In What Ways Does Artificial Intelligence Change the Work of Medical Experts in Hospitals?

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ABSTRACT,

This study is focused on how artificial intelligence (AI) can impact the job of medical experts. The motivation for this study comprises the impact of AI applications in the healthcare industry. In this case, the research entailed the current effects of AI in healthcare organizations and the potential positive and negative outcomes of the technology in the future. The primary objective of this research was to analyze how the jobs of medical experts change due to the rapid application of AI in health practices. The main research question that was developed was "In what ways does artificial intelligence can change the job design of medical experts in the hospital?" This study took the design of a qualitative research to describe the implications of AI in the healthcare industry. The study applied semi-structured interviews with ten medical experts to collect relevant data on the effects of AI on medical experts' job experience. The data collected was analyzed using thematic content analysis to understand the implications of the respondents' views on the role of AI on medical experts' job design. The findings of the research were that AI helps in the confirmation of diagnosis and accuracy in the diagnosis, improves patient outcomes, increases the autonomy of medical experts, improves physician role in healthcare, and enhances positive job feedback.

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CHAPTER 1: INTRODUCTION

The rapid technological advancement in different industries has led to the application of human intelligence in machines, which is called artificial intelligence. According to Bohr and Memarzadeh (2020), artificial intelligence (AI) refers to using human intelligence in machines through technological innovations. People from different fields such as healthcare experts and engineers, apply technology to replace human labor with machines. However, this concept does not imply that AI represents a class of robots aiming to eliminate human intelligence in the employment setup. In this case, scientists base AI on human intelligence to design machines to mimic and implement different tasks. Specialists such engineers can create devices to execute complex and straightforward roles that depend on the required human intelligence. In this way, the primary goal of AI involves imitating human activities, such as reasoning and learning, to impersonate services.

Experts in different sectors use this technology to provide quality services that align with human intelligence. AI plays significant roles in diverse industries. For example, engineers can design computers that can drive cars through the application of human intelligence (Barrat, 2013). The process involves technological innovations that mitigate the risks of self-driving vehicles to avoid collisions. Besides, experts apply the AI concept in the financial and transport industry (Hazarika, 2020). For example, in economic sectors, banks use AI to detect suspicious transactions that can lead to fraud. In healthcare, AI technology assists medical practitioners in dose drugs and offers efficient treatments for positive patient outcomes (Ahuja, 2019). The technology allows also the healthcare industry to perform multiple interventions that comprise surgical procedures in theaters. In this case, the engineers mimic doctors' intelligence to design the AI machines to offer healthcare services that a typical healthcare practitioner would provide to the clients.

This study is focused on the application of AI technology in the healthcare industry. Healthcare organizations utilize AI to realize affordable medical interventions and positive patient outcomes. The rapid rise of AI in the medical sector includes multiples examples, such as AI-assisted robotic surgery, clinical diagnosis, and drug discovery (Han et al., 2020). Health professionals liaise with engineers to produce intelligent machines that can apply human intelligence to improve quality medical services. For example, AI-assisted robotic surgery assists surgeons in enhancing their surgical outcomes (Dyrda, 2020).

In most cases, the results of surgery vary with a surgeon's experience and skills. Therefore, healthcare providers can minimize surgical outcomes due to human error using AI-assisted robotic surgery. Besides, doctors use AI to diagnose chronic illnesses, such as cancer. The technology allows health professionals to detect diseases at early stages to realize positive patient outcomes. More so, AI assists health professionals in discovering drugs for various illnesses. In this case, pharmaceutical companies improve drug discovery and play an essential role in mitigating high mortalities. The examples illustrate that AI promotes quality healthcare services (Han et al., 2020).

In this way, AI will have a substantial influence on the jobs of medical experts. Technology affects workers' skills in different ways. In the healthcare industry, engineers cooperate with health practitioners to invent technologies that directly impact the current healthcare services. The increasing complexity of the AI and the rise of big data in healthcare indicate that the technology will determine the criteria for deciding proficient doctors in the future (Davenport & Kalakota, 2019). Health experts use multiple AI applications to detect and treat illnesses ((Linda Bi, 2019). The process requires competent mastery of the new technologies in the healthcare industry to allow experts to provide quality medical services. Therefore, the continuous incorporation of AI technology in healthcare suggests that many medical experts may have to change their jobs since the AI robots perform their current tasks (Hyacinth, 2021)

As a result, healthcare providers must embrace technological changes to survive in the rapidly revolutionized medical industry (Han et al., 2019). The dominance of AI in healthcare threatens job security in the healthcare industry. Medical practice drastically changes with the development of new AI programs. Engineers couple the AI with constant improvement in computer processing that the current medical experts must learn to provide efficient healthcare services. With time, technological experts can develop sophisticated machines to replace some medical practices, such as radiology (Hazarika, 2020). The above shows that radiologists must change to align their skills with the current job demand. While the rise of AI cannot completely replace human intelligence in healthcare, health practitioners must learn and apply AI programs to improve medical outcomes. Medical experts must understand and implement the recent innovations in the healthcare industry to guarantee quality healthcare practices.

1.1 Research Motivation

Although the rise of AI applications in the healthcare industry promises positive patient outcomes, in our view, scholars have overlooked the impact of the technology on medical professionals. As a result, healthcare providers can focus on applying intelligent machines to the target market at the expense of health practitioners. Therefore, the motivation for this study comprises the impact of AI applications in the healthcare industry. In this case, the research entailed the *current* effects of AI in healthcare organizations and the potential positive and negative outcomes of the technology in the *future*. In this way, the study comprises changes that healthcare practitioners must embrace to align their skills with the AI machines.

1.2 Research Objective

The primary objective of this research was to analyze how the jobs of medical experts change due to the rapid application of AI in health practices. The study adopted the job design theory that was introduced by Hackman and Oldham's (Gareth,2015) to discover how AI applications can add value to medical providers through quality services. For example, how can healthcare organizations utilize technological inventions to promote positive patient outcomes and health workers' motivation simultaneously? Even though AI allows healthcare organizations to improve their performances, the technology must be appropriately integrated into the

human resource strategies to bring substantial benefits to the organization. Through job design theory, (human resource) managers in healthcare industries can prepare medical experts to utilize AI and realize organizational goals by developing strategies and providing training programs for the medical experts in the hospitals.

1.3 Research Question

Based on the above, the specific research question set for this study was "In what ways does artificial intelligence can change the job design of medical experts in the hospital?"

1.4 Theoretical and Practical Implications of the Job Design Theory

This research elaborated on how the introduction of AI technology in the health system affected the job design theory to have the following theoretical implications. First, the rise in AI in the healthcare industry is projected to influence the jobs of medical experts. The assertion implies that technological growth can replace various medical practices and cause joblessness in the healthcare industry. In this way, the study investigated the impact of AI on medical experts' roles in the future. Second, the rise of the application of this technology in healthcare cannot replace the fundamental parts of medical personnel. However, healthcare organizations will require training their medical personnel to adapt effective techniques for improving quality healthcare through AI applications. Therefore, AI machines would not enable healthcare organizations to realize their goals without a competent workforce.

A successful introduction of AI in a healthcare organization requires cooperation between the human resource department and employees. Healthcare managers must train medical experts on the usage of particular technologies. In this case, hospitals should introduce innovations that align with health practitioners' and patients' needs. Health organizations that focus on clients at the expense of workers can fail to meet their goals due to a lack of job satisfaction. Therefore, the study shows that healthcare organizations should apply job design theories to ensure that AI adds value to stakeholders and motivate staff to achieve the recruitment goals of the organization. The lack of an appropriate framework to use AI in healthcare organizations can compromise quality healthcare and create an unsatisfied workforce.

CHAPTER 2: LITERATURE REVIEW

This chapter provides a comprehensive background on the research topic to enable to recognize the efforts of others towards artificial intelligence in healthcare and build on the previous related work. It introduces significant concepts and themes associated with the AI system in healthcare settings. Such consideration gives an overview of what needs to be done and the ability to utilize the existing knowledge to inform the present study. Job design theory was considered helpful for the research.

2.1 AI Background

While AI has various definitions depending on its applications, experts use the technology to replace human intelligence with machines. The approach entails impersonating devices to perform similar functions that reflect specific skills. In this way, the Society for the Study of Artificial Intelligence and Simulation of Behavior (2021) recounts that John McCarthy introduced the AI concept in 1956 at Dartmouth. At this time, the invention did not attract significant interest in the technological industry until the AI winter that started in the early 1990s (Lewis, 2015). Different stakeholders began recognizing that the AI concept could significantly improve outcomes in multiple industries. Hazarika (2020) recounts that technological development led to rapid computer science applications in various sectors to enhance work efficiency. In this way, Davenport and Kalakota (2019) assert that people should define AI as machines with thinking and reasoning capacities that resemble human intelligence. The authors support this definition with recent technological inventions that can perform human roles, such as speech and facial recognition.

2.2 Job Design Theory

Since AI machines can utilize human thinking and reasoning capacity to perform various tasks, experts have applied it in healthcare practices. However, the situation has led to recruitment disputes between human resource managers and medical practitioners. Therefore, healthcare organizations should consider using job design theory to integrate AI technology with workforce requirements. Tipnis (2006) describes job design theory as a psychological framework for motivating managers to allocate tasks within organizations. According to the author, Hackman and Oldham (year) developed the job characteristic model (JMC) to expand their job opportunities to experience personal growth (Tipnis, 2006). In this way, they explain that the concept comprises five features that facilitate leaders to improve job satisfaction among workers. The fundamental elements of job design theory include skill variety, task identity, task significance, autonomy, and job feedback (Oldham & Fried, 2016). Therefore, effective managers should utilize the characteristics of job design to motivate staff to meet organizational goals. However, the 5 characteristics of the job design model are introduced and explained in detail below:

Skill variety refers to diverse activities that workers should perform to complete particular tasks. Organizations allocate employees different roles that align with their expertise. While the approach allows staff to focus on lessons to deliver the best results, Johari and Yahya (2016) emphasize that skill variety plays an essential role in employees' motivations. The authors recount that an appropriate job design framework should provide workers with tasks that require multiple skills to avoid boredom. The statement implies that division of labor should not deny staff the opportunity to try new roles within the organization. Oldham and Fried (2016) support this observation by affirming that employers can improve employees' motivation by introducing diverse skills rather than repetitive procedures that lead to monotony. Therefore, effective managers can create more skill variety to monotonous roles by promoting cross-collaboration within the organization. In this way, employees can utilize rotational positions to gain more skills for career growth.

