality, reliable data is a challenge, as AI relies on accurate data to perform reliably.
- **Privacy and security**: Keeping medical data and personal information of patients requires following strict procedures to maintain privacy and security.

3. **Interaction with Human Elements:**

- **Acceptance of technology**: New technologies may face resistance from some medical or administrative personnel due to lack of confidence in the new system or fear of switching to the technology.

4. **Training and Skills:**

- **Training cadres**: The application of artificial intelligence requires training medical and technical personnel to use new technologies, and this requires investment in training and education.

5. **Laws and Regulations:**

- Health legislation: Hospitals may face legal or regulatory restrictions in using smart technologies in healthcare.

6. **Challenges of Saving and Investing:**

- **Costs and sustainability**: Implementing AI can be expensive and require ongoing investments, which can be a challenge for hospitals under financial pressures.

These challenges are part of the many factors that must be considered and addressed when applying smart technologies such as artificial intelligence in the medical field. The success of these technologies requires strategic thinking and good planning, in addition to cooperation between the public and private sectors and the adoption of solutions that meet the actual needs of patients and medical personnel.

To overcome these challenges, Saudi hospitals must invest in:

- **Smart decision-making technologies**: Adopting artificial intelligence systems and big data analysis to provide accurate and quick insights for decision-making.
- **Technical infrastructure development**: The necessity of updating systems and software and providing the necessary infrastructure for modern technology.
- **Strengthening organizational and leadership capabilities**: developing leadership skills in making quick and influential decisions.

Quick decision-making is a major challenge facing Saudi hospitals, but technology and improving administrative capabilities can contribute to meeting this challenge and achieving the provision of distinguished health services (Al Alwan, 2020: 974).

18.The role of artificial intelligence in speedy decision-making in Saudi hospitals:

Artificial intelligence plays an important and diverse role in improving health services within hospitals in Kingdom of Saudi Arabia. Al Anazi's (2020) study explained some of the main roles that artificial intelligence can play in this context:

1. **Assistant diagnosis and analysis of medical images**: Artificial intelligence can help doctors analyze and interpret medical images such as X-rays, CT scans, and MRI images. This can speed up the diagnostic process and help detect diseases and changes more accurately.
2. **Improving patient experience**: Artificial intelligence can be used to personalize patient experiences, such as improving appointment and scheduling systems, providing accurate information about health conditions, and providing immediate responses to patient inquiries.

3. **Improving inventory and resource management**: Artificial intelligence can improve inventory management in hospitals by anticipating needs, reducing waste, and ensuring the accurate and effective provision of medicines and medical supplies.
4. **Providing personalized healthcare**: Artificial intelligence can be used to analyze big data for patients and provide personalized recommendations and personalized treatment based on that data.
5. **Developing medical research**: Artificial intelligence can contribute to analyzing large medical data to identify new trends and treatments and guide medical research.
6. **Improving practical management**: Artificial intelligence can be used to improve medical management processes, analyze financial data, and provide guidance to improve efficiency and reduce costs.

Artificial intelligence applications contribute to improving the quality of health care and providing better medical services. They also contribute to providing health care more efficiently and effectively to patients in Kingdom of Saudi Arabia.

19.Methodological Procedures of the study

Field Study Procedures

This section deals with a detailed description of the procedures followed by the researcher in implementing the study, including a definition of the study methodology, a description of the study population and its sample, design and preparation of study tool used (the questionnaire) and ensuring its validity and reliability, as well as the procedures for using and applying the study tools, and the statistical treatments that the researcher relied on in analyzing the study findings.

First: The Aim of the Field Study:

The study aimed to identify the effect of artificial intelligence applications on quick decision-making in government hospitals in Al Madinah Al Munawarah.

Second: Methodology:

The researcher used the descriptive method using the analytical method in order to achieve the objectives of the study, which is defined as: “It deals with events, phenomena, and

practices that exist and are available for measurement, and the study as it is without interference from the researcher in its course, and the researcher can interact with them, describe them, and analyze them" (Darwish, 2017 AD).

Third: Population of the Study

The study population consists of doctors, nursing staff, and technical and administrative staff in government hospitals in Al Madinah Al Munawarah in Kingdom of Saudi Arabia, numbering (6897) according to the statistics of the year 1445 AH.

Fourth: Study Sample:

The study sample represents the original community, and contains its features and characteristics. It consists of doctors, nursing staff, and technical and administrative staff in the government hospitals of Al Madinah Al Munawarah in Kingdom of Saudi Arabia. The sample was determined based on the size of the original population (6897), according to the American Association's approach to determining sample size, and calculating the equation. The sample size was (364) doctors, nursing staff, and technical and administrative staff in government hospitals in Al Madinah Al Munawarah in Kingdom of Saudi Arabia, and they represent the study population. The questionnaire tool was distributed to doctors, nursing staff, and technical and administrative staff in government hospitals in Al Madinah Al Munawarah in Kingdom of Saudi Arabia from the sample.

