

The Impact of Telemedicine on Improving Public Health Services: A Study of International Experiences and the Algerian Case

MAGBI Mimouna^{1*}, SI AHMED Nadir²,

¹Blida 2 University, Laboratory for the Management of Local
Communities and their role in Achieving Development (Algeria)

m.magbi.etu@univ-blida2.dz

²Blida 2 University, Economic and human development laboratory in
Algeria (Algeria),

n.si-ahmed@univ-blida2.dz

Received: 05/10/2024; **Accepted:** 15/12/2024; **Published:** 23/12/2024

Abstract: This study aimed to examine the impact of telemedicine technology on public health services delivery, including its benefits, opportunities, and efforts to improve healthcare delivery. The study addresses the challenges that hinder the progress and development of this technology and presents international experiences in its implementation in both Saudi Arabia and India. Additionally, the study highlights the steps and measures taken by Algeria to activate this technology. The study concluded that telemedicine has improved public health services in India and Saudi Arabia by bridging the rural-urban health divide and addressing significant manpower shortages in the public health sector.

Keywords: Telemedicine; Health Services; Public Sector; Information and Communication Technology (ICT).

Jel Classification Codes : I18, Q3

* Corresponding author.

Introduction:

The current era is marked by significant advancements and rapid development in information and communication technology, leading to the growth of knowledge. These developments have become crucial elements in various sectors, including healthcare. The healthcare sector has witnessed significant changes in service delivery, treatment methods, and scientific research on epidemics and diseases. This has been achieved through technological techniques, such as telemedicine. Telemedicine is a medical practice that utilizes digital health information and the Internet to connect healthcare institutions with patients seeking preventive or therapeutic services.

Many countries have adopted telemedicine to improve their healthcare services due to its numerous advantages, particularly in the public sector, given the growing number of individuals seeking such services. Algeria, like other countries, has implemented measures to introduce this technology to align with the requirements of innovation and better utilize available resources to provide the best healthcare services to its citizens. The aim is to ensure that patients can access these services regardless of location and time constraints.

From the preceding, the study problem can be identified and formulated in the following question:

-How does telemedicine improve health services provided in the public sector?

To clarify the problem, we need to address several sub-questions, including the following:

- What are the main challenges facing the implementation of telemedicine in the public health sector?
- How do both India and Saudi Arabia adopt telemedicine to provide public health services?
- What are the major key steps and measures taken by Algeria to activate telemedicine in the public health sector?

Study Objectives

This study aims to:

- Highlight the concept of telemedicine and its applications.

- Identifying the major advantages and opportunities offered by telemedicine in the field of healthcare services.
- Addressing the key challenges facing the implementation of telemedicine in the public healthcare sector.
- Studying the experiences of both India and Saudi Arabia in implementing telemedicine (strategies, objectives, steps, procedures, and outcomes).
- Analyzing the steps and measures taken by Algeria to activate telemedicine technology.

Study Hypotheses:

In light of the study's subject matter and objectives, the study's hypotheses can be formulated as follows:

- Digital Technology Acceptance is one of the main challenges facing the implementation of telemedicine in the public healthcare sector.
- India has utilized telemedicine to provide healthcare services and reach patients due to its dense population and diverse demographics. At the same time, Saudi Arabia has used telemedicine to provide healthcare services and ensure their distribution due to its vast geographical area.
- Algeria has made considerable strides in integrating telemedicine into its public healthcare sector.

Methodology:

To achieve the study's objectives, the analytical and descriptive approach was adopted to prepare this paper. Numerous scientific articles were collected, and various official websites of the Saudi, Indian, and Algerian Ministries of Health, as well as the World Health Organization's website, were referred to gather information and cover all aspects of telemedicine technology.

Previous studies:

There have been multiple previous studies that have shown interest in this particular area of research. Some of these studies include:

❖ Study of Nidhi Dani and others, GIS and Telemedicine: eHealth tools for Public Healthcare: (Nidhi & others, 2016)

Through this study, the researchers aimed to present their perspective on the synergistic application of two cutting-edge eHealth tools,

namely geospatial technologies (or GIS) and Telemedicine, to improve public health services. The researchers arrived at a set of findings, the most significant of which are:

- Remote sensing, part of geospatial technologies, supports real-time epidemic monitoring and early warning systems, enhanced by telemedicine.
- Geospatial technologies enrich telemedicine by providing clinicians with vital geographic and socio-economic data, aiding comprehensive epidemic guidelines.
- The integration of telemedicine and geospatial technologies enables healthcare administrators to respond more effectively to epidemics.