In this way, employers can facilitate ***task identity*** by allowing employers to participate and

understand processes that must follow to complete particular roles. The facet of job design theory indicates that a worker should have an idea of doing a specific job from the beginning to the end. The approach allows employees to identify with the outcomes of their works. Daniels et al. (2017) recount that managers, can enable staff to master all the procedures to produce the desired organizational results. For example, the authors explain that employers who encourage their staff to identify with tasks create a competent workforce due to increased employees' motivation to realize particular goals. While this approach minimizes the chances of boredom and improves workers' output, Jiang et al. (2020) note that most specialized jobs lack a task to identify the program. The situation implies that employees in these positions lack the expertise to complete particular lessons from the beginning to the end because they only perform a part of the production process. Thus, lack of task identification decreases employee motivation.

Task significance affects employee's morale due to a lack of appreciation. Job design theory shows that workers should play significant roles in their organizations to fulfill personal and organizational goals (Jiang et al., 2020). The situation leads to a discussion on the importance of individuals' positions in a company's success. In this case, junior workers can perceive that an organization does not appreciate them because their works significantly impact overall performance. While all employees contribute to organizations' operations, some workers have played more essential roles than their colleagues (Kooij et al., 2017). Therefore, companies offer remunerations and benefits according to the functions of employees in overall performance. Kooij et al. (2017) assert that effective managers should create ways to appreciate workers' contribution to the desired outcomes regardless of their positions. The approach can allow human resource management to show all employees that they play essential roles in the organization. In this way, task significance motivates workers to meet personal and organizational goals.

The job design theory shows that workers expect some level of ***autonomy*** to allow them to make independent decisions. The concept involves the ability to perform flexible roles that can influence creativity. Rožman et al. (2017) report that, lack of independence in a workplace can reduce employees' motivation to improve their contributions to organizational performance. The authors link workers' productivity with the freedom to enhance their work experience. In this case, employers who create inclusive corporate cultures that allow staff to use their capabilities and drive to achieve specific targets increase workers' sense of personal responsibility for their determinations (Rožman et al., 2017). The outcome implies that managers provide staff with the opportunity to make specific business decisions. The approach should consider the implication of job allocation to ensure all the allocated autonomy does lead to preventable risks. In this way, employees who require freedom to perform particular roles must account for their irresponsibility.

The last characteristic of job design theory involves ***feedback***. The feature refers to managers' role in informing providing direct information concerning employees' performance. Hardavella et al. (2017) recount that, influential leaders should communicate with staff to discuss how the organization has performed in different areas. In this case, the authors emphasize that managers must provide precise results that reflect individuals and collective contributions to the overall outcome. Jiang et al. (2020) affirm that this approach improves workers' motivation to improve their productivity by eliminating laziness. For example, cash officers in banks can measure tellers' performance by averaging their transactions per week and announcing the results in general meetings. Companies with physical meetings between managers and employees to discuss departmental performances create a consistent organizational culture for influencing workers to meet their targets through job feedback. The strategy allows the managerial team and staff to identify and address issues that can impede them from realizing particular goals.

2.3 Job Design of Medical Experts

Like any other industry, job design theory plays a significant role in medical experts' experience by making the clinicians more robust and adaptable to rapidly changing healthcare systems. Healthcare organizations have human resources personnel who address employees' challenges. The administrators rely on job design to determine the most appropriate strategies to create enabling work environment for medical experts. In skills variety, most medical experts lack the opportunity to avoid monotony due to specialization. Medical experts specialize in particular areas to enhance positive patient outcomes. In this way, human resources cannot depend on creating therapeutic practices with diverse roles to motivate medical experts.

However, specialization does not prevent medical experts from realizing task identity. Healthcare supervisors allocate physicians (medical experts) roles that align with their expertise. In this case, medical experts can provide specific medical interventions from the start to the end and identify with the outcome. For example, nurses can help their clients to deliver babies because they understand all the procedures for standard delivery. The illustration shows that specialization in healthcare does not eliminate task identity. In this way, medical experts experience substantial task significance in their workplace. Jiang et al. (2020) affirm that specialization in the healthcare industry allows medical practitioners to focus on areas they can provide quality services. For example, orthopedic surgeons should feel essential to healthcare operations because they can treat patients with bone issues better than physicians from other departments. Thus, task identity in healthcare improves medical experts' task significance and overall job motivation.

While health professionals enjoy significant autonomy in their operations, patients have the right to make independent decisions. The situation limits medical experts' role in healthcare literacy. Ahuja (2019) affirms that patients' autonomy overrides informed medical interventions. In this case, medical practices require medical experts to consult their clients before making major health decisions. However, healthcare organizations create flexible working hours for their medical experts. The strategy allows healthcare providers to schedule with their clients the appropriate time to perform particular therapeutic interventions. In this way, a human resource that denies medical experts flexible schedules lower their motivation to provide quality healthcare. Jiang et al. (2020) recount that excess supervision in healthcare organizations increases job dissatisfaction. Therefore, medical experts' autonomy

improves their motivation to offer quality healthcare services.

Medical experts require feedback to gather information for realizing positive patient outcomes. The job design can influence healthcare practice to consolidate awareness of strengths and areas for improvement (Hardavella et al., 2020). Therefore, medical experts at all levels depend on feedback to determine the most appropriate care plan. Hardavella et al. (2020) assert that doctors do not require input for competition. The process allows them to assess the impact of different treatment plans on patients. In this way, Hardavella et al. (2020) recount that medical experts from different levels approach their peers or juniors to receive appropriate feedback. In this case, the central feedback involves patients' reactions to particular treatment plans. Medical experts can depend on clients to provide essential feedback to improve medical interventions. Therefore, constant job feedback in the healthcare industry motivates medical experts to try various treatment plans to realize positive patient outcomes.

2.4 Influence of AI on Medical Experts' Job Design

AI has a significant influence on the job design of medical experts. The technology allows health practitioners to practice skill variety such as their empathy, time management, and accuracy because the invention involves different expertise. Healthcare organizations can create opportunities for medical experts to use various technologies for treatment interventions. In this case, AI introduction in hospitals facilitates medical experts to acquire a range of skills required to perform particular medical procedures (Gibbs, 2017). AI will enable healthcare organizations to alleviate monotony and motivate medical experts to achieve positive patient outcomes. In task identity, AI influence job design of medical experts by creating opportunity for health practitioners to outsource some functions to the new technology (Talby, 2019). Medical experts with competent knowledge to operate the machines will improve their chances to treat different conditions from the start to the end without seeking further help. The situation can encourage medical experts to identify with specific diseases and offer complete treatment interventions.

More so, AI has an important impact on the task significance of medical experts. Several studies recognize that the technology helps health practitioners to realize positive patient outcomes (Talby, 2019). The invention facilitates medical experts to augment different clinical activities and access critical information for quality medical interventions. AI allows medical experts to automate some medical processes to detect patients' risks at early stages. The technology improves physicians' (medical experts) roles in promoting organizational goals. However, increased automation of various treatment interventions can make medical experts feel that their work is not essential to an organization's performance (Jiang et al., 2020). The situation has led to a discussion on whether AI technology can replace medical experts' roles in future. In this case, some medical experts may feel that they do not provide substantial healthcare services to their organizations. Human resource should consider ways to facilitate their workforce to feel that their roles influence organizational performance. Talby (2019) recounts that, employers can recognize medical experts' roles through awards and compensations. The approach can influence medical experts to realize positive patient outcomes.

Appropriate application of AI can influence medical experts' autonomy and ability to schedule medical interventions. Lewis (2015) recounts that, most medical experts prefer flexible policies that can allow them to make decisions and flexible roles. In this case, AI can influence medical experts to create additional time for other medical services because the technology automates some medical procedures. Having surplus time implies that healthcare workers can schedule tasks to align with their shifts. Lewis (2015) acknowledges that a practical level of autonomy can enhance healthcare workers' experience and productivity. Besides, AI does not replace medical experts' decision-making. In this way, machines augment human decisions making skills rather than automating the entire healthcare process.

2.5 Research Framework

This study integrated theoretical frameworks like applications of AI in healthcare and job design theory, which were used to explain the concepts and clarify occurrences. The approach allowed the study to provide an in-depth analysis of particular ideas. The research design of the study enabled investigation, observation, and analysis of secondary data. Therefore, the process did not comprise practical experiments for collecting primary data. An appropriate research framework for understanding AI involves machine learning, natural language solutions, and neural frameworks (Ahuja, 2019). In this case, appropriate research frameworks cover AI's possible positive and negative influences on medical experts. Figure (1) below shows the main framework of the research. The figure shows the factors that impact the job design and employee well-being while implementing new technology (AI).

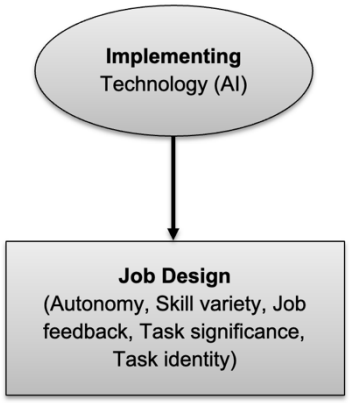

Figure 1: Research Framework

CHAPTER 3: METHODOLOGY

3.1 Research Design

The study relied on a qualitative research design (descriptive) to describe the implications of AI in the healthcare industry. Wright et al. (2016) explain that this research design facilitates investigators to gain a detailed understanding of their topics. The strategy allows researchers to focus on analyzing issues that involve "why" and "how "questions. However, the study recruited 10 participants from different hospitals. Two respondents were recruited via Facebook group, and these two respondents mentioned the other respondents for the study. The participants were practicing medical experts in from different specializations with a working experience ranging from 5 years to 18 years of practice as medical professionals. The data collection was through semi-structured interviews and every interview lasted for about 30minutes. Qualitative research design allows investigators to account for the respondents' feedback and participation in the study (Hennink et al., 2020). Thus, the technique facilitates researchers to obtain quality data for analysis without using numerical findings.

