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Emergency Before Hospital Perceptions Paramedics Around Use Hospitals Virtual To Support Care

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Abstract

This study aims to identify paramedics' perceptions of the use of virtual hospitals to support pre-hospital emergency medical care, given the increasing importance of this technology in improving the quality of healthcare services and the speed of response to critical cases. The research relied on the descriptive analytical approach by preparing a questionnaire consisting of eight items distributed on a five-point Likert scale, and included a sample of **500 paramedics working in emergency medical services. The results showed that the sample members' perceptions of virtual hospitals were moderately to highly positive, with the arithmetic means of the items ranging between (3.7 - 4.2), reflecting the participants' belief in the effectiveness of this technology in improving medical decision-making, increasing diagnostic accuracy, and reducing response time to emergency cases. The results also showed that virtual hospitals contribute to improving the quality of pre-hospital care, enhancing coordination between paramedics and specialist physicians, and supporting paramedics' professional development through direct communication with experts. Statistical differences tests (T-test and ANOVA) showed no statistically significant differences attributable to gender, while differences related to years of experience appeared in favor of those with more than ten years of experience, indicating that practical experience enhances acceptance of this technology and appreciation of its importance. The study emphasizes the importance of expanding the application of virtual hospital technologies in field settings, while providing training programs for paramedics to enhance their proficiency in using this technology, thus contributing to improving the quality of emergency care and reducing medical errors.

Keywords: Virtual Hospitals - Emergency Medical Care - Pre-Hospital - Paramedic Perceptions - Telemedicine - Medical Decision Support.

Introduction

Many paramedics expect virtual hospitals to play an increasingly important role in supporting pre-hospital emergency care(pre-hospital care) which many see as a powerful tool to improve the quality and speed of care provided. This technology provides field paramedics with immediate, specialized support from hospital physicians helping them make better decisions and deliver more accurate services 1,6

The concept of virtual hospitals can be explained in more than one way , but they all revolve around a basic idea providing healthcare services remotely using digital technologies without the need for the patient to be physically present . This can be explained as follows 2,8

Virtual hospitals are defined as an integrated digital platform and a system that integrates various technologies such as telemedicineand remote patient monitoring, to provide a wide range of medical services , where These platforms help and enable doctors to communicate with patients and provide them

with continuous care from their homes, especially patients Those who suffer from chronic diseases or difficulty in mobility 6

It is also a support program for traditional healthcare, as virtual hospitals are part of a healthcare system that works alongside... Along with traditional hospitals, they provide support. Specialized for partner hospitals, facilitating the management of complex cases and facilitating It also helps in making treatment decisions, especially in emergency situations . Virtual hospitals represent a qualitative leap in the field of healthcare because they combine technology and medicine to provide more flexible and efficient care 9

Discussion

- **The development of virtual hospital applications in the healthcare field**

The development of virtual hospital applications in the healthcare sector is a story of gradual and rapid digital transformation, supported by technological progress and the growing need for more efficient ,healthcare services. This development can be divided into several main stages, namely: the early stage which is the focus on remote consultations(Telemedicine) , where the concept of virtual hospitals began in a simple form with a focus on receiving treatment and remote consultations(Telemedicine) where these , applications at this stage were mainly limited to Telephone consultations Where doctors were providing advice to patients over the phone and using email to send medical reports and analyses between doctors and patients Or between doctors themselves in different locations and The use of simple devices to monitor some vital signs of patients such as blood pressure and send them to the doctor. This stage suffered from a weak technical infrastructure and limited services provided 1,5

but it laid the foundation for the idea of remote healthcare . The second stage is the emergence of integrated platforms, the spread of the Internet and the emergence of smartphones, as virtual hospital applications developed to become more integrated. At this stage, video platforms began to appear with high technology and quality. It became possible to conduct visual consultations between the doctor and the patient, which allowed for an initial visual examination of the case. Then, electronic health records(EHR/EMR) began , so patients' medical records were digitized, which provided doctors with access to their complete health history from anywhere. Data analysis is easier and applications dedicated to patients on smartphones are beginning to appear, enabling them to book appointments , communicate with doctors, and follow up on ,their treatment plans. During this stage 5,7