❖ **Study of Raj Kishor Kustwar and Suman Ray, eHealth and Telemedicine in India: An Overview on the Health Care Need of the People: (Kustwar & Suman, 2020)**

This research aimed to investigate the potential of telemedicine in providing quality and affordable healthcare to India's poorest people and bridging the rural-urban health gap. It also aimed to assess whether telemedicine technology effectively meets the healthcare needs of remote and rural populations. The researchers have obtained a set of results, the most important of which are:

The researchers have obtained a set of results, the most important of which are:

- There is a significant shortage of manpower in India's health sector.
- Telemedicine technology in India offers new opportunities to address the current shortcomings in the public health sector.
- The Indian government provides funds for the expansion of telemedicine facilities to reach inaccessible areas of the country.

I. The concept of Telemedicine:

Telemedicine has evolved since the early 1980s with the primary goal of providing medical services in impoverished areas or rural regions parallel to those available in major cities and capitals. It aims to reduce patient transportation costs and facilitate communication between patients and doctors, thus maximizing comfort for patients

who may suffer from travel-related difficulties and long distances that can negatively affect their health.

1.1. Definition of Telemedicine:

Scientists fail to agree on one definition of telemedicine and many of them created their own definitions of telemedicine (apho ly & Touré, 2022, p. 22); the following are some definitions of telemedicine:

World Health Organization (WHO) has defined telemedicine as: “the delivery of healthcare services, where distance is a critical factor, by all healthcare professionals using information and communication technologies for the exchange of valid information for diagnosis, treatment and prevention of disease and interests of advancing the health of individuals and their communities”.(WHO, 2010, p. 9)

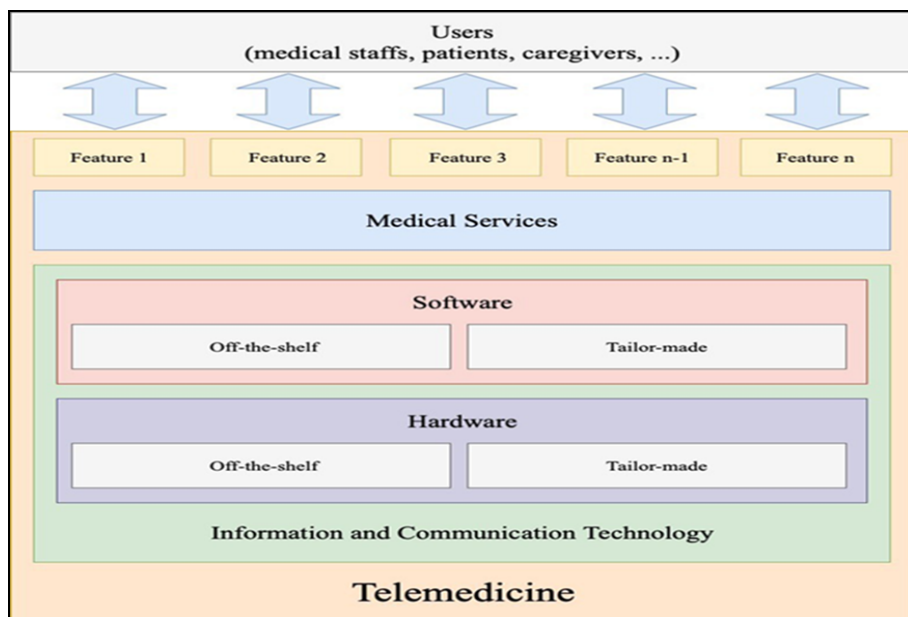
Telemedicine is a form of remote medical practice that utilizes information and communication technologies. (Benski & Reich, 2021, p. 1785)

Telemedicine on the other hand is defined as "the use of communication networks to exchange healthcare information to enable clinical care and medical education" (Nidhi & others, 2016, p. 2).

We define Telemedicine as a type of healthcare service that focuses on providing medical attention and treatment to patients remotely, through the use of technology and telecommunications. This modality of service allows patients to receive medical care from the comfort of their own homes without needing to visit a medical facility in person.

Telemedicine is regarded as a crucial field in the modern digital economy (TROUBIA, 2024, p. 444) as it combines hardware and software technologies, information and communication technologies, and medical services. It offers essential features and services to users, as shown in Fig. 1. Users are responsible for facilitating the processes of each service offered, even if they are not familiar with the underlying technologies.