Characteristics of the Study Sample:

- **Gender**

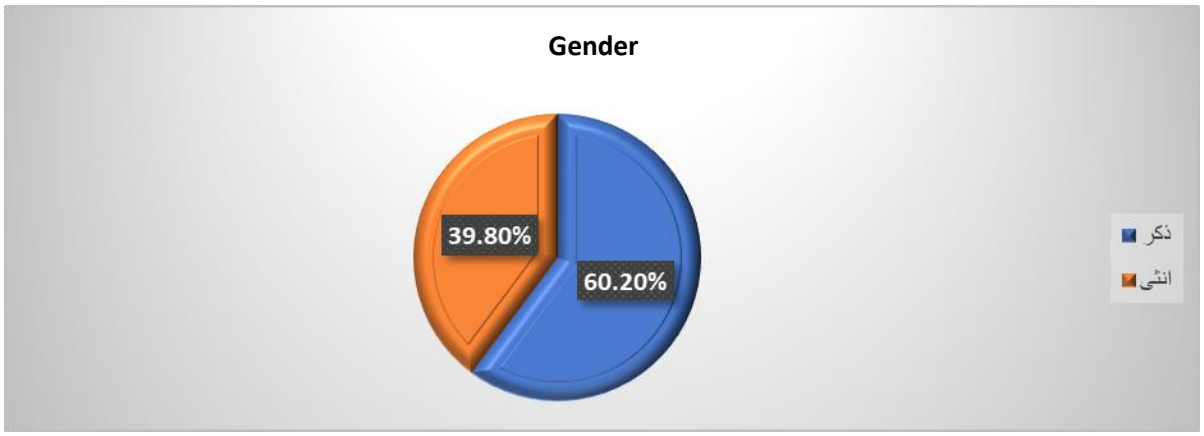
Table (1)

Distribution of sample members by gender

Gender	Frequency	%
Males	60.2	219
Females	39.8	145
Total	100.0	364

Table No. (1) shows that the percentage of males reaches 60.2% of the sample size and that the percentage of females reaches 39.8%.

Figure (1) shows the percentage of males and females in the study sample



- **Academic Qualification**

Table (2)

Distribution of sample members according to academic qualification

Qualification	Total study sample	%
Less than the Bachelor	81	22.3
The Bachelor	230	63.2
Master's Degree	37	10.2
PhD	16	4.4
Total	364	100.0

It is clear from the previous table that the highest percentage is the number of holders of a bachelor's degree at a rate of (63.2%), followed by those who hold less than a bachelor's degree at a rate of (22.3%).

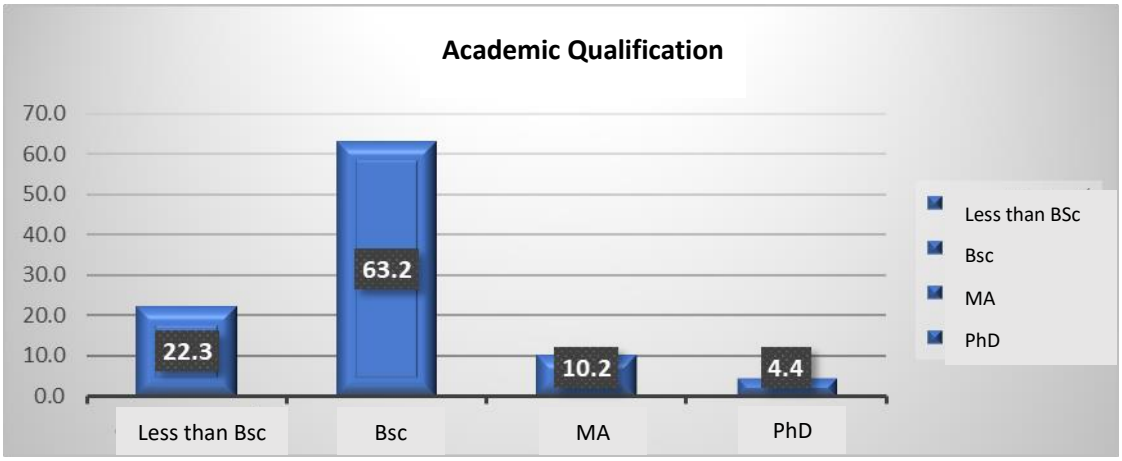


Figure (2): the percentage for the academic qualification variable

- **Experience**

Table (4)

Distribute the research sample according to experience

Stage	Frequency	%
Less than 5 years	75	20.6
5 to 10 years	151	41.5
More than 10 years	138	37.9
Total	364	100.0

It is clear from the previous table that the highest percentage of those with less than 5 to 10 years of experience reached (41.5%), followed by those with more than 10 years of experience with a rate of (37.9).