the efficiency of providing care has been greatly increased and patients have access to it has been facilitated Then , the current stage is integration with artificial intelligence and the Internet of Things .(IoT). At this stage, virtual hospitals have become not just platforms for communication , but have become smart systems based on the latest technologies. One of the most important features of these is remote patient monitorin (RPM) .using devicesIoT and the use of internet-connected home devices (such as blood glucose and blood pressure monitors) to continuously monitor patients' vital signs in real time. This data is automatically sent to the doctor, allowing for early intervention in the event of any abnormal changes . This stage also features the use of artificial intelligence to analyze patient data and predict potential risks, such as the risk of stroke or heart attack, and to assist in diagnosis by providing AI-powered tools to help doctors analyze medical) images (such as X-rays) and provide initial diagnoses Virtual realityVR) and augmented reality(AR) are also being used in areas such as remote physical therapy, doctor training, or remotely assisting surgeons in complex operations 10,9

Therefore, the future of virtual hospital applications is heading towards their full integration into the daily fabric of healthcare . The future does not lie in the existence of separate virtual hospitals , but rather in transforming the traditional hospital into a connected systemwhere the patient can receive care from anywhere and health data is transferred seamlessly between doctors and various healthcare facilities 3,5

- **The role of virtual hospital applications in supporting pre-hospital emergency care**

Virtual hospital applications play an important role in supporting pre-hospital care. These applications are no longer just a means of communication , but have become integrated tools that give paramedics in the field the ability to provide more efficient and accurate medical care before the patient arrives at the emergency room . They contribute to providing clinical support in real time, as these applications allow paramedics to communicate immediately with specialized doctors in the hospital , as the paramedic can use the camera of his smartphone or any connected device to share a live image of the patient's condition with the specialist doctor in the hospital. This allows the doctor to better assess the patient's condition and determine the most appropriate treatment plan, such as administering certain medications or taking emergency measures. Specialized directions and instructions can also be provided in critical cases such as strokes or heart attacks, as the doctor in the hospital can guide the paramedic step by step in the necessary treatment procedures. It increases the speed of medical intervention and improves the patient's chances of survival and recovery . The monitoring devices in the ambulance can also send patient data such as an ,electrocardiogram . Blood pressure and oxygen level measurements are sent directly to the hospital allowing doctors to begin analyzing the condition and making early decisions even before the patient arrives 1,11

Therefore, virtual hospital applications represent a qualitative shift in the field of emergency care transforming the paramedic from a mere first aid provider to part of an integrated and interconnected medical team, leading to better care and saving more lives 2,4

- **Tasks paramedics in phase what before hospital**

.Paramedics perform vital and intensive tasks in the pre-hospital phase(pre-hospital care) they are the , first line of defense to save lives and manage emergency cases . These tasks are not limited to rapid transport to the hospital, but they also include providing an assessment Comprehensive and providing medical care in the field. The primary tasks of paramedics are rapid response and access to the site, as paramedics respond to reports received from the emergency operations room. They analyze the initial information of the case and then the initial assessment and initial diagnosis . The paramedics conduct a .quick and systematic assessment of the case to determine its severity and provide medical care on site After the assessment process, the paramedics begin providing the necessary and appropriate treatment for the case and then communicate with the hospital. Effective communication with the hospital is one of the important aspects, as the paramedics inform the hospital's emergency team of the details of the patient's condition. The procedures taken and the expected arrival time. This communication enables the hospital to prepare the necessary medical team, operating room or intensive care unit in advance to receive the patient and then transport him safely to the hospital 5,3

- **Challenges that Facing paramedics in Interventions Ambulance**

face a wide range of challenges in emergency interventions, as the nature of their work requires flexibility .and quick thinking. The ability to deal with critical situations in difficult and unpredictable environments These challenges can be explained as follows: Challenges related to the environment. Paramedics often respond to accidents that occur in dangerous locations , such as traffic accidents on highways. Or fires or crime scenes , they may be exposed to the risk of injury, pollution or even violence, as well as severe weather conditions, as heavy rain, snow or extreme heat can affect their ability to reach the site or provide care effectively. Remote locations also represent one of the challenges for paramedics, as some places are difficult to access, such as rural areas or mountains, which increases response time and delays the patient's arrival to the hospital. There are challenges related to the patient's medical condition, as paramedics may sometimes face difficulty in diagnosis, as some of the patient's symptoms may not be clear. This makes it difficult for the paramedic to determine the true nature of the problem, especially in cases that require .immediate intervention 1,8