Therefore, this study utilized a qualitative research design to answer the research question. The research design does not require quantifiable data that the investigator can spend more time and resources to gather. In this case, finding the implications of AI technology to medical experts' job design was simple and cost-effective. The qualitative research design enabled the investigator to collect adequate statistical data about the subject under investigation. In this way, the qualitative approach allowed the investigator to use a theoretical framework to justify them. The process depended exclusively on the participants' responses regarding the effects of AI technology on medical experts' job design.

More so, this study utilized a descriptive research design to determine the implications of AI technology in healthcare through primary data. Hennink et al. (2020) affirms that qualitative approach allows researchers to explore the trend in an entirely unchanged natural environment. The opportunity implies that the research design does not allow the researcher to influence the study outcomes because it limits them to the respondents' views. However, Hennink et al. (2020) mention that descriptive research may reflect bias due to a lack of statistical tests. The study ensured that the approach only utilized data from the targeted participants to alleviate bias responses. In this way, the qualitative design focused on AI machines' current and future implications in medical experts' job characteristic model. Since qualitative studies lack hypothetical tests, the research did not develop an interest to manipulate the findings to prove particular propositions. In this way, the research design described the effects of AI in healthcare from medical experts' perspectives.

Nevertheless, ethical practices were taken into consideration, as the research focused on primary data. However, this was done by ethically handling the data of participants. In this case, the university ethical board approval was sought as the research involved primary data collection.

3.2 Data Collection

Research design plays a significant role in determining the data collection approach in different studies. The process influences options researchers can use in collecting data for analysis. In this case, the study utilized a qualitative research design to explore the impact of AI on medical experts' job experience. Hennink et al. (2020) explain that researchers can use various data collection techniques, such as interviews and case studies, to support qualitative research design. However, the author affirms that the most appropriate approaches in healthcare investigations include interviews and focus groups. Therefore, data collection was through semi-structured interviews and every interview lasted for about 30 minutes. All the participants provided their responses according to 8 questions about the 5 characteristics of the job design model plus other four introductory questions about their personal experiences and information, all interviews were conducted online due to the pandemic and in English language, **Table 1** below summarizes relevant information about the 10 interviewees. Hennink et al. (2020) states that research interviews facilitate investigators to explore participants' views and experiences concerning particular matters. In this study, the qualitative method provided a deeper understanding of AI technology in healthcare from social implications perspective at workplaces.

Respondents	Profession	Department and task	Example of the type of AI they use	Years of experience	Country
1	Specialist of cardiology	Manager of Emergency department	Premium cardiac ultrasound systems which include (deep and machine learning algorithms)	5 years	Qatar
2	Consultant general surgeon	Emergency department dealing with wide variety of surgical conditions	Bayesian classifier algorithm that is probabilistic classifier that is used to identify Influenza.	18 years	Canada
3	ENT (Ear, Nose, and Throat) Consultant	Works in Otolaryngology department and responsible for the diagnosis and treatment for ENT patients clinically and surgically	posterior tympanotomy air cell system that helps faster and accurate access to the middle ear from the mastoid.	10 years	Qatar
4	Ophthalmologist	Diagnosis screening and follow up patients with ocular problems and pathology.	OCT images that are used for diagnosis, monitoring, and management of many retinal problems.	6 years	Qatar
5	Consultant obstetrician and gynecologist	head consultant of Obstetrics and Gynaecology department of the centre.	Cardiotocography (CTG) in which it is a tool for screening for the development of hypoxia and help to facilitate decision making.	6 years	United Arab Emirates
6	Consultant internal medicine	Deal with prevention, diagnosis, and treatment of internal diseases for adult.	AI classifier systems that help for faster decision-making during diagnosis.	14 years	Qatar
7	Consultant radiologist	Head of department and producing reports in different imaging modulation including MRI, CT, and Ultrasound	3D machines to detect diseases such Alzheimer's and segmentation of organs	6 years	Qatar
8	Orthopedic specialist	Head of the Orthopedic department	Mako system and ROBODOC system used for hip and joint replacements.	10 years	Qatar
9	Consultant radiologist	Head of the department	3D machines to detect diseases such Alzheimer's and segmentation of organs	7 years	Qatar
10	Dentist	dealing with patients having dental problems	Artificial and Convolutional neural networks for the analysis of visual images diagnosis.	9 years	Qatar

Table 1: Information about the 10 interviewees.

Due to the in-depth semi-structured interviews, the study used a relatively small sample and few questions on the impacts of AI on job designs in the healthcare industry, for more details about the interview structure and

the main interviews protocol (see appendix 1: Interview protocol**)**. While the number of inquiries required for constructing primary data does not matter, Creswell (2007) recommends five to ten questions for researchers using semi-structured interviews. The study utilized eight questions to collect data from the participants. Random sampling was applied to obtain data from ten medical experts worldwide. The decision aligned with Creswell's (2007) and Marshall et al. (2015) suggestions that the appropriate sample size for semi-structured interviews ranges from 5 to 25. Therefore, using ten respondents from diverse healthcare organizations helped alleviate bias and improved the accuracy of the collected data.

Semi-structured interviews require appropriate recording techniques to collect primary information without manipulation. The approach involves meeting the selected respondents and asking them relevant questions that necessarily adhere to the formalized format. Instead, the process allows during the interview to ask open-ended questions to collect in-depth data (Hennink et al., 2020). In this case, the data collection process required an audio recording of the respondents' views and experiences on the effects of AI technology on medical experts' job design. However, when the respondents were asked about their willingness to record their responses, they refused due to their workplace rules and regulations as they work at a military hospitals in Qatar, United Arab Emirates, and Canada. Nevertheless, to ensure the validity and reliability of the results the paper of Tessier (2012) of doing qualitative research was taken into consideration, and indeed extensive notes were taken during the interviews, after that, all notes were clarified and summarized and then sent to each interviewee for confirmation whether the interpretations were correct during the interviews.

3.3 Data Analysis

The research used thematic content analysis to understand the implications of the respondents' views on the role of AI on medical experts' job design. Thematic content analysis refers to the categorization, tagging and thematic analysis of qualitative data, which can help in this case because the research is based on a qualitative approach. The data analysis consisted of reliable data from eight semi-structured interview questions as mentioned before. In this case, the analysis started by treading the taken notes from each participant. The process involved skimming and summarizing the clarified notes to identify common themes in the responses, see (Table 2) below for summarization of the six broad themes. The findings helped in summarizing the final data, for more details about each theme (see appendix 3, table 2, 3, and 4: Detailed table for the six broad themes analysis). After establishing common themes in the answers, each interview notes were analyzed to obtain in-depth information. The strategy enabled the research to justify various articles that have been identified by skimming the taken notes. Harding (2018) asserts that researchers should concentrate on identifying bias in both phases. According to the authors, inconsistency can occur in the interviewees' data and the applied methodologies. As a result, focusing on the identification of bias when reading the answers of the respondents is essential.

Main Themes	Main responses from the 10 respondents
Increasing the skill variety of medical experts	Quicker, accurate, and precise diagnosis and treatment of patients
AI improves task identity of medical experts	improves the task identity of medical experts by making their task clearer until they achieve positive outcomes.
AI increases the autonomy of physicians	Increase autonomy by: 1. releasing stress during diagnosis 2. don't need to wait for other doctors or studies to be done since working with AI algorithms. 3. autonomy to take faster and accurate decisions during diagnosis 4. increase autonomy in time and decision makings. 5. Reducing doctor liability during interventions
AI increases the task significance of medical experts	1. Improves physician's role 2. do job faster and more accurate this will help me to meet my organization goal 3. add value to the medical expert's role in the hospitals and increase the doctors-patients relation 4. accelerate and increase accuracy in achieving organizational goals
AI enhances positive job feedback	1. provide faster and accurate diagnosis for the patients which results in positive feedback from the patients and from the management team 2. improves the ability to get feedback in our job, however, this depends on the hospital spending's on technology. 3. better communication between the management team and the doctors
AI reduces medical experts' creativity	1. made them more dependent on machines reducing their creativity and brain thinking 2. AIs in the long run can limit or reduce the doctor's creativity, which will reduce their autonomy

Table 2: Summarized themes analysis

The second step involved annotating the interviews notes and conceptualizing the data. In this phase, the research matched relevant words and phrases with codes. The utilized codes assisted in establishing essential qualitative data and trends (Vaismoradi et al., 2016). In this case, appropriate labels comprised views and experiences that can shape the analysis of the impact of AI in the healthcare industry. After the annotations, conceptualizing the qualitative data was important to align them with relevant themes from the observational notes. Then the process integrated pieces from different notes to categorize the findings based on applicable codes. In this way, the study involved the grouping of regulations that the research developed during the annotation process. Vaismoradi et al. (2016) assert that researchers can exclude or combine particular codes rather than use all of them to conceptualize the data. Therefore, the research only utilized relevant regulations that influenced the findings of the study.

With multiple codes from the interview notes, the analysis process segmented the data to connect different categories, an operationalization table was used to define the 5 characteristics to help connect the different codes together (See appendix 3, table 1: Operationalization Table). The process allowed the research to arrange the collected data comprehensively. Vaismoradi et al. (2016) guide qualitative researchers to segment their thematic content data by labeling categorized codes. The approach enables the research to apply descriptive analysis to explain the relationship between different categories. In this study, a spreadsheet was created to compile data from the semi-structured interview. Analyzing data placed significant variables in the columns to analyze the data using codes. The approach enabled to identify different codes for data analysis.

The final process of the thematic analysis of the interviewees included segment analysis presenting the results using descriptive analysis, while all the information was anonymously processed for all interviewees. Data analysis required reviewing the hierarchy of the established categories. In this case, the

research identified if all the codes have the same impact on the study's results. Next, the process comprised drawing a table to summarize the findings (see appendix 3, table 2, 3, and 4: Detailed table for the six broad themes analysis) and align them with any quantitative data developed from the analysis. In this way, the research will have complete thematic data analysis. Finally, utilization of the insights to integrate job design theory was applied to answer the research question. The process required objective analysis that reflected the study's findings within the aims and objectives of the research

CHAPTER 4: RESULTS

The findings of this study demonstrate that Artificial Intelligence has been adopted in the healthcare industry. All the participants acknowledged to have used AI in their operation at various points especially in disease diagnosis. Therefore, the results of this study are summarized in six broad categories, these categories explain how AI impacts the job characteristics model of medical experts in hospitals. The six broad categories are: AI could help the doctors to increase their skill variety; AI improves the task identity of medical experts; AI increases the autonomy of medical experts; AI increases the task significance of medical experts; AI enhances positive job feedback; and lastly, AI reduces medical experts' creativity.