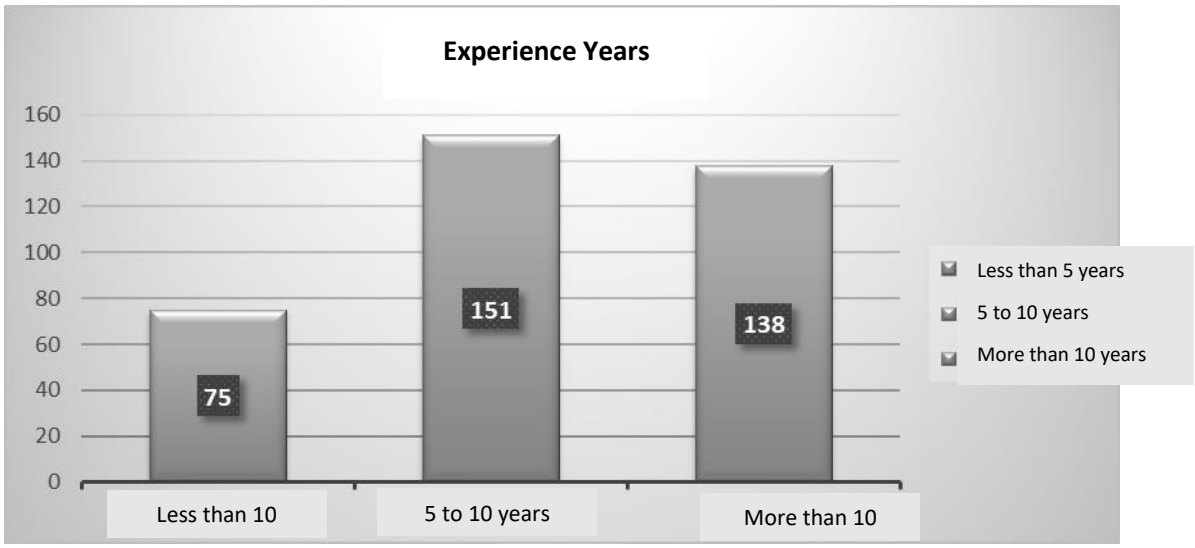


Figure (4): the percentage in relation to the experience variable

- **Job**

Table (5)

Distribution of the study sample according to jobs

Stage	Frequency	%
Less than 5 years	75	20.6
5 to 10 years	151	41.5
More than 10 years	138	37.9
Total	364	100.0

It is clear from the previous table that the highest percentage is for the position of doctors, at a rate of (44.8%), followed by the position of nurses, at a rate of (28.3).

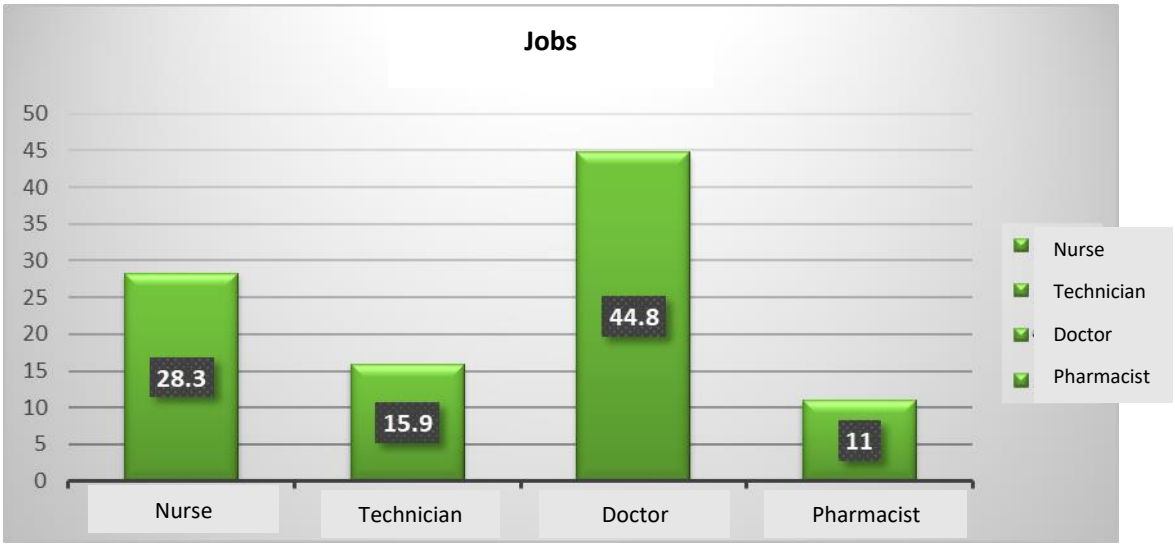


Figure (4): the percentage in relation to the function variable

20.Description of the design, preparation and control of the study tool:

Based on the nature of the data and the approach followed in the study, it was concluded that the most appropriate tool to achieve the objectives of the study is the questionnaire. The questionnaire was used to identify the effect of artificial intelligence applications on quick decision-making in government hospitals in Al Madinah Al Munawarah. The questionnaire was prepared by reviewing the literature related to the aim of the research, as well as after reviewing previous studies, Alwan's study (2020), Al Anazi's study (2020), and Ajam's study (2018), and its design is as follows:

A. Questionnaire: The current study used a questionnaire consisting of two sections:

1) The first section: data related to the study sample members, that is: personal data related to describing the study sample, which are:

i. Gender
ii. Qualification
iii. Job experience
iv. Job

2) The second section: consists of (25) phrases, divided into five dimensions as follows:

i. First dimension: applying fuzzy logic systems. It consists of (5) phrases.

ii. Second dimension: Application of expert systems and consists of (5) phrases.
iii. Third dimension: Application of neural network systems and consists of (5) phrases.
iv. Fourth dimension: The role of artificial intelligence in quick decision-making. It consists of (5) phrases.
v. Fifth dimension: Challenges of applying artificial intelligence. It consists of (5) phrases.