- **importance to support decision Medical Fast in This is amazing stage**

Rapid medical decision support in the pre-hospital phase is of great importance as it represents the cornerstone of providing effective emergency care. At this critical stage, every second is valuable and the decisions made directly affect the patient's chance of survival and recovery without any complications The importance of rapid medical decision support is due to the fact that it contributes to improving the patient's health outcomes by reducing response time, as it provides immediate support to paramedics to take the necessary measures quickly, such as administering medications or stabilizing injuries, which reduces lost time and prevents the patient's condition from deteriorating. This is considered one of the important measures in cases such as heart attacks and strokes, where early intervention is directly linkedBy improving the chances of survival , rapid support helps avoid wrong decisions resulting from stress and ensures that the correct medical protocols are followed. Also, the optimal use of resources helps support the decision in guiding the paramedic to determine whether the patient needs to be transferred to the emergency department or whether he can be directed to a specialized clinic or primary care facilityThis reduces the pressure on busy emergency departments . When paramedics can provide the hospital with accurate information about a patient's condition before arrival, the hospital's medical staff can prepare the necessary resources, such as an operating room or surgical team, saving time upon the patient's arrival 10

Based on the above, rapid medical decision-making support in the pre-hospital phase is an important and necessary measure. It ensures that decisions made in the most difficult circumstances are best for the patient, saving lives and improving the efficiency of the healthcare system as a whole

- **level awareness And knowledge In hospitals Virtual**

One of the most important perceptions of paramedics regarding virtual hospitals is the improvement of clinical support and immediate and accurate decision-making. Paramedics believe that virtual hospitals provide them with the ability to consult with doctors and specialists in real time using video or audio This direct support can be important in complex cases. They also believe that they contribute to the diagnosis of critical cases, as the specialist doctor can see the patient's condition himself and provide guidance to determine the condition, such as strokes or heart attacks. They also believe that they contribute to the management of emergency cases, such as shock or serious injuries, as the paramedic can receive precise instructions on how to deal with the patient before arriving at the hospital . In generalparamedics view virtual hospitals as a natural evolution in the field of emergency care, as they provide them with new tools and greater capabilities to provide better care to patients. However, they emphasize the importance of addressing technical and training challenges to ensure the success and sustainability of this system 11

However, with the rapid development in the field of digital healthcare, the level of awareness and knowledge of virtual hospitals remains uneven among different segments of society, whether at the level of ordinary individuals, or even among some health professionals . There is limited awareness, as most people see hospitals as tangible buildings and that healthcare requires the presence of Personally Awareness of virtual hospitals is still weak and some may hesitate to use these services for fear of From lack of quality or privacy, or because they do not trust the diagnosis that is done remotely , but there is an increase in awareness, especially after the Covid-19 pandemic , as it played a pivotal role in raising awareness of remote health services, as many were forced to use it, which showed them its benefits . The level of knowledge also varies between doctors, nurses and paramedics, as we find that the younger generations , are often more familiar with these technologies and prepared. To integrate them into their work practices paramedics realize the importance of these technologies, especially in supporting medical decisions in the field. However, their knowledge may remain theoretical unless practical training and the necessary infrastructure are provided . One of the most important challenges facing paramedics is the lack of training in the use of these applications , in addition to concerns related to legal liability and adherence to new protocols 5,8

Therefore, the level of awareness of virtual hospitals remains in the development stage , and it requires significant efforts to educate and raise awareness to increase confidence in them, which opens up broader horizons for their integration into the health system

- **Benefits Expected from Destination consideration paramedics**

Virtual hospitals hold great promise for improving the quality and efficiency of pre-hospital emergency care. From the perspective of paramedics , they see them as an invaluable tool because they enhance their capabilities and provide the best possible care to the patient . One of their benefits is providing immediate and specialized clinical support , which is the most important benefit for paramedics . Instead of relying solely on their individual expertise , virtual hospitals enable them to obtain immediate advice from ,specialized doctors in the hospital. This support gives paramedics the confidence to make critical decisions especially in rare or complex cases that they have not encountered before . The doctor in the hospital can see the case through video and guide the paramedic in the correct procedures, which reduces the possibility of errors . Using virtual hospitals, the paramedic can also transmit X-ray images, EKG results , or even ultrasound images taken in the field to the doctor in the hospital. This data allows the doctor to provide a more accurate initial diagnosis, which helps in developing a better treatment plan and determining the ,necessary medications before the patient arrives. It contributes to increasing efficiency and reducing time as virtual hospitals enable the hospital to prepare in advance to receive the patient Once the case is assessed remotely, the hospital can activate the surgical team or stroke treatment teamThis is a summary of what is very important in saving lives in emergency 1,8