Figure (1): Concept of telemedicine



Source: (Khemapech & others, 2019, p. 24)

1.2.Types of Telemedicine:

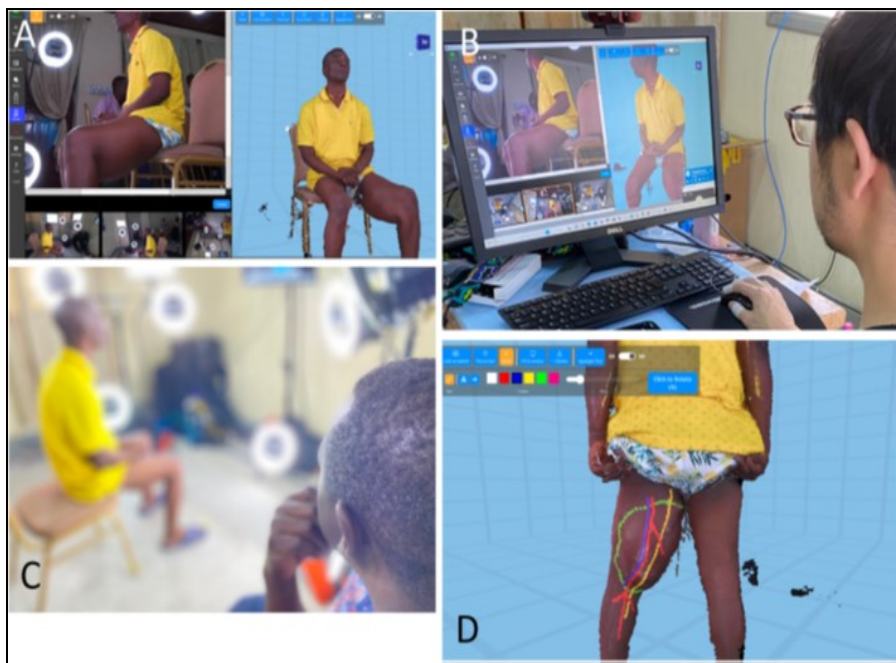
Telemedicine is divided into clinical telemedicine and informative telemedicine, which was defined by the World Health Organization (WHO) in 1998 as follows (Pierre , 2017, p. 10):

- Clinical telemedicine: This professional activity uses digital telecommunications allowing doctors and other members of the medical profession to carry out medical for patients remotely.
- Informative telemedicine: is an interactive audio-visual communication service that organizes the dissemination of medical knowledge and patient care protocols with the aim of supporting and improving medical activity.

Telemedicine also includes the following remote medical practices (Manus, 2021, p. 22):

- ❖ **Tele-consultation:** It allows doctors and patients to communicate and consult remotely using communication tools such as phone or video. Doctors can provide medical diagnosis, consultation, assess the patient's health condition, and provide guidance regarding treatment and care.

Figure (2): Remote Patient Diagnosis



Source: (Lo & others, 2024, p. 428)

- ❖ **Tele-monitoring:** It involves remote monitoring of patients' health status using technology. Doctors collect, analyze, and monitor health-related data such as vital signs and clinical information. It can help evaluate health progress, detect potential issues, and adjust treatment accordingly.
- ❖ **Tele-expertise:** It enables doctors to communicate, exchange information, and consult remotely with their colleagues in other medical specialties. Advanced technologies such as medical images, reports, and clinical data can be used to obtain specialized opinions and consultations in diagnosing and treating complex health conditions.
- ❖ **Tele-surgery:** It is a recent technological advancement in the field of cross-border medicine, where surgeons can perform surgical procedures on patients in remote locations using remote control of surgical robots and other advanced technologies
- ❖ **Regulation:** It refers to the medical response provided by emergency call centers, where doctors establish an initial diagnosis over the phone to determine and trigger the appropriate response

to the situation.

These are some of the main types of telemedicine, relying on technology to facilitate access to healthcare and improve communication between doctors and patients across distances.