21.Standardization of the study tool - Psychometric Properties

- **Apparent validity (validity of arbitrators):**

The tool was presented to a number of (9) faculty members to express their opinion on the validity of the tool and its relationship to the variables of the study, the extent to which the tool's items match what it measures, as well as the scientific validity of the terms and concepts used and linguistic validity. The items were presented to a number of faculty members in the Department of Administration, and some of them modified the wording of some phrases and deleted others. An agreement rate of no less than (80%) was relied upon.

- **Content validity (logical validity):**

This was verified by:

- Reviewing literature, books, previous studies and research, and theoretical frameworks that dealt with the variables of the study in general.
- Analyzing these references and studies; This is to reach the dimensions and expressions that are related to the problem of the study.

Internal Consistency:

First: Measuring Correlation Coefficients.

To measure the reliability of the tool, the researcher calculated the reliability coefficients for the tool by applying it to a survey sample consisting of (30) doctors, nursing staff, and technical and administrative staff in government hospitals in Al Madinah Al Munawarah in Kingdom of Saudi Arabia. It was chosen randomly by calculating the correlation coefficient between each statement and the total score of the dimension it follows, as follows:

The first dimension: applying fuzzy logic systems (5 phrases)

Table (6)

Values of correlation coefficients between each statement of the first dimension: applying fuzzy logic systems with the total score

Paragraph No.	first dimension: applying fuzzy logic systems	Correlation coefficient
1	Fuzzy logic systems are used within government hospitals for decision-making.	0.652**
2	Government hospitals use fuzzy logic systems to process data that cannot be processed through traditional computer programs.	0.632**
3	Fuzzy logic systems are used within government hospitals in several fields.	0.674**
4	Fuzzy logic systems are used in government hospitals in combination with artificial intelligence applications such as expert systems.	0.628**
5	Fuzzy logic systems are used within government hospitals as advanced information systems that help in decision-making.	0.696**

Significant at a significance level of 0.01 ** Significant at a significance level of 0.05*

It is clear from Table (6) that the correlation coefficients between the items in the first dimension and the total score for the dimension were all positive and statistically significant,

with medium and high values. It is also clear from the previous table that the (correlation) values between each of the first dimension's phrases and the total score for the dimension ranged between (0.628) and (0.696), which are good correlation coefficients from which the researcher concludes that they are true to what they were designed to measure, and that they are significant at level (0.01), as well as being statistically significant. This indicates that the dimension of "applying fuzzy logic systems" has a high validity. Therefore, this result demonstrates the validity of the dimension items and its validity for field application.

The second dimension: application of expert systems.

Table (7)

Values of correlation coefficients between each statement of the second dimension: application of expert systems with the total score for the dimension

Paragraph No.	Second dimension: applying expert systems	Correlation coefficient
1	Government hospitals use expert computer systems to improve the decision-making process.	0.741**
2	Government hospitals rely on expert computer systems to solve various problems.	0.689**
3	Government hospitals rely on expert computer systems to acquire skills and knowledge in areas that help in decision-making.	0.617**
4	Government hospitals base their thinking processes on expert computer systems, and are not limited only to providing information.	0.614**
5	Expert systems contribute to modeling human experience in problem solving and decision-making.	0.639**

Significant at a significance level of 0.01 ** Significant at a significance level of 0.05*

It is clear from Table (8) that the correlation coefficients between the items in the second dimension and the total score of the dimension were all positive and statistically significant, with medium and high values. It is clear from the previous table that the (correlation) values

between each statement of the second dimension and the total score for the dimension ranged between (0.614) and (0.741), which are good correlation coefficients from which the researcher concludes that they are true to what they were designed to measure, and that they are significant at level (0.01).), as well as being statistically significant. This indicates that the "Application of Expert Systems" dimension has a high validity, and accordingly, this result demonstrates the validity of the dimension' paragraphs and its validity for field application.

Table (8)

Values of correlation coefficients between each statement of the third dimension: applying neural network systems with the total score for the dimension

Paragraph No.	Third dimension: neural networks system application	Correlation coefficient
1	Neural networks help government hospitals upload enormous information.	0.661**
2	Government hospitals use neural networks to create workflows through which they process information.	0.687**
3	Government hospitals rely on neural networks for their ability to derive information from complex data.	0.617**
4	Government hospitals use neural network systems to excel in learning.	0.683**
5	Neural networks provide government hospitals with multiple options.	0.674**

Significant at a significance level of 0.01 ** Significant at a significance level of 0.05*

It is clear from Table (7) that the correlation coefficients between the items in the third dimension and the total score of the dimension were all positive and statistically significant, with medium and high values. It is also clear from the previous table that the (correlation) values between each of the third dimension's phrases and the total score for the dimension ranged between (0.617) and (0.687). These are good correlation coefficients from which the researcher concludes that they are true to what they were designed to measure, and that they are significant at level (0.01), in addition to being statistically significant, which indicates that the dimension of "Application of Neural Network Systems" has a high validity. Therefore, this result demonstrates the validity of the dimension items and its validity for field application.