It also contributes to directing non-critical cases to specialized clinics, which reduces pressure on emergency rooms . It also contributes to enhancing the confidence of paramedics and developing their skills. When paramedics see that they are part of an integrated and interconnected medical team, their confidence in their decisions increases significantly . Continuous interaction with specialist doctors gives them the opportunity to learn and develop their skills, making them more efficient and prepared. To deal .with any future emergencies 5,8

Therefore, paramedics in virtual hospitals see it as a revolutionary tool that aims not only to improve patient care but also to further empower and develop them as an integral part of the healthcare system

- **concerns and obstacles potential**

emerge that may impact the widespread adoption and implementation of virtual hospitals, particularly in supporting pre-hospital emergency care. These challenges can be categorized into technical, legal, and training aspects, as follows

We find technical and infrastructure challenges , which are represented by weak internet connectionwhere Virtual hospitals rely heavily on a reliable and fast internet connection . In remote areas or areas with poor communication networks, real-time video and data transmission may be difficult or impossible , hindering the provision of remote support . Patient health data is also highly sensitive , and there are significant concerns about the security of these platforms and the protection of data from hacking or leakage, which may compromise patient privacy. Devices used in the field, such as smartphones or tablets, may also face issues. Technical issues such as battery drain or unexpected malfunctions that affect paramedics' ability to communicate with the hospital 7

.Legal concerns include whether a doctor in a hospital makes a diagnosis or provides remote guidance .Questions may arise about who bears legal responsibility: the hospital doctor or the paramedic in the field This ambiguity may lead to physicians being reluctant to provide remote support . Licensing laws may also differ across geographic boundaries, making it difficult for physicians to provide services to patients in other areas 9

- **The effect on speed Response Quality care**

play a pivotal role in improving the speed of response and the quality of emergency care before arriving at ,the hospital, as the direct impact of this technology is reflected positively on both paramedics and patients leading to better treatment outcomes . Virtual hospitals contribute to accelerating the emergency response

process through Prioritize where the doctor in the virtual hospital can provide an assessment. first The case is monitored through video or data transmission, which helps direct the ambulance team to determine the priority of transport and prepare the hospital's medical team to receive the most critical case first. It also contributes to reducing wasted time, as immediate communication enables paramedics to obtain immediate guidance on the necessary medications or procedures, eliminating the need to wait to reach the hospital to make critical decisions and reducing the ambulance time in the field. Rapid response teams can also be activated, as the hospital can activate specialized teams such as the stroke team in advance , which saves time upon the patient's arrival and enhances the speed of therapeutic intervention

In terms of its impact on the quality of care, virtual hospitals bring about a qualitative shift in the quality of care provided by supporting medical decisions, asVirtual hospitals provide support Specialized for paramedics, enabling them to make decisions based on the expertise of the hospital's specialist doctorsProviding high-quality care in the field . The exchange of vital data, images, and videos allows the hospital physician to make a more accurate initial diagnosis, which reduces errors and ensures that the care provided in the field is consistent with the optimal treatment protocol. Therefore, this technology ensures continuity of care between the field and the hospital, as the hospital's emergency team can obtain a complete picture of the patient's condition and the procedures taken before his arrival, which facilitates the process of handing him over and receiving the necessary treatment 9

- **The effect on cut Mistakes Medical**

allow paramedics immediate access to specialized doctors. This communication greatly reduces the possibility of errors resulting from misdiagnosis or lack of knowledge of the condition. Paramedics can .also transmit the patient's vital data, such as an EKG or ultrasound images, to the hospital in real time This allows hospital physicians to analyze data instantly, helping to detect subtle changes in a patient's condition that a paramedic alone might not notice. It also provides a more accurate diagnosis, such as differentiating between types of stroke , which impacts the treatment provided. It also helps reduce psychological stress on paramedics, as working in an emergency environment is very stressful , and decisions made under pressure can be error-prone . With a support network of specialized physicians, the pressure on paramedics is reduced, allowing them to better focus on their tasks and provide care more calmly and efficiently. This psychological support indirectly reduces the likelihood of human error These systems facilitate the automatic documentation of medical procedures performed in the field reducing the likelihood of forgetting or omitting any important details in the final report . This accurate documentation ensures continuity of care when the patient is delivered to the hospital and prevents any misunderstandings 6