I.3.Challenges and Opportunities:

I.3.1.Challenges:

Telemedicine is a technology that has been deployed in several countries worldwide, both in developed and developing regions. While it offers many advantages, some challenges need to be addressed. In this section, we will outline five key issues related to telemedicine, considering economic, technological, and social aspects (Khemapech & others, 2019, p. 249):

- ❖ **System Development Cost:** Telemedicine requires significant investment in computer equipment, software, and qualified personnel. These costs are additional to regular medical expenses and should be supported by government policies.
- ❖ **System Implementation:** Telemedicine requires careful consideration of technological and societal aspects, as well as addressing legal, regulatory, security, and human resources issues for successful implementation.
- ❖ **Digital Literacy:** Elderly individuals who were not born into the digital age may struggle with using devices and health technology-based applications. Studies have shown that older users tend to have lower success rates and higher error rates in computer-based tasks. Efforts are needed to improve digital literacy among the elderly. The elderly and some individuals have privacy concerns when using digital technology. Safe transmission of personal health data and wearable device accuracy are major healthcare concerns. Defining telemedicine services and addressing these concerns is crucial for acceptance.
- ❖ **Diagnostic Accuracy:** Accurately diagnosing patients far from physicians is a major concern. Telemedicine provides continuous monitoring and valuable alternatives, especially in high-demand situations. Diagnostic accuracy studies in emergency departments and ophthalmology show telemedicine's viability and value.

Successfully implementing and accepting telemedicine requires addressing these challenges.

I.3.2.Opportunities:

Telemedicine can help improve healthcare services in underserved and developing countries by increasing access to basic care. By providing populations in these countries with the means to access health care, we can address previously unmet needs and positively impact health services. In this section, we will explore feasible opportunities for implementing telemedicine (WHO, 2010, p. 15):

- ❖ Telemedicine provides remote physician access to specialist opinions, making it a valuable solution for healthcare professionals with limited access to expert advice.
- ❖ Telemedicine programs can reduce referrals to off-site facilities and benefit patients and healthcare systems in less developed countries by decreasing the distance traveled for specialist care. They can also motivate rural practitioners to continue practicing by providing professional support and development opportunities.
- ❖ Telemedicine networks in developing countries offer additional benefits by connecting remote sites, increasing collaboration between health facilities, providing distance learning and training for healthcare providers, and creating opportunities for professional development.

II. Indian and Saudian experiences in telemedicine

II .1. Telemedicine in India:

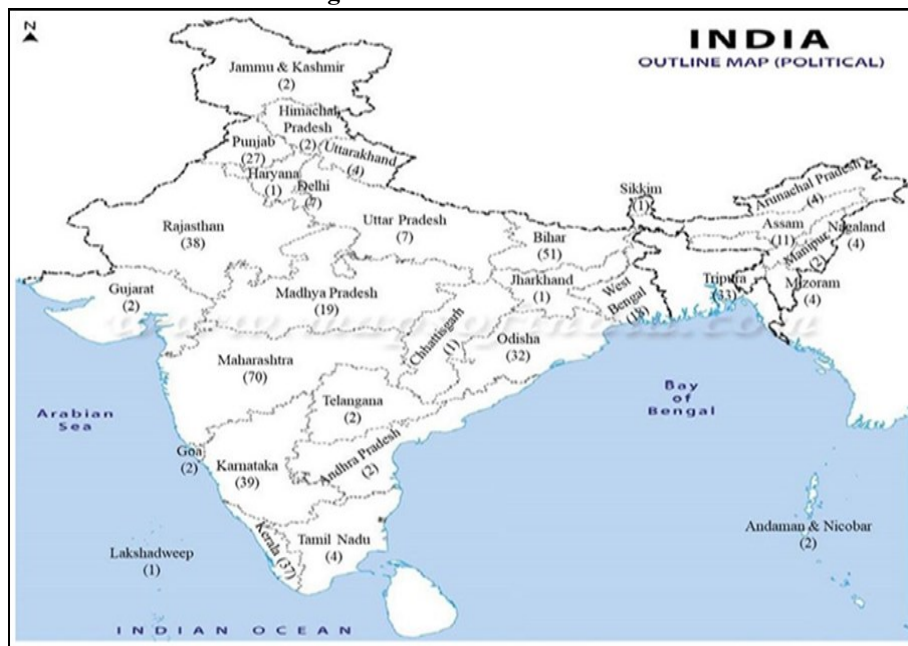
India is a vast and diverse nation, home to a population of more than 121 cores of sundry people. The current population of India as of the beginning of the new year 2024 is 1.438 billion people The population density in India is 481 people per square kilometer (1,244 people per square mile) (Population of India, s.d.). However, there is a significant disparity in the distribution of healthcare services throughout the country, with most medical facilities concentrated in urban areas. As a result, a large portion of the population in rural India, where 68.84% of the country's residents live, lacks adequate access to healthcare (census of INDIA, s.d.).