To start it off, the first broad category was that **AI could help medical experts to *increase their skill variety*** as they can have the ability to differentiate faster and more accurate between life threating diseases, for example, AI algorithms used in healthcare help doctors to make patients get more relaxed because when the patient feels that there is a tumor or a tissue that contains fluid or air under his/her skin they get worry because they might think that this is a cancerous cell under skin, but this could be prevented when doctors have the variety of skills to perform their tasks and deliver the best results for the patients.

The second broad category was that ***AI improves the task identity of medical experts*** by improving patient outcomes through the improvement of the diagnosis of different diseases through non-invasive techniques (without surgical intervention), also through the improvement of treatment (rapid and accurate) through minimal invasive techniques using imaging and endoscopic (long thin tube inserted into the body to see organs in detail). Moreover, another medical expert recounted several ways whereby medical experts can use AI to promote positive patient outcomes including: Neurology -patients who have lost their ability to move or speak because of neurological diseases or trauma will be able to restore these functions using BCI (Brain Computer Interfaces) backed by artificial intelligence; Radiology - AI will enable in inventing a new generations of radiology tools, such as MRI, CT scans and x-rays, that are accurate and detailed enough to replace the need for tissue samples (biopsies) which carry the risk of infections. Moreover, this will enable experts to have more accurate understanding of how tumours behave as a whole, instead of basing their decision on a small segment of the tumour; Clinical documentation/order entry -voice recognition and dictation are helping to improve the clinical documentation, order entry; these are done using Natural Language Processing tools (NLP). The result will be reducing the time consumed by medical experts to document and put orders on the system; Infection control and antibiotic resistance -AI can help create electronic health record data that can assist in identifying infection patterns and highlight patients who are at risk of developing antibiotic resistance before starting to show symptoms. This will give healthcare providers faster and more accurate alerts for identifying antibiotic resistance; Creating more precise analytics for pathology images -AI can provide analytics that can drill down "to the pixel level" and analyse pathological specimens so accurately than what human eye can miss (pathologist). This will help clinicians assess the behaviour of cancer cells according to their progression rather than by other clinical staging or grade; Monitoring patients in ICU (intensive care unit) -smart devices are being made using AI to monitor patients in ICU. These are so accurate in identifying deterioration in patients' condition, or development of complications; Immunotherapy and cancer treatment -AI has been used to develop "checkpoint inhibitors" to block some of the proteins made by the immune cells, using the body's own immune system to attack malignancies (cancer growth). Therefore, it is evident that doctors can use AI technologies to improve positive patient outcomes. The provision of patient-centred care entails substantial awareness, engagement, and discussion among clinicians, patients, and families on the proof, risks and benefits and the options available.

The third broad theme discovered was that ***AI increases the autonomy of medical experts***. Autonomy refers is the level of choice, freedom, and independence employees feel they have to do their jobs. The respondents suggested that AI will help medical experts to increase their autonomy at work and this is because AI will impact different perspectives such as reducing time and facilitate decision making. For example, it helps medical practitioners to facilitate the decisions they take during diagnosis by only relying on the data they see on the computers or AI technology scans they use during the diagnosis of patients, and this increase their autonomy by make them not to rely on other doctors or wait for confirmation from their head consultants. AI gives medical experts the autonomy to prepare their functions and take faster decisions for instance during surgeries. For example, for general surgeons, considering the intraabdominal conditions such as gallbladder stones, kidney stones, and blunt abdominal trauma are not seen through the skin, it's important to confirm them so that further management can be done properly. This implicated that physician were viewed as autonomous professionals using their knowledge and skill in medicine to treat clients. medical experts are increasingly working in facilities operated by non- medical experts. Public and private health insurance requirements also influence physician discretion in performing their duties. These changes can influence the physician's autonomy in treating clients according to their best judgement.

The fourth broad category was that ***AI increases the task significance of medical experts***. medical experts have several defined roles in healthcare. The participants noted that AI technologies improve the physician's role in healthcare which in the long run can increase their task significance in the hospitals by allowing medical experts to fulfil their organizations goals. One of the participants

held the view that as AI is improving there is still the need for doctors for the human sense, because at the end AI's are machines that doctors control, for example when doctors carry out surgical procedures, they use operating microscope AI technology but they still control the AI machines to cut for example specific veins or remove a tumor in a specific area in the body that needs a surgical intervention by the doctors in order to control any unexpected situation that might occur during the surgery. AI increases the task significance of medical experts by improving their ability to be more accurate and faster during surgical procedures. Generally, AI has a positive impact on doctors and patients in healthcare because of the ability to gather and analyse a large amount of medical data yielding quicker and more accurate diagnose of a large section of the population. Therefore, if there are a portion of people who are not able to access specialized healthcare, then they might achieve the advantage through artificial intelligence. Moreover, the integration of modern technology will not greatly influence the jobs of the medical staff, because whatever the development of Artificial Intelligence is, it is not only reliable, but must be in service of the human factor and provide a high-level of medical service. More specifically, AI will increase the efficiency of medical experts in their jobs as it can help them predict, diagnose, and treat patients faster with high quality healthcare systems, doctors, and feedback. Now AI is stimulating medical innovations and virtual medicine which means that in the future this will strengthen the use of AI in the healthcare because it will enhance the hospitals productivity due to the ability to control and handle large information more than human ability.

The fifth broad category was that ***AI enhances positive job feedback***. Job feedback refers to information provided by patients or employees regarding the performance, ability, or skills of the medical experts. It was noted that job feedback helps medical experts to learn more for what they practice every day with patients, however, if AI can motivate practitioners to be more productive and proactive in their work, it will definitely also improve the feedback they get from their work, because, if any employee is motivated to improve his/her work and be productive in his/her work, this will lead to positive feedback at the end from his/her manager. medical experts recounted getting more positive feedback by using AI technologies because of the rapidity and accuracy of diagnosis. The finding of the study proved that quick and early diagnosis reduces the length of treatment and the length of hospital stay. Positive job feedback is essential in nursing as it helps motivate the medical experts and enabling them to see how significant aspects of their job and career are faring. Therefore, the use of AI technologies improves positive job feedback for the medical experts.

The sixth broad category, in which it was a contradictory category according to the other five categories was that **AI reduces medical experts' creativity.** Two of the respondents mentioned that the constant relying on AI in jobs of medica experts can negatively impact medical experts in the long run, because relying on machines to take medical decisions during surgical intervention or diagnosis can reduce their creativity and brain thinking, as a result this could also impact one of the above brad categories which is the task significance, as medical experts in the long run could not add value or their human interactions could not affect others.

CHAPTER 5: DISCUSSION

The study has shown that AI technologies are being developed and used in the medical sector and the job design of medical experts is being affected in the following ways: there has been recorded an increase in the doctor's and the clinical workers skills and efficiency. The medical workers have found a specialization in the AI technology, and they have acquired a task identity and their tasks have a significant role in the healthcare sector. The level of choice, freedom, and independence employees in the medical field has increased. There has arose a positivity from the responses of all who give their feedbacks concerning the performance of the healthcare systems. On the other hand, the medical expert's creativity is becoming inactive and unproductive as the substitution of the experts by the machines has made the experts not to put to exercise their skills and expertise and solve issues in the healthcare sector.

Reflectively, the study has been relevant in its findings as the results produced has helped discover that artificial intelligence is being installed and used in healthcare organizations to attain affordable medical interventions and positive patient outcomes. Other findings have recorded that AI technology has aided medical practitioners in predicting, diagnose and detect diseases accurately and faster. Surgical robotics has also helped in data collection and is improving the surgical approaches utilized in the healthcare system. Other medical processes are being automated, such as ICU transfers, pinpointing risks of the patient acquiring infections from the hospitals, and the medics' workflows have improved. The medical practitioners are gaining better understandings of the needs of their patients and the daily patterns, which has helped produce better patient outcomes through the feedbacks, support, and guidance given to the patients.

The methodology used to reach the study's findings of AI implications on the healthcare systems has shown that the technologies are continually being implemented in the healthcare sector and have impacted so much reformation in that field. The statistics of the data collected to determine the performance of the AI technology in the healthcare systems shows that AI technology has been able to imitate most tasks that the medical practitioners normally conduct. However, the study has discovered that AI technology can produce errors severally or fail to function properly at times, impairing healthcare operations. AI has to go through significant evolutions and advancements to be independent and perform certain procedures more well like human doctors and clinical workers and do well in a variety of medical tasks. In the meantime, the results are clear that AI technology has to be monitored and improved to avoid errors and shutdowns.

Past research has recorded the AI technology has been used in healthcare organizations, but it caused recruitment conflicts between medical practitioners and the resource managers, and a suggestion was made calling the healthcare organizations to integrate workforce requirements and AI technology. A theory

was used variously by other researchers such as the paper of Parker and Grote (2020) and its fundamental building blocks were skill variety, task identity, task significance, autonomy, and job feedback. This theory constitutes characteristics that the studies suggested that the characteristics in the theory can be used to motivate the workforce and produce desirable outcomes. The result of this study agrees with other researcher's studies and from the participants who were interviewed, there was an acknowledgement that AI technology is being used in the healthcare systems. The results derived from this study summarized the job characteristics from the model suggested by the other researchers such as Parker and Grote to improve medical expert's significance. In this study, it is evident that AI has increased task significance and identity, skill variety and has enhanced positive job feedback. Nevertheless, according to the interview results that were analyzed from the respondents of this study, these findings can be considered realistic and satisfactory, because AI may reduce the human error that medical experts may face during surgical intervention or diagnosis, as a result this will lead in increasing the task significance of medical experts, increasing their autonomy to take faster decisions, and increase their task identity by achieving positive patients' outcomes.