Therefore, virtual hospitals act as a kind of safety net that gives paramedics the confidence and resources needed to handle any emergency, ultimately improving the quality of care and significantly reducing medical errors

- **The effect on satisfaction patients and practitioners Health workers**

Virtual hospitals have a positive impact on the satisfaction of both patients and paramedics. Patients feel more reassured by the immediate and continuous medical support they receive on the ground, which enhances their confidence in the quality of care provided. For healthcare practitioners, virtual hospitals increase their job satisfaction by reducing psychological stress and providing specialized support that enables them to make informed decisions, making them more efficient and effective in their work. This interaction ensures that all parties feel satisfied with the quality of medical care provided and the smooth running of the medical process 1,5

- **Models Global in application hospitals Virtual**

Teladoc Healthin the United States is the world's leading virtual healthcare provider . The system connects ,patients with healthcare professionals remotely, providing them with easy access to treatment anytime ,anywhere. Teladoc offers a wide range of services, including general and specialized medical consultations , psychological care, and chronic disease management. Users can connect with doctors via video calls phone calls , or text messages, reducing wait times. The system also provides support in emergencies such as strokes and heart attacks, connecting paramedics in the field with hospital-based specialists. The system allows for the creation of personalized care plans for each patient, with the ability to monitor health progress remotely. It relies on the latest technologies to ensure the security and privacy of patient data, in addition to integrating artificial intelligence to improve the quality of care 6,8

The TELEMACO ,project in Italy is one of the most prominent Italian models in the field of telemedicine especially in the Lombardy region. The project aims to ensure continuity of healthcare for patients after they are discharged from the hospital, especially those suffering from chronic diseases such as congestive heart failure and chronic obstructive pulmonary disease. TELEMACO relies on providing remote home monitoring Patients are provided with devices to continuously measure vital signs from home and receive .remote consultations .It provides patients with online access to doctors for consultations and follow-up The project also provides additional consultations for primary care physicians from specialists in fields such as cardiology and diabetes, ensuring better patient care 5,8

In the Netherlands, one of the most prominent of these models isthe telemedicine initiatives adopted by Dutch hospitals to connect various hospitals and health centers. These initiatives are distinguished by their focus on the exchange of experiences , as these networks allow doctors in small hospitals or remote areas to consult with specialist doctors in major medical centers . For example: A doctor at a small hospital can send x-rays or patient data to a specialist at a university hospital for a second opinion ensuring that all patients receive the best possible care andVirtual ICUs in some major hospitals in the Netherlands monitor ICU patients in less well-equipped hospitals, ensuring 24/7 specialized care even in hospitals that lack specialized staff. These networks also allow patients with chronic diseases to follow up on their condition with their doctors from home, reducing the number of unnecessary hospital visits These Dutch initiatives aim to improve the efficiency of the health system, save costs, and reduce the geographical gap in health service provision 4,1

- **Capability Application in Context Local**

The Seha Virtual Hospital(SHV) is the first integrated virtual hospital in the Middle East and a pioneering project of the Saudi Ministry of Health . The hospital operates as an advanced digital platform that aims to provide specialized remote health services to enhance access to high-quality healthcare across the Kingdom of Saudi Arabia , especially in remote areas and peripheral hospitals that lack subspecialties . The hospital focuses on several basic services and the Virtual Intensive Care Unit(Virtual ICU), which is one of its most prominent services. A team of specialized doctors and consultants monitors intensive care patients in several different hospitals from a central control room 2,9

This service ensures that patients in small hospitals receive specialized care around the clock, and

demonstrate that virtual hospitals are effectively applicable in the region for several reasons , including responding to the geographical distance. The region is vast, and some areas suffer from a shortage of specialized medical personnel. Virtual hospitals work to bridge this gap and ensure access to care for all We also see that governments in the region have adopted strong digital transformation strategies in many countries , providing the necessary infrastructure for communications and digital technologies. These models are ideal solutions for supporting paramedics in the field, which improves the quality of emergency care and reduces medical errors 1,11

Study Field (Hilal) Red Saudi

The scope of the study is to identify the perceptions of paramedics working in the Saudi Red Crescent Authority regarding the use of virtual hospitals to support pre-hospital emergency medical care. The importance of this field stems from the vital role paramedics play in responding immediately to emergency situations, and the support virtual medicine technologies can provide in improving the quality of medical care and accelerating decision-making.