Table (9)

Values of correlation coefficients between each of the phrases of the fourth dimension: The role of artificial intelligence in quick decision-making with the total score for the dimension

Paragraph No.	Fourth dimension: role of artificial intelligence in quick decision-making	Correlation coefficient
1	Artificial intelligence contributes to providing quick information that contributes to speedy decision-making.	0.624**
2	Artificial intelligence can be used to diagnose some medical conditions, which allows the appropriate action to be taken quickly for the patient.	0.643**
3	Artificial intelligence contributes to transferring sufficient realistic expertise, in cooperation with the largest international hospitals, to government hospitals in the Kingdom.	0.609**
4	Artificial intelligence allows government hospitals in the Kingdom to keep pace with medical developments and administrative work, which helps in determining the most appropriate decisions when providing services.	0.637**
5	Artificial intelligence allows the provision of all information about the history of various diseases and methods of treatment, and a quick answer to any information needed by the medical staff, which contributes to the speed of making the appropriate decision.	0.641**

Significant at a significance level of 0.01 ** Significant at a significance level of 0.05*

It is clear from Table (9) that the correlation coefficients between the items in the fourth dimension and the total score of the dimension were all positive and statistically significant, with medium and high values. It is clear from the previous table that the (correlation) values between each of the phrases of the third dimension and the total score of the dimension ranged between (0.609) and (0.643). These are good correlation coefficients from which the researcher concludes that they are true to what they were designed to measure, and that they

are significant at level (0.01), in addition to being statistically significant, which indicates that the dimension of "Application of genetic algorithm systems" has a high validity. Therefore, this result demonstrates the validity of the dimension items and its validity for field application.

Table (10)

Values of correlation coefficients between each statement of the fifth dimension: Challenges of applying artificial intelligence in Saudi hospitals with the total score for the dimension

Paragraph No.	Fifth dimension: Challenges of applying artificial intelligence in Saudi hospitals	Correlation coefficient
1	Infrastructure needs strong technological updates.	0.624**
2	New technologies face resistance from some medical or administrative staff due to lack of confidence in modern technological systems.	0.639**
3	Hospitals face legal or regulatory restrictions in using smart technologies in healthcare.	0.618**
4	Strict procedures are followed to maintain privacy and security to preserve medical data and personal information of patients.	0.698**

5	The application of artificial intelligence requires training medical and technical personnel to use new technologies.	0.634**

Significant at a significance level of 0.01 ** Significant at a significance level of 0.05*

It is clear from Table (7) that the correlation coefficients between the items in the third dimension and the total score of the dimension were all positive and statistically significant, with medium and high values. It is also clear from the previous table that the (correlation) values between each of the third dimension's phrases and the total score for the dimension ranged between (0.618) and (0.698). These are good correlation coefficients from which the researcher concludes that they are true to what they were designed to measure, and that they are significant at level (0.01), in addition to being statistically significant, which indicates that the dimension of "Challenges of applying artificial intelligence in Saudi hospitals" has a high validity. Therefore, this result demonstrates the validity of the dimension items and its validity for field application.

22.Structural Validity of the Dimensions:

Table No. (11) shows the correlation values between the average of each dimension with the total average of all the dimension phrases, which shows that the correlation values have a good meaning and are significant at the significance level (0.01).

Table (11)

Values of correlation between each dimension of the questionnaire with the total score of the questionnaire phrases

S	Dimension	Correlation coefficient
1	Application of fuzzy logic systems	0.674**
2	Application of expert systems	0.682**
3	Application of neural network systems	0.649**
4	The role of artificial intelligence in speed of decision-making	0.693**
5	Challenges of applying artificial intelligence	0.678**

Significant at a significance level of 0.01 ** Significant at a significance level of 0.05*

It is clear from Table (11) that the correlation coefficients between the items in the first dimension and the total score for the dimension were all positive and statistically significant, with medium and high values. It is also clear from the previous table that the (correlation) values between all the scores of the first dimension, the second dimension, the third dimension, the fourth and fifth dimension, and the total score of the dimensions ranged between (0.649) and (0.693). These are good correlation coefficients from which the researcher concludes that they are true to what they were designed to measure, and that they are significant at level (0.01), in addition to being statistically significant, which indicates that the dimensions of the study have a high validity. Therefore, this result demonstrates the validity of the dimension items and its validity for field application.

Questionnaire Reliability:

The reliability of the study tool means that the tool will give the same results when applied multiple times to the same sample. This means to what degree the study tool will give close readings each time it is used, and it means ensuring that the response will be approximately the same if it is repeatedly applied to different people at different times.

Alpha Chronbach coefficient was used to verify the study tool, and Table (12) shows the values of the Cronbach Alpha reliability coefficients for each dimension of the questionnaire, which is shown in the following table:

Table (12)

Reliability coefficient (Cronbach's alpha) for the study dimensions

S	Dimension	No. of phrases	Cronbach's alpha
1	Application of fuzzy logic systems	5	0.889
2	Application of expert systems	5	0.878
3	Application of neural network systems	5	0.863
4	The role of artificial intelligence in speed of decision-making	5	0.891
5	Challenges of applying artificial intelligence	5	0.896

It is clear from the previous table that the reliability coefficients are high, ranging between (0.863) and (0.896), and from these values it is clear that the questionnaire is characterized by a high degree of reliability that the researcher is reassured about when applying it to the study sample.