Medical experts have greatly impacted the implementation of Artificial intelligence as they have used their knowledge in the AI diagnostic and detection implementation processes by clarifying the problems that the Artificial technology has been designed to handle. The experts have helped determine the AI systems that are viable and relevantly meet the healthcare needs and the affordable ones. The medical experts determine the healthcare infrastructure's convenience before the AI systems are implemented and help improve them so that the AI technology can be installed and implemented in conducive environments and not be damaged. Another role that the medical experts have played in implementing the AI technology is by training other staff on the implementation and the use of the systems. In general, the medical experts have helped make the implementation process smooth by ensuring everything, including the plans, goals, and strategies, has been attained. They ensure the efficiency of the implementation by checking the resources available and their compatibility with the technology to be implemented and the required budget to complete the whole process.

AI technology in healthcare systems has resulted in remarkably positive changes in the healthcare systems. Discoveries such as consumer health applications and the Internet of Medical Things have helped improve the patient's well-being and have helped the clinical workers have an easy time managing the patients. Deadly diseases such as cancer are being detected at early stages more accurately. DeepMind Health for Google has partnered with researchers, patients, and health workers to offer solutions to emerging health issues. Neuroscience systems and machine learning are the technologies that have been combined to come up with the DeepMind Health Google. The benefits of AI technology in the healthcare systems are to reform the training sectors through naturalistic simulations using computerized algorithms. The training is accessed at any place provided a person has AI technology embedded in their phones. Medical research has been made easy, and the discovery of drugs, making the processes less costly and timely.

5.1 Limitations and Future Research

Although the study had significant theoretical and practical implications, relying on a qualitative approach only has various limitations that can influence the relevance of the findings. Firstly, the study used a semi-structured interview to collect data from medical experts. The qualitative method does not allow researchers to verify outcomes (Hennink et al., 2020). Therefore, the medical experts will have substantial control over the content used in the thematic analysis. The situation will increase potential bias due to a lack of statistical analysis (Hennink et al., 2020). Secondly, the study relied on the views of ten randomly selected interviewees from only three hospitals worldwide to represent the entire healthcare industry as well as, the interviews were not recorded due to the workplace sensitivity. The relatively small sample and lack of a statically representative approach can lead to inconsistent results. Lastly, collecting data through a semi-structured interview is time-consuming because each interview will last at least half an hour with each respondent. After the interview, the research required more time to perform thematic content analysis. Future studies need to be conducted using a larger population sample to confirm the findings of this research. Another study approach may also be used to conduct the same research to confirm the validity of the findings and alleviate any bias that might have occurred in this study.

6. CONCLUSION

This study shows that AI will affect the jobs of medical experts in the hospital. AI's influence on the job design of medical experts occurs through AI application's positive enhancement of the medical expert's skillset, improvement of task identity, increased autonomy, task significance, and positive job feedback. Debatably we need AI because, with AI, patient diagnosis is quick, accurate, and precise. The study's findings augment that AI increased Autonomy emanates from stress relief during diagnosis, quick decision making, and minimal doctor liability when making medical interventions. With AI, meeting organizational objectives is easier because it shortens periods between activities, enhances the doctor-patient relationship, accelerates, and increases the accuracy of obtaining organizational goals. Conversely, AI encompasses some negative implications for the job design of medical practitioners. For instance, with increased reliance on AI, the creativity of medical practitioners will decrease, leading to redundancy of personnel and reducing their autonomy to take decisions.

Persuasively AI's influence on the healthcare system's job design centers in AI patient care, surgical assistants in place of nurses, and computer-assisted diagnosis. Nevertheless, AI has a limitless potential of driving significant changes in the care sector which has been proved by the findings of this study. However, this study resolves that AI's best influence and deployment entails the kind of technology augmenting human capabilities but does not replace them. Similarly, reduced creativity affects autonomy and delays the decision-making process, further affecting the job design of medical experts. Finally, the study found that the incorporation of AI in healthcare improves physician's positive job feedback. medical experts get more positive feedback when they use AI technologies because of their accuracy and quick diagnosis.

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APPENDIXES

Appendix 1: Interview protocol

Research question: In what ways does artificial intelligence can change the job design of medical experts in the hospital?

Semi-Structured Interview Questions

Before conducting the interview, a small introduction about the topic will be given to the interviewee. Plus, a polite greeting and thank the interviewee for meeting.

- **Before the interview:**

  1. A table includes all the concepts with meanings and examples (see appendix 2, table 1: operationalization table) will be used to assure that the interviewee understands the concepts and can help the interviewer gets all the needed information on the concepts after the interview ends.
  2. Assure that the interview questions need to be asked in a simple language to assure that the respondents understand the concepts and provide helpful answers on the topic and for the research.
  3. The interviewer asks for a permission from the interviewee to record the interview.

- **Introductory questions:**
  1. Could you please introduce yourself and tell a bit about your work?
  2. Could you please specify your role in the hospital?
  3. For how long have you been working here?
  4. what is the impact of AI in general on your job?

- **Questions more related to the topic of the research:**
  (Before starting to ask questions on the topic, an introduction will be given to the respondents to get an idea what AI in the context of the research is).
  1. Could you explain how you (medical expert) use artificial intelligence to promote positive patient outcomes.
  2. How does the rapid application of AI in healthcare influence medical experts' skills varieties during treatment interventions?
  3. Based on your experience, does AI application in healthcare improve or decrease physicians' role in healthcare provision?
  4. Every employee wants to feel that their contributions have substantial impacts on organizational goals. How does AI influence the significance of your role in healthcare practice?
  5. How does the rapid application of AI technology affect medical experts' autonomy and ability to perform their functions?
  6. How does AI influence the job feedback that you get?
  7. How do you think the incorporation of AI technology in healthcare will influence medical experts' jobs in the future?
  8. What kind of strategies can human resource management utilize to alleviate the potential risks associated with IA technology?

- **After the interview:**
  1. verify if the tape recorder worked throughout the interview.
  2. make a clarifying note on the written notes to clarify any notes that don't make sense.
  3. write down any observations made during the interview.

  If the interviewee refused to record, make sure to take extensive notes during the meeting and then send the notes to the interviewee after the interview for confirmation.

Appendix 2: interview notes for each respondent

Respondent 1:

- **Introductory Questions:**
  1. Specialist of cardiology
  2. Specialist of cardiology, manager of ER department (emergency department)
  3. Experience in the field for 5 years
  4. The main impact of AI on my job is the that it improved my performance and confirming diagnosis.
- **Other questions related to the Job Characteristic Model (JCM)**
  1. Of course, as I'm a specialist in cardiology, AI helped me to promote positive patients' outcomes for example in Echo cardiography which is a sound waves test that creates moving pictures to assess and evaluate functioning of the patient heart. there are three main types of the Echo cardiography.
     . Doppler: assessment for blood flow direction and assessment for regurgitations value movements.
     . CT. Coronary: Assessment for diagnosis of thromble (it is a test that uses sound waves to look at the flow of blood in the veins), assessment for risk stratification for ischemic heart disease (which means when the patient has narrowed heart arteries).
     . MRI (Magnetic resonance imaging): it is a gadolinium test helps for assessment and diagnosis of congenital heart disease.
     So, these are all tests that helps the doctors using artificial intelligence to promote positive patients' outcomes, because without the use of AI these types of heart diseases can pose potentially serious or life-threatening implications.
  2. For example, in diagnosis of thrombi in coronary artery (a blood clot inside a blood vessel of the heart). AI helps the doctor to sends patients quickly and directly to **coronary intervention** or **Thrombolytic therapy.**
  3. Improves
  4. Since AI helps faster diagnosis of diseases, faster diagnosis of hidden symptoms, confirming during diagnosis, and shorten the diagnosis time, this means that using AI powered cardiology diagnostic tests is very important and can increase the significance of cardiologist's role in the hospitals, because as I said before these tests can reduce the risk of death to many patients as these diseases can pose to life-threatening implications.
  5. I see that AI will help medical experts to increase their autonomy at work and this because AI will impact different perspectives, for example it helps medical practitioners to release the stress they feel when they diagnose or prescribe for treatment, because it helps to have accurate outcome and faster decisions, as a result, this will increase their motivation and proactivity in their work because they feel more confident in diagnosing the health condition and the prescription the provide to the patient.
  6. I believe that job feedback helps medical experts to learn more for what they practice every day with patients, however, if AI can motivate practitioners to be more productive and proactive in their work, it will definitely also improve the feedback they get from their work, because I see it as a closed circle, if any employee is motivated to improve his/her work and be productive in his/her work, this will lead to positive feedback at the end.
  7. From what I understood form the JCM that you provided, AI will definitely influence each of these elements in the future, for example, as I said before will increase the autonomy of medical experts and positively impact the skills of medical experts by increasing their ability to do their job faster, easier, more efficient, and with high quality. Overall, it will improve the quality of procedures, leads to improvement for accuracy in diseases diagnosis and higher rates of patients cure.
  8. The HR managements should set rules and regulations urging that before the procedures, all patients should learn the indications and contraindications of instructions related to the procedures.

Respondent 2:

- **Introductory Questions:**
  1. 45 years old, specialized in general surgery since 2007, also master's degree in medical emergencies and general comprehensive medicine at a … medical university. I'm married, have 3 children 2 of them and my wife are currently with me in Qatar.
     I work as a consultant general surgeon at OPD (Outpatients Diagnosis Clinics), dealing with a wide variety of surgical conditions which more frequent are Anorectal diseases (**Hemorrhoids, anal fissure, and fistula),** pilonidal disease, umbilical and inguinal hernia, and soft tissues tumours. At emergency department I'm always available for reviewing and diagnosis some part abdominal conditions as requested by ER doctors.

     Minor surgical procedures for the conditions mentioned before are also carried out using AI technologies as they are faster and more accurate than the doctors in such cases.
  2. Consultant general surgeon

3. I have been working in this field since 2003, while working in Qatar since 2017, AI has been developed a lot during my medical journey and this helped the doctors to be more accurate with their jobs and reduce the risk of misdiagnosis.
4. Artificial intelligence gives me the possibility to confirm immediately most of diagnosis at the same time they are made, giving that way accuracy to the management of surgical conditions as well as save time for patients and for me as well.