Methodology Search And Its Tools

The questionnaire was used as the primary tool for data collection. It was designed in light of the research objectives and themes, and included eight basic items formulated according to a five-point Likert scale to measure paramedics' perceptions of the effectiveness of virtual hospitals in pre-hospital emergency medical care.

Analysis Results

The study sample included 500 paramedics working in the Saudi Red Crescent Authority. The analysis results showed that the sample members' perceptions were moderately to highly positive, with arithmetic means ranging between (3.7 - 4.2). It was also found that there were no statistically significant differences attributable to gender, while differences related to years of experience appeared in favor of those with more than ten years of experience. These results underscore the importance of enhancing training programs and employing virtual hospital technologies to improve the quality of care and reduce medical errors.

Taple (1) Mean, Median, and Std. Deviation

Item	Mean	Median	Std. Deviation
1. Effectiveness in supporting medical decisions	3.9	4	0.88
2. Accuracy of diagnosis	4.1	4	0.82
3. Reducing decision-making time	3.8	4	0.90
4. Improving quality of care	4.0	4	0.85
5. Enhancing survival chances	4.2	4	0.80
6. Coordination with doctors	4.1	4	0.83
7. Reducing medical errors	3.7	4	0.95
8. Supporting professional development	3.9	4	0.87

The table shows that the arithmetic means of the questionnaire items ranged between 3.7 and 4.2, indicating that the sample members' perceptions tended generally to be positive regarding the role of virtual hospitals in supporting pre-hospital emergency medical care. The item "improving chances of survival" had the highest average score of 4.2, reflecting paramedics' awareness of the importance of this technology in increasing the patient's chance of survival. The results also showed that the items "diagnostic accuracy" and "enhancing coordination with physicians" achieved an average score of 4.1, which reflects paramedics' confidence in the role of virtual hospitals in improving diagnosis and enhancing cooperation with specialist physicians. In contrast, the item "reducing medical errors" had the lowest mean (3.7) with a relatively high standard deviation, indicating a variance in participants' opinions about the effectiveness of virtual hospitals in reducing medical errors. Overall, the results reflect a clear positive attitude among paramedics toward this technology, while indicating the need for further training and practical experience to enhance confidence in some aspects.

Taple (2) T-test (Gender Differences)

Group	N	Mean	Std. Deviation	T-value	Sig. (p)
Male	220	3.95	0.82	1.87	0.062
Female	180	4.08	0.79		

The table shows the results of a T-test comparing the means of males and females in their perceptions of virtual hospitals. The results showed that the mean of females (4.08) was higher than the mean of males (3.95), but the statistical significance value (Sig = 0.062) was greater than 0.05, indicating that there were no statistically significant differences between the two groups. Therefore, it can be said that gender did not significantly influence the sample members' opinions regarding the use of virtual hospitals.

Taple (3) One-Way ANOVA

Source of Variance	Sum of Squares	df	Mean Square	F	Sig. (p)
Between Groups	4.82	2	2.41	3.65	0.027
Within Groups	261.50	397	0.66		
Total	266.32	399			

The table shows the results of a one-way analysis of variance (ANOVA) test to study the differences in sample members' perceptions of virtual hospitals according to years of experience. The statistical significance value (Sig = 0.027) was less than 0.05, indicating that there were statistically significant differences between the groups. This result indicates that years of experience had a clear impact on shaping participants' perceptions, as it was found that those with more than ten years of experience displayed more positive attitudes compared to their less experienced colleagues.

Results and Recommendations

First: Results

1 .The survey results showed that paramedics' perceptions of the use of virtual hospitals in pre-hospital emergency care were generally positive, with arithmetic means ranging from 3.7 to 4.2.

2 .The item "Improving Survival Chances" ranked first with a mean of 4.2, reflecting paramedics' belief in the importance of this technology in increasing patients' likelihood of survival.