Table (9)

Estimate of the average percentage of response for the two dimensions

Average	Average %	Estimate degree
From 1 to less than 1.8	20% to less than 36%	Very low
From 1.8 to less than 2.6	36% to less than 52%	Low
From 2.6 to less than 3.4	52% to less than 68%	Medium
From 3.4 to less than 4.2	68% to less than 84%	High
From 4.2 to less than 5	From 84 to 100%	20% to less than 36%

23.Study Results, Interpretation and Discussion

Introduction:

The researcher addresses the questions related to the study, with a review of the most important results that emerged through the application of the study tool (the questionnaire), especially from the analysis of its paragraphs. To identify the effect of artificial intelligence applications on quick decision-making in government hospitals in Al Madinah Al Munawarah, then verify the hypotheses of the study to know this role with the variables of the study, which are: -

1- Gender
2- Academic qualification
3- Experience
4- Jobs

24.Analysis and Interpretation of the Study Results:

1. What is the effect of artificial intelligence applications on quick decision-making in government hospitals in Al Madinah Al Munawarah?
2. What is the reality of applying fuzzy logic systems that affect quick decision-making in government hospitals in Kingdom of Saudi Arabia?
3. What is the reality of implementing expert systems that affect quick decision-making in government hospitals in Kingdom of Saudi Arabia?
4. What is the reality of applying neural network systems that affect quick decision-making in government hospitals in Kingdom of Saudi Arabia?
5. What is the role of artificial intelligence on quick decision-making in government hospitals in Kingdom of Saudi Arabia?
6. What are the challenges of applying artificial intelligence technologies that affect quick decision-making in government hospitals in Kingdom of Saudi Arabia?
7. Are there statistically significant differences at the level of significance (a = 0.05) due to the variables (gender - academic qualification - years of experience - job)?

Therefore, the researcher here addresses the answer to the questions related to the field study, while reviewing the most important results that emerged through the application of the study tool (the questionnaire), especially from the analysis of its paragraphs. Therefore, statistical treatments were carried out on the data resulting from applying the questionnaire

to the study sample, where the researcher used the Statistical Packages for the Social Studies (SPSS) program to obtain the study findings. To interpret the study findings and estimate the level of responses, the researcher relied on a five-point Likert scale, considering that the maximum score corresponds to the relative weight (100%). He also used statistical treatments for arithmetic means, standard deviations, frequencies, and ratios

First: Displaying the Results

First: Results related to the first dimension, applying fuzzy logic systems

Table (13) Arithmetic means and standard deviations for the application of fuzzy logic systems dimension

Paragraph No.	Phrases	Weight average	SD	%	Degree	Rank
1	Fuzzy logic systems are used within government hospitals for decision-making.	2.05	0.578	%41.0	Low	5
2	Government hospitals use fuzzy logic systems to process data that cannot be processed through traditional computer programs.	2.91	0.288	%58.2	Medium	1
3	Fuzzy logic systems are used within government hospitals in several fields.	2.2	0.718	%44.0	Low	4
4	Fuzzy logic systems are used in government hospitals in combination with artificial intelligence applications such as expert systems.	2.73	0.66	%54.6	Medium	3

5	Fuzzy logic systems are used within government hospitals as advanced information systems that help in decision-making.	2.74	0.437	%54.8	Medium	2
Total degree		2.527	0.2669	50.5%	Low	

It is clear from the previous table that the total score for the dimension "Application of fuzzy logic systems" came with an average of (2.26), with a percentage of (50.5%), which is a low percentage according to the study tool. Phrase No. (2) states that "government hospitals use fuzzy logic systems to process data that cannot be processed through traditional computer programs". This phrase came in ranked No. (1) as the highest ranking in the averages with an average percentage of (2.91) and a relative weight of (58.2%), while Phrase No. (1) came in the lowest ranking in the averages with a low percentage with an average of (2.05), and a relative weight of (41%), which stated, "Fuzzy logic systems are used within government hospitals for decision-making". These results were consistent with the study of Al Anzi (2020), some of whose findings were that there is a deficiency in the application of artificial intelligence technologies in health care institutions.

Second: Results related to the second dimension:

Table (14) Arithmetic means and standard deviations for the expert systems application dimension

Paragraph No.	Phrases	Weight average	SD	%	Degree	Rank
1	Government hospitals use expert computer systems	2.93	1.155	%58.6	Medium	1

	to improve the decision-making process.					
2	Government hospitals rely on expert computer systems to solve various problems.	2.58	0.898	%51.5	Low	3
3	Government hospitals rely on expert computer systems to acquire skills and knowledge in areas that help in decision-making.	2.38	0.487	%47.6	Low	5
4	Government hospitals base their thinking processes on expert computer systems, and are not limited only to providing information.	2.52	0.572	%50.3	Low	4
5	Expert systems contribute to modeling human experience in problem solving and decision-making.	2.78	0.974	%55.6	Medium	2
Total degree		2.637	0.4779	52.7	**Average**	

It is clear from the previous table that the total score for the dimension "Implementing expert systems" came at an average of (2.64), with a rate of (52.7%), which is a very high percentage according to the study tool. Phrase No. (1), which states that "government hospitals use expert computer systems to improve the decision-making process", was ranked No. (1) as the highest ranking in the averages, with an average percentage of (2.93), and a relative weight of (58.6%), while Phrase No. (3) was ranked lowest in the averages, with a low percentage with an average of (2.38), and a relative weight of (47.6%), which stated: "Government hospitals rely on expert computer systems to acquire skills and knowledge in

areas that help in decision-making". These results were consistent with the study of Al Alwan (2020), Al Anazi (2020).