- **Other questions related to the Job Characteristic Model (JCM)**
  1. Differentiating among Cysts, abscesses, and lipoma through AI is for sure the best way to promote positive patients outcomes, because differentiating immediately between these three conditions is very hard for a doctor to recognize using the simple medical methods, however AI could help the doctors to differentiate faster between the three conditions as this will help also the patients to get more relaxed because when the patient feels that there a tumor or a tissue that contains fluid or air under his/her skin they get worry because they might thing that this is a cancerous cell under skin.
  2. By shortening the patients stay at the ER (Emergency department) when revelling out acute and major surgical conditions allowing then delivery the patients optionally at OPD (outpatient diagnosis unit) is also applied for confirmation of diagnosis, avoiding that way the need of further appointment and follow up.
  3. AI application in healthcare improves physicians role in healthcare provision in many ways, because as I mentioned before, that has been many developments of AI in the healthcare sector, which many people could think that this cannot help physicians role and AI could replace doctors in the future, however, is not true in my opinion, because as AI is improving we still need for doctors for the human sense, because at the end AI's are machines that we as a doctors control, for example when I carry out surgical procedure I use AI, but still I control the AI machines to cut for example specific veins or remove a humor in a specific area in the body that needs a surgical intervention by the doctors in order to control any unexpected situation that might occur during the surgery. AI increase my physician role by improving my ability to be more accurate and faster during surgical procedure.
  4. AI increases the significance of doctor role inside the hospital, doing job faster, being able to diagnose more patients in less time, and increasing the efficiency of the job is of course increasing the significance of doctors' roles inside the hospital, and this because without the intervention of doctors with these AI machines, there were not have been development in the healthcare sector, because AI still needs to be controlled by doctors.
  5. I'm an example of that. I don't need to wait for other doctors or studies to be done, since I'm capable to use AI in my surgery clinic, so it gives me autonomy to prepare my functions and take faster decisions during the surgeries, for example as a general surgeon, considering the intraabdominal conditions such as gallbladder stones, kidney stones, and blunt abdominal trauma are not seen through the skin, it's important to confirm them so that further management can be done properly.
  6. By following up all the patients with AI, watching behind postsurgical complications and normal evolutionary.
  7. There is still a long way to go regarding AI, but for sure it will be positive as long as a doctor is sitting there and controlling the machine.
  8. Providing related employees all possible and available personal protection devices, for patients as well. Also, they should plan strategy for social supporting and contacting, as this will help to increase the job satisfactions between doctors especially in the public hospitals because they usually diagnose and treat larger number of patients, so they need to satisfy in order to be motivated to their jobs and reduce risks.

Respondent 3:

- **Introductory Questions:**

  1. My name is (unknown), I work as a physician, I'm an ENT () consultant.
  2. I'm responsible for the diagnosis and treatment for ENT patients clinically and surgically.
  3. I have been working for about 10 years now in this hospital.
  4. AI helped me a lot in the rapidity and accuracy of my work.

- **Other questions related to the Job Characteristic Model (JCM)**
  1. AI improves the diagnosis of different diseases through non invasive techniques (without surgical intervention), also improve treatment (rapid and accurate) through minimal invasive surgical techniques using imaging and endoscopic (long thin tube inserted into the body to see organs in detail).
  2. This will promote rapid improvement of skills of healthcare provisions, as in past days doctors were used to normal skills or to be more clear used to usual medical methods, but the integration of AI in the healthcare could help the doctors to improve their skills varieties for example, doctors will be able to diagnose patients more accurate and faster as well as this will give the doctors more confidence of what they are doing with the patients and during the surgical procedures. Also, AI could improve doctors' skills during the surgery as they can help the doctors to have faster reaction towards any unexpected situation that might happens.

3. Definitely improves physician's role in healthcare provisions. Increase their productivity by allowing them to have faster diagnosis time.
4. AI allows me to provide better services to healthcare receivers, so it improves my role as a healthcare provider individually and with the organization team, which keeps up with organizations goals. So, for example, if I'm able to do my job faster and more accurate this will help me to meet my organization goal, because any health organization will seek towards better health treatment and good cooperation between doctors and nurses. Indeed, AI is doing by offering technologies that can help also for a faster and immediate communication between doctors and management or doctors and nurses and even between doctors and patients.
5. It helps to save time and effort by giving the doctors the autonomy to take fast and accurate decisions during diagnosis of a patient or surgical procedure.
6. From my experience with AI, I'm always getting positive feedback, and this is because patients usually don't like to wait until they get their diagnosis results because they are always worried about the results, so AI helps me to provide faster and accurate diagnosis for the patients which results in positive feedback from the patients and from the management team as well, as there are no complaints from the patients about misdiagnosis or a delay to get the diagnosis results.
7. It will change the nature of medical experts' jobs. In the future instead of doing everything manually medical experts will shift to be operating with AI instruments that well automatically do the job by itself.
8. Human resources management can adopt the strategy to provide funds for periodically updating AI technology to alleviate the potential risks.

Respondent 4:

- **Introductory Questions:**
  1. My name is (unknown), I'm an Ophthalmologist
  2. Diagnosis screening and follow up patients with ocular problems and pathology.
  3. 6 years
  4. Time saving and more precise follow up when we use AI technology in special investigation.

- **Other questions related to the Job Characteristic Model (JCM)**
  1. Screening and follow up of retinal problems (p.e) using OCT programs for macular oedema (is an eye disease that causes fluid to build up in the macula) or glaucoma (it is a common eye condition where optic nerve is damaged). I also want to mention that because of the help of AI and technology, one of the doctors in our hospital has invented a system called "a three steps eye-liveness validation system" this system is being used in the airports now to help the authorities in security and authentication systems, this system works by recognizing the pupil diameter size and also the heart pulses from the eyelid, in this case the system will recognize the eye as alive. Then, the system will start authenticating the iris. This could be a very good example of how AI influence the job medical experts, I can share with you the link of the document.
  2. In our cases OCT helps us to skills in adjusting treatment during the follow up and make it easier, which results in a better result for the patients.
  3. It helped to increase our ability for screening and follow up of patients, and this is the main role of ophthalmologists.
  4. AI cannot replace doctor -patient relationship, because communication of doctors with patients is very important so it help us to give more and better services. However, in the future AI could affect this, but the problem is that in my opinion as a ophthalmologist, communication with patient after the diagnosis, screening or surgery is the main role in our filed, AI could impact this role but this will negatively impact the patients because it will be not realistic if patients are communicating with machines instead of doctors and they will not feel safe if they are getting orders or prescription form machines about treatment for their eyes.
  5. Doctors decide finally about the treatment, AI could help us only to screen and follow up patients.
  6. This depends on the organization if they are spending on technologies that could improve the communication inside the organization or not, in our case or in this hospital, we usually get quick feedback for our work, and this because of the strong use of technology between the doctors and the managers
  7. It will improve the patient care, more accuracy and better follow up therefore enhance quality of life.
  8. Intensive training and periodic update of knowledge of medical staff inside the hospitals.

Respondent 5:

- **Introductory Questions:**
  1. I'm (unknown), consultant obstetrician and gynaecologist at Nova Medical Centre in Abu Dhabi, UAE.
  2. I'm the head consultant of Obstetrics and Gynaecology department of the centre.
  3. I have been working in this field for 6 years.
  4. AI helps to take rapid, accurate and precise decisions during diagnosis or surgical conditions.

- **Other questions related to the Job Characteristic Model (JCM)**
  1. Medical experts can use artificial intelligence to promote positive patient outcomes in many ways:
     1. Neurology: patients who have lost their ability to move or speak because of neurological diseases or trauma will be able to restore these functions using BCI (Brain Computer Interfaces) backed by artificial intelligence.
     2. Radiology: AI will enable in inventing a new generations of radiology tools, such as MRI, CT scans and x-rays, that are accurate and detailed enough to replace the need for tissue samples (biopsies) which carry the risk of infections. Moreover, this will enable experts to have more accurate understanding of how tumours behave as a whole, instead of basing their decision on a small segment of the tumour.
     3. Clinical documentation/order entry: voice recognition and dictation are helping to improve the clinical documentation, order entry; these are done using Natural Language Processing tools (NLP). The result will be reducing the time consumed by physicians to document and put orders on the system.
     4. Infection control and antibiotic resistance: AI can help create electronic health record data that can assist in identifying infection patterns and highlight patients who are at risk of developing antibiotic resistance before starting to show symptoms. This will give healthcare providers a faster and more accurate alerts for identifying antibiotic resistance.
     5. Creating more precise analytics for pathology images: AI can provide analytics that can drill down "to the pixel level" and analyse pathological specimens so accurately than what human eye can miss (pathologist). This will help clinicians assess the behaviour of cancer cells according to their progression rather than by other clinical staging or grade.
     6. Monitoring patients in ICU (intensive care unit): smart devices are being made using AI to monitor patients in ICU. These are so accurate in identifying deterioration in patients' condition, or development of complications.
     7. Immunotherapy and cancer treatment: AI has been used to develop "checkpoint inhibitors" to block some of the proteins made by the immune cells, using the body's own immune system to attack malignancies (cancer growth).

  2. The rapid application of AI in healthcare has both positive and negative impact on medical experts' skills. It has helped them make faster, more accurate decisions and long-term prognostic advances. However, it has made them more dependent on machines reducing their creativity and brain thinking with less of the less of the ethical and empathetic part of medical practice.
  3. AI improves physician's role in healthcare provision making his/her clinical decisions more accurate, faster, and precise. AI also provide medical experts with the ability to make accurate prognostic decisions based on the behaviour of disease, progression of tumours, and the response of the immune system. AI will "spare" healthcare providers the time to document, order investigations and medications, and make them focus more on patient care.
  4. AI will eventually shift the role of the medical experts towards preventing the occurrence of the disease rather than treating it and waiting for it to occur. AI has provided highly sophisticated tools that can predict the behaviour of the tumours and the progression of disease, giving medical experts more control over its treatment.
  5. AI has resulted in the development of smart software that enable machines to mimic human behaviour. They learn through training on autonomous systems (ever expanding data sets), that act independently using AI to make independent decision when faced with unanticipated scenarios. In other words, AI has resulted in machines that operate on their own without or with little human interaction. If these machines become super intelligent, then it could become very difficult to be controlled by humans, which can eventually replace human values and decision making. Moreover, these autonomous machines will replace the need for humans to perform the same jobs, resulting in many workers losing their jobs. Worker's layouts will increase as companies will look for more ways to save money using machines rather than paid workers to do the same job.
  6. AI no doubt has resulted in giving inaccurate assessment of job feedback and workers appraisal s almost everything is being done by smart machines limiting the ability of humans to show their creativity and performance.
  7. – Reduce medical experts' errors/less litigation
     - Better diagnosis and treatment
     - Faster decisions
     - New inventions
     - Saving time in documentation, ordering investigations and prescribing medications.
     - Reducing physical strain on surgeons during operations (robots).