3 .The items "Diagnostic Accuracy" and "Enhancing Coordination with Physicians" had high means (4.1), indicating paramedics' confidence in the role of virtual hospitals in improving diagnosis and supporting professional communication.

4 .The item "Reducing Medical Errors" had the lowest mean (3.7) with a high standard deviation, reflecting the diversity of paramedics' opinions on this aspect.

5 .The results of the t-test showed no statistically significant differences between males and females ($p > 0.05$), indicating that gender did not influence perceptions.

6 .ANOVA results showed statistically significant differences between groups based on years of experience ($p < 0.05$), in favor of those with more than ten years of experience.

Second: Recommendations

1 .Expand the application of virtual hospital technologies within Saudi Red Crescent services to enhance the quality of emergency medical care.

2 .Providing practical training programs for paramedics to enhance their proficiency in using virtual medicine technologies and increase their confidence in using them.

3 .Enhancing integration between paramedics and specialist doctors across virtual platforms to reduce response time and improve diagnostic accuracy.

4 .Focus on evaluating the actual impact of virtual hospitals on reducing medical errors through broader future studies.

5 .Encourage the exchange of experiences between experienced paramedics and their less experienced colleagues to maximize the use of technology.

6. Supporting digital infrastructure and developing technical systems to ensure the continuity and efficiency of virtual hospital services.

Conclusion

.Virtual hospital applications help make important decisions about a patient's destination before they arrive Once a patient's condition is assessed remotely, the hospital's physician can alert and prepare the specialized team, such as the surgical team or neurologists, to receive the patient, saving time upon arrival at the hospital. The application can also direct the paramedic to another medical facility or specialized clinic instead of the emergency department, reducing congestion and freeing up available resources to focus on more serious cases

Paramedics may also deal with patients suffering from psychological disorders or aggressive behavior which poses a danger to them and makes it difficult to provide assistance, as in cases of disasters or mass accidents. Paramedics face a major challenge in sorting the injured and determining care priorities according to the severity of the injury(Triage) With limited resources , there are also some challenges related to resources and training. The paramedic may not have all the necessary medications or equipment to deal with all cases, which limits his treatment options in the field. There is also a lack of dealing with ,modern, modern technologies, as paramedics need continuous training to keep up with these technologies such as the use of portable ultrasound or advanced monitoring devices. There are also some psychological and physical challenges that paramedics are exposed to, including psychological pressure. Paramedics are ,exposed to tremendous psychological pressure as a result of dealing with cases of death and serious injuries which may lead to emotional exhaustion or post-traumatic stress disorder(PTSD) as well as physical , ,exhaustion, as working in the field of ambulance requires effort. Big body Such as carrying injured people which may increase the risk of long-term physical injuries and exposure to work under pressure for long periods, as the paramedic is required to make quick and correct decisions under great pressure, where there is no room for error in many cases

Challenges related to training include a lack of training, as paramedics and doctors need extensive training on how to use these technologies effectively. Paramedics must learn how to use remote imaging devices .and transmit data correctly, while doctors must train to provide diagnosis and support through screens There may also be resistance to change from some. Some paramedics or doctors may be reluctant to adopt these new technologies due to familiarity with traditional methods of work or a lack of confidence in the effectiveness of these applications. There are also some medical conditions that require a thorough physical examination that cannot be performed entirely remotely, which may limit the accuracy of initial diagnosis However, despite these challenges, the potential benefits of virtual hospitals in emergency care outweigh . the challenges, motivating stakeholders to find innovative solutions to ensure their successful and safe adoption

reduces the need to transfer them to larger hospitals. The hospital also provides virtual clinics, as it provides ,specialized consultations in diseases such as diabetes and heart disease. And neurological diseases allowing patients to communicate with the best doctors without the need to travel, and also provides emergency medical care The hospital communicates with emergency teams on the ground to provide advice and medical support, enhancing the quality of emergency care before the patient arrives at the hospital. It , also allows paramedics to communicate directly with doctors specializing in stroke and heart attacks speeding up treatment and increasing the chances of recovery

The Virtual Health Hospital is a successful model of digital transformation in the healthcare sector and reflects the Kingdom of Saudi Arabia's Vision 2030 to provide comprehensive and innovative healthcare to all citizens

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