Third: Results related to the third dimension:

Table (15): Arithmetic means and standard deviations. Application of neural network systems

Paragraph No.	Phrases	Weight average	SD	%	Degree	Rank
1	Neural networks help government hospitals upload enormous information.	1.38	0.485	%27.5	Very low	5
2	Government hospitals use neural networks to create workflows through which they process information.	2.40	0.574	%48.0	Low	3
3	Government hospitals rely on neural networks for their ability to derive information from complex data.	2.37	0.483	%47.4	Low	4
4	Government hospitals use neural network systems to excel in learning.	2.82	0.485	%56.4	Medium	1
5	Neural networks provide government hospitals with multiple options.	2.67	0.470	%53.5	Medium	2
Total degree		2.328	0.2241	46.6%	**Low**	

It is clear from the previous table that the total score for the dimension "Application of Neural Network Systems" came with an average of (2.33), with a percentage of (46.6%), which is a low percentage according to the study tool. Phrase No. (4) stated that "government

hospitals use neural network systems to excel in learning". Ranked No. (1) as the highest ranking in the averages with an average percentage of (2.82) and a relative weight of (56.4%), while Phrase No. (5) came in the lowest ranking in the averages with a very low percentage with an average of (1.38), and a relative weight of (27.5%), which stated: "Neural networks help government hospitals download enormous information". These results were consistent with a study Alwan (2020).

Fourth: Results related to the fourth dimension: The role of artificial intelligence on quick decision-making

Table (15): Arithmetic means and standard deviations. The role of artificial intelligence on quick decision-making

Paragraph No.	Phrases	Weight average	SD	%	Degree	Rank
1	Artificial intelligence contributes to providing quick information that contributes to speedy decision-making.	4.2	0.601	84.0%	Very high	
2	Artificial intelligence can be used to diagnose some medical conditions, which allows the appropriate action to be taken quickly for the patient.	4.39	0.592	87.8%	Very high	
3	Artificial intelligence contributes to transferring sufficient realistic expertise, in cooperation with the largest international hospitals, to government hospitals in the Kingdom.	4.16	0.670	83.2%	High	

4	Artificial intelligence allows government hospitals in the Kingdom to keep pace with medical developments and administrative work, which helps in determining the most appropriate decisions when providing services.	4.32	0.751	86.4%	Very high	
5	Artificial intelligence allows the provision of all information about the history of various diseases and methods of treatment, and a quick answer to any information needed by the medical staff, which contributes to the speed of making the appropriate decision.	4.48	0.419	89.6%	Very high	
Total degree		4.31	0.2705	86.2%	**Very high**	

It is clear from the previous table that the total score for the dimension "The role of artificial intelligence on quick decision-making" came at an average of (4.31), with a percentage of (86.2%), which is a very high percentage according to the study tool. Phrase No. (5), which states that "Artificial intelligence allows the provision of all information about the history of various diseases and methods of treating them, and a quick answer to any information needed by the medical staff, which contributes to the speed of making the appropriate decision". It was ranked No. (1) as the highest ranking in the averages, with an average percentage (4.48), and a relative weight (89.6%), while Phrase No. (3) was ranked lowest in the averages, with a high percentage with an average of (4.16), and a relative weight of (83.2%), which stated: "Artificial intelligence contributes to transferring sufficient realistic expertise, in cooperation with the largest international hospitals, to government hospitals in

the Kingdom". These results were consistent with Saleh's study (2022), which included among its findings the importance of the role of artificial intelligence in quick decision-making.

Fifth: Results related to the fifth dimension: Challenges of applying artificial intelligence

Table (15): Arithmetic means and standard deviations. Challenges of applying artificial intelligence

Paragraph No.	Phrases	Weight average	SD	%	Degree	Rank
1	Infrastructure needs strong technological updates.	3.99	0.584	%79.8	High	1
2	New technologies face resistance from some medical or administrative staff due to lack of confidence in modern technological systems.	3.53	0.576	%70.7	High	3
3	Hospitals face legal or regulatory restrictions in using smart technologies in healthcare.	3.14	0.483	%62.9	Medium	5
4	Strict procedures are followed to maintain privacy and security to preserve medical data and personal information of patients.	3.33	0.511	%66.6	Medium	4
5	The application of artificial intelligence requires training medical and	3.55	0.551	%71.0	High	2

	technical personnel to use new technologies.					
Total degree		3.509	0.1605	70.2%	**High**	

It is clear from the previous table that the total score for the dimension "Challenges of applying artificial intelligence" came at an average of (3.51), with a percentage of (70.2%), which is a high percentage according to the study tool. Phrase No. (1), which states that "the infrastructure needs strong technological updates", was ranked No. (1) as the highest ranking in the averages, with a very high percentage with an average of (3.99), and a relative weight of (79.8%), while Phrase No. (3) came in the lowest ranking in the averages with a high percentage with an average of (3.14), and a relative weight of (62.9%), which stated: "New technologies face resistance from some medical or administrative personnel due to a lack of confidence in modern technological systems". These results were consistent with the study of Al Sardiya (2022) and the study (Florea, & Radu, 2019), where among their results was that there are many challenges faced by regular institutions, the most important of which are resistance to change, providing information security, and also providing the necessary infrastructure for applying artificial intelligence.