8. – have understanding and coordination between AI leadership and executive team on the strategy and the risk of AI, this will result in knowing exactly how AI impact people lives and what to do when things go wrong.
    - Understanding the financial implications on workplace balancing the cost of software development with that of human cost.
    - Allocation of resources for human monitoring and corrective action of these smart machines.
    - Reducing the dependence on AI in legal and ethical fields as it can lead to bias and negative ethical implications.

Respondent 6:

- **Introductory Questions:**
  1. I'm Dr. (unknown) consultant internal medicine (medical specialist) dealing with prevention, diagnosis, and treatment for internal diseases for adults.
  2. Deal with prevention, diagnosis, and treatment of internal diseases for adult.
  3. 14 years
  4. The AI has a positive impact on work in terms of diagnosis of treatment and skills development.

- **Other questions related to the Job Characteristic Model (JCM)**
  1. Through our medical website and medical systems used in the hospital (ultrasound, Echocardiography)
  2. AI machines helps to facilitate diagnosis which means that this can help doctors to improve their skills and reduce any medical errors.
  3. It improves
  4. Contributing to the achievement of the goals of the institution depend on the human effort which is difficult to dispense easily in the medical field, but AI can contribute to accelerate and increase accuracy in achieving these goals.
  5. We need to be specific when talking about autonomy because medical experts can have the autonomy from many perspectives. So, if we talk about the timing, yes AI could help medical experts to have autonomy in time, due to its ability to help medical experts perform their tasks faster, as a result this may help them to perform more tasks and diagnose more patients for examples during their working hours. As they have time to chooses when to work. If we talk from the perspective about what decision they take during their work, AI help doctors to have the autonomy to choose how they are going to work.
  6. This depends on the hospital if the hospital spend more on improving the technology they are using for communication between employees, this will help all employees in the organization to get feedback from the managers or even from the patients faster and easily and this can help the doctors to usually keep undated with the managers and get more confidence about their job which will help at the end for more motivation for the doctors to do their tasks and feel that their work is contributing to the organizations, at the end AI of course improved the communication between doctors and patients, for example I'm as a doctor working in Qatar can easily get an instant feedback from a more experienced doctor in Germany for example.
  7. Yes, it will raise the level of performance and it will affect from other side some medical experts job it will be replaced by AI machines.
  8. Human resources should make rules about keeping AI under control of medical experts. AI remains under human control decision-making or actions; this will greatly reduce the risk of AI.

Respondent 7:

- **Introductory Questions:**
  1. My name is Dr. (unknown), I'm a consultant radiologist working at the clinic radiology department in the hospital as a head of radiology depart. Organizing the flow of work in the department.
  2. My role in the hospital is producing reports in different imaging modalition including MRI, CT, and Ultrasound, in addition to my job as a head of department.
  3. I have working for about 6 years in this hospital
  4. AI impact was mostly on breast, thoracic and neuroimaging mainly involving mammography, CT, and MRI. AI will make the radiologist-patient relation more interactive.

- **Other questions related to the Job Characteristic Model (JCM)**
  1. Pattern recognition software has advanced to the point where AI has been shown to be at least as accurate as doctors in identifying abnormalities and in some cases significantly more accurate. For instance, more efficient in in identifying and assessing severity of lung cancer. In study has shown that AI can be 95% accurate in identifying malignant melanoma from images.
  2. As I'm the head of radiologist department in the hospital, AI proof that it has improved the skills of radiologists, as I can see that the doctors working with me in the department have new skills learned from interacting with the AI machines such as the doctors are more accurate and faster in diagnosis, early detection of diseases, faster decision making, and better communication with patients after surgery for prescribing a treatment plan.

3. Of course, it can Improves because medical experts with the help of AI are more willing to do their roles, however, someday AI may even replace radiologist's role. Because with the increasing of AI in the healthcare sector, human knowledge will decrease.
4. AI influence the significance of radiologist role in healthcare: AI based systems are already improving the accuracy and efficiency of diagnosis, and in my opinion the increasing focus of AI in radiology suggestions that someday AI may even replace radiologist's role. As they will be improved to do everything the radiologists can do.
5. In the long-term risks, AI will decrease the doctor's autonomy to take decisions or to rely on their own diagnosis, and this because long-term risks involve shifts in the medical professions, some medical specialists, such as radiology, are likely to shift substantially, as much of their work becomes automatable. Widespread use of AI will result in decrease human knowledge as I said before and capacity overtime, such that providers lose the ability to catch and correct AI errors and further to develop medical knowledge.
6. As AI help the doctors to get more feedback, this will promise to revolutionize the workplace, enhance productivity, and help drive innovation, helping employees strengthen their skills.
7. As I said before AI could replace the doctors in the long run, but in my opinion other than radiologists AI could not replace completely all doctors because simply doctors must still control these machines as well as, it will be difficult for patients to completely rely on machines to do for example a huge surgery or accept a robot as their primary surgeon.
8. As I'm the head of the department and usually I'm the responsible to communicate with the HR team about anything related to the department, the HR department should invest in learning and increasing the knowledge of the doctors about how to deal with AI's in the future as everyday AI's in the health sector are improving and this may cause a gap in the doctor's knowledge of how to deal with AI's.

Respondent 8:

- **Introductory Questions:**
  1. My name is Dr. (unknown), I'm an orthopaedic specialist in the hospital and has been working for 10 years in the field.
  2. Orthopaedic specialist
  3. I have been working in this hospital (internal security force hospital) for 3 years, while working in the field for 10 years.
  4. The primary aim of health-related AI applications to analyse relationship between prevention or treatment techniques, and patient outcomes. AI programs are applied to practices such as diagnosis, processes, treatments protocol developments, drug developments, personalized medicine and patient monitoring and care.

- **Other questions related to the Job Characteristic Model (JCM)**
  1. Primary care physicians can use AI to take their notes, analyse their discussions with patients and enter required information directly into HR systems or department. These applications will collect and analyse patient data and present it to primary care physicians alongside insight into patient's medical needs.
  2. Rapid application of AI in healthcare improves the skills of medical experts during treatment interventions, reduces time of diagnosis and treatment and patient outcomes.
  3. Of course, it improves physician's role in healthcare provisions, as AI's applications are developing every day, the role of medical experts is increasing and this because AI's should be controlled by medical expert.
  4. It can learn, develop, and improves my capabilities overtime, because I'm as an orthopaedic specialist I need to keep always updated to what developments are being made in AI's applications to be able to integrate easily with the new technology that is being provided by the hospital constantly.
  5. AI could impact the autonomy of health practitioners in both ways negative and positive, because get use took base decisions on AI's in the long run can limit or reduce the doctors autonomy, while on the other side, some doctors may feel that this can increase their autonomy because depending on AI's to take decisions can sometimes reduce the doctors liability and risks.
  6. It dramatically improved the efficiency of my workplace which results in a better communication between the management team and the doctors, as a result doctors are getting feedback constantly on their work, as well as, they are getting usually positive feedback from the management and patients as well, due to the more efficient diagnosis, and this is very important because this reduces the number of times the patient visit the doctors due to misdiagnosis.
  7. Generally speaking, AI will increase the efficiency of medical experts in their jobs as it can help them predict, diagnose, and treat patients faster with high quality healthcare systems, doctors, and feedback. Now AI is stimulating medical innovations and virtual medicine which means that in the future this will strengthen the use of AI in the healthcare because it will enhance the hospitals productivity due to the ability to control and handle large information more than human ability.
  8. HR department could use many strategies to reduce the risk of AI, 1. they can improve the payroll management which can help to motivate the doctors to learn more about the new developments of AI's, 2. They could invest in developing the doctors on how to use AI in their jobs more efficiently which will help to increase the doctor's engagement and reduce the risk that may arise from the lack of knowledge.

Respondent 9:

- **Introductory Questions:**
  1. I'm doctor (unkown),, I'm a consultant radiologist.
  2. I'm specialized in diagnosis and treatment of diseases and injures by using medical instruments such as X-rays, computed tomography (CT), magnetic resonance imaging (MRI)
  3. 7 years
  4. There are so many developments in the field of AI in healthcare, especially with radiologists as we are using AI's every day in our jobs, these medical instruments or medical imaging procedures that are being used for diagnosis are fully AI technology that help medical experts to have accurate and deep diagnosis of patients. Without these instruments it is very hard to impossible for doctors to detect specific diseases or injures by normal human diagnosis.

- **Other questions related to the Job Characteristic Model (JCM)**
  1. Artificial intelligence is the most important factor for success, enhancing therapeutic results and reducing the failure rate in all branches of medicine, especially the diagnostic radiology department, in terms of using the artificial mind to determine the most accurate images of tumors and determine the amount of dye required. With the development of artificial intelligence, therapeutic radiation has also been used extensively and influential.
  2. The rapid intervention of artificial intelligence has proven highly effective, especially in surgical intervention, especially in interventional radiology, transferring it from just a diagnostic radiation to therapeutic radiation, and transferring medical- surgical development to a new successful stage in terms of accuracy and efficiency.
  3. Of course, artificial intelligence leads to improving the medical efficiency of medical staff and providing the best medical care
  4. Artificial intelligence positively affects the practice of medical care for employees, as it facilitates setting goals, facilitating follow-up, working as a team, and communicating between different departments to raise the quality of service.
  5. The rapid application of artificial intelligence affects the development of work mechanisms to raise the efficiency of the medical team and make it more independent and in control of the course of things
  6. Artificial intelligence gives a comprehensive idea of all observations, whether from colleagues or patients, whether positive or negative, and analyzes them and gives solutions to negative evaluations.
  7. I think that the integration of modern technology will not greatly affect the jobs of the medical staff, because whatever the development of artificial intelligence is, it is not only reliable, but must be in the service of the human factor and provide a high- level medical service.
  8. By 1) Training. 2*)* increase the knowledge of medical experts to reduce the relying on medical experts only because at the end they are machines, and some errors may occur. 3) follow-up and analysis to understand the struggles, weaknesses and strengthens that medical expert might be facing with AI's.