Sixth: The Answer to the question: "What is the effect of artificial intelligence applications on quick decision-making in government hospitals in Al Madinah Al Munawarah?"

The researcher extracted the frequencies for each of the phrases: "What is the effect of artificial intelligence applications on quick decision-making in government hospitals in Al Madinah Al Munawarah" as follows:

Table (16): Arithmetic means and standard deviations for each dimension: "Applications of artificial intelligence"

Paragraph No.	Phrases	Weight average	SD	%	Degree	Rank
1	Application of fuzzy logic systems	2.53	0.267	50.6%	Low	5
2	Application of expert systems	2.64	0.478	52.8%	Medium	3
3	Application of neural network systems	2.56	0.160	51.2%	Low	4
4	The role of artificial intelligence on quick decision-making	4.31	0.270	86.2%	Very high	1
5	Challenges of applying artificial intelligence	3.51	0.1605	70.2%	High	2
Total degree		3.110	0.2705	62.2%	**Medium**	

It is clear from the previous table that the total score for the dimension on artificial intelligence applications was at an average of (3.11), with a percentage of (62.2%), which is an average percentage according to the study tool. Dimension No. (4) came in the highest ranking in the averages with a very high percentage with an average of (4.16), and a relative weight of (86.2%), and its title was "The role of artificial intelligence on quick decision-making". It was followed by Dimension No. (5) as the second highest in the averages, with a high percentage with an average of (3.51), and a relative weight of (70.2%), which was titled: "Challenges of applying artificial intelligence, followed by dimension No. (2) in the ranking of averages with a high percentage with an average of (2.64), and a relative weight of (52.7%), which was titled "Application of expert systems". This was followed by Dimension No. (3), which stated that "application of neural network systems" had a high percentage with an average of (2.56), and a relative weight of (51.2%). Phrase No. (3) also came in the lowest ranking in the averages, with a low percentage with an average of (2.53), and a relative weight of (50.5%), where it stated "Applying fuzzy logic systems".

25.Summary of Study Results:

Previously, the results of the field application of the study were presented in light of the responses of the research sample, and they were processed statistically using descriptive statistics and processed with specialized statistical programs, reaching the results, their analysis and interpretation. The study findings will be presented below, and recommendations and proposals will be presented.

26.Findings of the Study:

This includes presenting the most prominent findings of the study with regard to answering the questions and achieving its objectives, as follows:

1- The level of application of artificial intelligence systems is still weak in government hospitals in Al Madinah Al Munawarah due to many reasons, the most important of which is the lack of sufficient training among medical staff on the various artificial intelligence systems that can be applied within government hospitals.

2- It also became clear that there is a confusion between the concepts of artificial intelligence and its different types that can be applied within government hospitals.

3- It was also clear from the results that there are many challenges that prevent the application of artificial intelligence, the most important of which is providing infrastructure, as well as adequate training for medical staff to use artificial intelligence in diagnostic, therapeutic, technical or administrative aspects alike.

4- There is also a fear of data security and loss of information.

5- There is also a lack of good legislative and executive cover governing the process of applying artificial intelligence within government hospitals.

6- On the other hand, it was found that artificial intelligence, from the point of view of medical staff working in government hospitals, has a great impact on the decision-making process in government hospitals. It provides a huge amount of information that contributes to making appropriate decisions at the right time, its effective role in tracking the medical history of some patients, as well as its effective role in analyzing historical and current data on some endemic diseases and epidemics, which contributes to determining effective vaccines and treatments in a proactive manner.

27.Recommendations:

1. **Providing training and education**: Doctors, nurses and medical staff should be given opportunities to train in the use of smart technologies. This could include educational courses and workshops to understand how AI can be used to improve healthcare and streamline medical processes.
2. **Developing technological infrastructure**: Government hospitals must be equipped with the necessary infrastructure to accommodate artificial intelligence technologies, such as robust and secure computer systems and networks, and robust and secure data systems.
3. **Investing in cloud-based AI solutions**: Cloud computing can be beneficial for government hospitals that want to implement smart technology, as they can gain access to greater and more effective AI services without the need for large investments in infrastructure.
4. **Focus on security and privacy**: AI systems in hospitals must be highly protected and adhere to the highest standards of medical security and privacy.
5. **Continuous evaluation and improvement**: Continuous evaluation of AI applications is essential to ensure their efficiency and effectiveness. There must be mechanisms to measure the impact of the use of smart technologies on the quality of care and the efficiency of operations.

6. **Strengthening communication and partnerships**: Government hospitals can benefit from cooperation with technology companies and academic bodies to develop and improve artificial intelligence applications in health care. Implementing artificial intelligence in government hospitals requires a strategic vision and multifaceted efforts to ensure its effective integration within the healthcare environment.

28.Proposed Research

1. Studying the impact of applying artificial intelligence on improving the quality of health care within government hospitals.
2. Conducting studies on the financial and health costs and benefits of artificial intelligence applications in government hospitals.

3. Studying the effect of artificial intelligence on the experience of patients and patients, and its role in improving the patient experience within government hospitals.

29.References

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