Respondent 10:

- **Introductory Questions:**
  1. I'm a dentist. Since I'm a doctor specialized in root canals mainly deals with root canal therapy and restoration of teeth.
  2. I'm a specialist dentist dealing with patients having dental problems.
  3. I have completed 9 years in this hospital
  4. AI has the potential to introduce solutions with personalized diagnostics more quickly. It will improve communication betw*een* doctors and patients and accurate analysis of patient tests.

- **Other questions related to the Job Characteristic Model (JCM)**
  1. AI in dentist can be used to give voice commands to pull up X-rays, patients records and charts. It creates a handsfree approach and speeds up work.
  2. AI can interpret X-rays and plan treatment, and it can detect cavities on film, which means that (blanks that appears on x-rays films, which can indicate for certain injures and diseases). Robotic surgery is in experimental stage yet. Also, artificial intelligence requires a large amount of healthcare data to train and learn from in order to provide more accurate clinical decision and increase treatment efficiency. AI is allowing clinicians to make more efficient and accurate decisions which in turn betters the care of patients as a whole.
  3. I comprehend that AI application will improve physician's role in healthcare provision because it helps doctors to perform their roles faster and more accurate. Overall, AI has a positive impact on doctors and patients in healthcare because of the ability to gather ana analyse a large amount of medical data yielding quicker and more accurate diagnose of a large section of the population. Therefore, if there are a portion of people who are not able to access specialized healthcare, then they might achieve the advantage through artificial intelligence.
  4. If AI is used in the right way, it can help me in providing better treatment and efficient patient management
  5. Rapid application of AI will initially cause a learning curve to achieve but eventually it will help in the performance of the clinicians as this will increase the autonomy of medical experts.

6. I guess AI works as an intelligent assistance and will provide better coordination and contacting of patients, so the job feedback is predictably accurate and useful
7. Use of AI in dentist has potential to introduce solutions with personalized diagnostics more quickly.
8. Potential risks like injures, errors privacy, bias related to AI can be alleviated by addressing these concerns in a judicious way.

Appendix 3:

Table 1: operationalization table

Job dimension	Definition	Example
Skill variety	Several different abilities a particular job needs.	Management position habitually has a variety of high abilities because they must supervise workers, track firm performance, and provide feedback. The administration needs general knowledge of more work processes, enabling them to substitute the skills that they are utilizing. Assembly line and more simple level positions have low skills diversity because they use fewer skills repeatedly throughout the day. These jobs are usually oriented around the routine of one main task, which can hinder an employee's inspiration due to the monotony.
Task identity	The extent to which the job needs to finish the whole procedure from start to the end.	A person who works alone and completes the job to meet the customers requires has high task uniqueness. Equally, a factor employee who only boxes the final product has low task identity because he only completes a small ratio of the general work.
Task significance	The effect of the job has on others.	All jobs have a level of status, but each person can interpret the importance of every job differently. For example, an emergency room doctor may feel that her job is more expressive than the job of the hospital caretaker.
Autonomy	The level of choice, freedom, and independence employees feel they have to do their jobs.	Assembly line workers do not have a high level of autonomy; they involvement little liberty in what they do daily and will likely always have a schedule set for them.
Job feedback	The employee regarding the efficiency of their routine establishes direct and precise information.	An individual can receive a quick response when they are working on a job. However, conversely, a public relations manager who implements a new public relations approach might never find out how well prejudiced sales.

Table 2: Detailed table for the six broad themes analysis (respondent 1, 2, and 3).

Theme	Respondent 1 (Specialist of cardiology)	Respondent 2 (Consultant general surgeon)	Respondent 3 (Ear, Nose, and Throat Consultant)
Increasing the skill variety of medical experts	Helps doctors to send patients quickly for intervention or therapy	Confirm immediately most of the diagnosis, accurate and faster diagnosis.	helps me in the rapidity and accuracy of the work, improves doctors diagnosis without surgical intervention,improves the ability of doctors to give treatement rapid and accurate, also help doctors to have faster and accurate reaction during surgeries for unexpected situations.
AI improves task identity of medical experts	AI improves patients outcomes as they make jobs of medical experts more clear	Differentaiting among hard diseses through AI technology is of corse the best way for postive patient outcomes which means that it improves the task idnetity of medical experts by making their tasks clearer until they achieve positive outcomes.	no response
AI increases the autonomy of medical experts	AI will increase autonomy at work by releasing stress during the diagnosis	I don't need to wait for other doctors or studies to be done, since I'm capable to use AI in my surgery clinic, so it gives me autonomy to prepare my functions and take faster decisions during the surgeries	gives doctors the autonomy to take faster and accurate decisions during diagnosis and surgical procedures.
AI increases the task significance of medical experts	AI improves the physicans role as a result this will increase their task significance	AI increase physicans role, however, AI will help medical experts to add value to their, which means that AI can help medical experts to increase their significance but not to replace them. Doing job faster and accurtae this also can increase the significance of medical experts jobs.	if I'm able to do my job faster and more accurate this will help me to meet my organization goal which will help to increase my task significance
AI enhances positive job feedback	it is a closed circle if AI motivate employees to imporve their productivity this will definitely improve the feedbcak they get from their work	NO RESPONSE	AI helps me to provide faster and accurate diagnosis for the patients which results in positive feedback from the patients and from the management team as well, as there are no complaints from patients
AI reduces medical experts' creativity			

Table 3: Detailed table for the six broad themes analysis (cont'd) (respondent 4, 5, and 6).

Theme	Respondent 4 (Ophthalmologist)	Respondent 5 (Consultant obstetrician and gynecologist)	Respondent 6 (Consultant internal medicine)
Increasing the skill variety of medical experts	skills in adjusting treatment during the follow up and make it easier, increase the ability of screening	helps take rapid, precise, and accurate decisions during diagnosis. Faster decision, better ability to diagnose and treat	improve medical experts skills
AI improves task identity of medical experts	no clear response	helps improves the task idnetity of doctors from many perspectives such as, Neurology, Radiology, Clinical documentation, and Infection control and antibiotic resistance, which means that in this case medical expert will has a clear task and will be able to acheive postive patients oucomes at the end for his/her job.	AI has the ability to improve the job description because of its ability to make job easier as a result this will help improve the task identity of medical experts.
AI increases the autonomy of medical experts	Doctors decide finally about the treatment, AI helps only for screening and follow up patients	AI has resulted in machines that operate on their own without or with little human interaction	helps to increase autonomy in time and decision makings.
AI increases the task significance of medical experts	AI will not replace the doctor-patient relationship which means that this will add avlue to the medcial exeprts and increae the job significance in the hopsitals, as AI are acting as a helping factor for thr mrdcial experts.	ability to make accurate prognostic decisions based on the behaviour of disease, progression of tumours, and the response of the immune system. Accurate and faster, and precise decisions, shifting the role of physicians towards preventing the occurrence of the disease rather than treating it.	AI can contribute to accelerate and increase accuracy in achieving organizational goals which can help to increase medical experts task significance.
AI enhances positive job feedback	improves the ability to get feedback in our job, however, this depends on the hospital spendings on technology.	negative response	improves the ability to get feedback in our job, howvever, this depends on the hopital spendings on technology.
AI reduces medical experts' creativity		it has made them more dependent on machines reducing their creativity and brain thinking with less of the less of the ethical and empathetic part of medical practice.	

Table 4: Detailed table for the six broad themes analysis (cont'd) (respondent 7, 8, 9, and 10).

Theme	Respondent 7 (Consultant radiologist)	Respondent 8 (Orthopedic specialist)	Respondent 9 (Consultant radiologist)	Respondent 10 (Dentist)
Increasing the skill variety of medical experts	doctors becomes more efficient, acccurate and interactive while identifying lung cancers or hard diseases (faster decision making, more accurate, ealry detectionof diseases, and bettter communication woth patients)	improves the skills of medical experts during treatment interventions, reduces time of diagnosis and treatment and patient outcomes.	medical experts to have accurate and deep diagnosis of patients	quicker ability to diagnose and increase treatment efficiency
AI improves task identity of medical experts	no clear response	can help medical experts to perform their tasks easily and faster which at the end will affect their task idnetiy because they will be more able to finish their tasks easily due to the clearness of their task identity.	facilitates setting goals, facilitating follow-up, working as a team, and communicating between different departments to raise the quality of service and improves the task identity of medical experts to perform their jobs	AI improves patients outcomes as they make jobs of medical experts more clear
AI increases the autonomy of medical experts	AI will decrease the doctor's autonomy to take decisions or to rely on their own diagnosis, and this because long-term risks involve shifts in the medical professions	doctors may feel that this can increase their autonomy because depending on AI's to take decisions can sometimes reduce the doctors liability and risks.	helps to incraese autonomy in time and decision makings.	**w**ill help in the performance of the clinicians as this will increase the autonomy of medical experts.
AI increases the task significance of medical experts	improving the accuracy and efficiency of diagnosis which will positively impact the task significance of medical experts by doing better job.	improves physicians role which positively impact the task significance of medicl experts.	improving the medical efficiency of medical staff and providing the best medical care. Also reduce the failure rate, facilitating the follow-up.	it helps doctors to perform their roles faster and more accurate. Overall, AI has a positive impact on doctors and patients in healthcare because of the ability to gather ana analyse a large amount of medical data yielding quicker and more accurate diagnose of a large section of the population
AI enhances positive job feedback	AI help the doctors to get more feedback, this will promise to revolutionize the workplace, enhance productivity, and help drive innovation, helping employees strengthen their skills.	better communication between the management team and the doctors, as a result doctors are getting feedback constantly on their work	Artificial intelligence gives a comprehensive idea of all observations, whether from colleagues or patients	intelligent assistance and will provide better coordination and contacting of patients, so the job feedback is predictably accurate and useful
AI reduces medical experts' creativity		AI's in the long run can limit or reduce the doctors creativity, which will reduce their autonomy		