In an effort to tackle this problem, the Indian Space Research Organization (ISRO) initiated a Telemedicine Pilot Project that linked Chennai's Apollo Hospital with the Apollo Rural Hospital in the

Chittoor district of Andhra Pradesh. Various government bodies, including the Department of Information Technology (DIT), the Ministry of External Affairs, the Ministry of Health and Family Welfare, and state governments, have backed the advancement of telemedicine services in India.(Bansi, 2020, p. 9).

The Department of Space (DoS) launched a Telemedicine (TM) program in 2001 to provide TM systems hardware, software, communication equipment, and satellite bandwidth to 384 hospitals. This included 60 specialty hospitals connected to 306 remote, rural, district, and medical college hospitals. In addition, eighteen (18) Mobile Telemedicine units were equipped for satellite connectivity. Despite these efforts, most of the TM nodes are underutilized, and currently, only around 100 Telemedicine nodes are operational, as shown in Fig (03). (MINISTRY OF HEALTH & FAMILY WELFARE, s.d.)

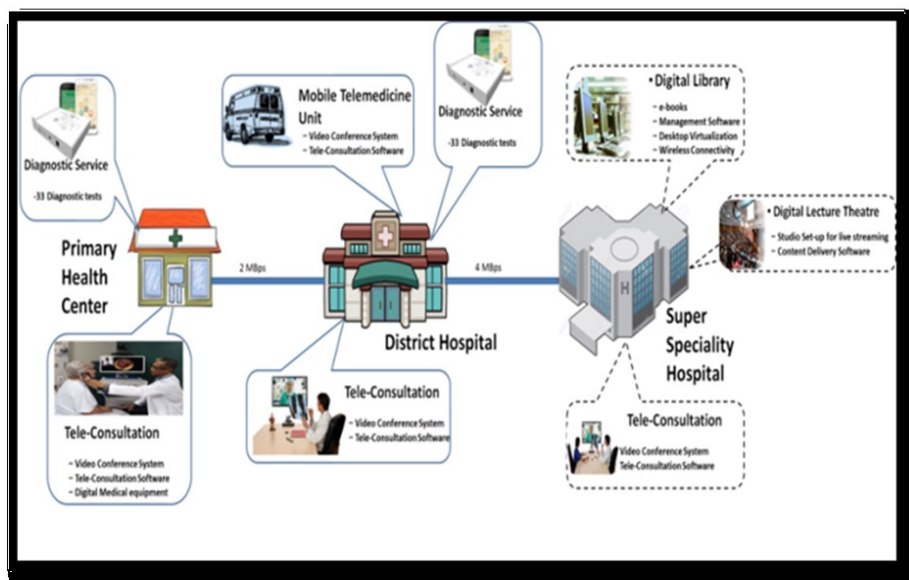
Figure (3): Distribution of Telemedicine Centers in Indian States and Union Territories; The number of telemedicine centers in each state is indicated against name of each state



Source: (Kustwar & Suman , 2020, p. 26)

The Ministry of Health in the Government of India has also launched several projects to simplify access to public health data. These projects include the Integrated Disease Surveillance Project (IDSP), National Cancer Network (ONCONET), National Rural Telemedicine Network, National Medical College Network, and Digital Medical Library Network. The government has also taken positive steps, such as setting up standardized telemedicine practice guidelines by the Department of Information Technology and establishing a National Telemedicine Task Force by the Health Ministry in 2005 (Vinoth & others, 2019, p. 1873)

.Figure (4): The components of the telemedicine system in India



Source: (MINISTRY OF HEALTH & FAMILY WELFARE, s.d.)

In addition, the External Affairs Ministry has initiated international projects such as the Pan-African E-Network Project and the SAARC (South Asian Association for Regional Co-operation) Telemedicine Network Projects, which have placed Indian telemedicine in the global scenario. (Ministry of External Affairs, s.d.)

II .2. Telemedicine in Saudi Arabia:

The history of telemedicine in Saudi Arabia is a great example of how combining technological advancements and strategic governance can successfully meet public health requirements in a vast and geographically diverse country. Saudi Arabia, being known for its expansive deserts and considerable distances between urban hubs and remote villages, has long grappled with the formidable challenge of providing consistent and high-quality healthcare services to every part of the Kingdom. (Almutairi & others, 2023, p. 54)

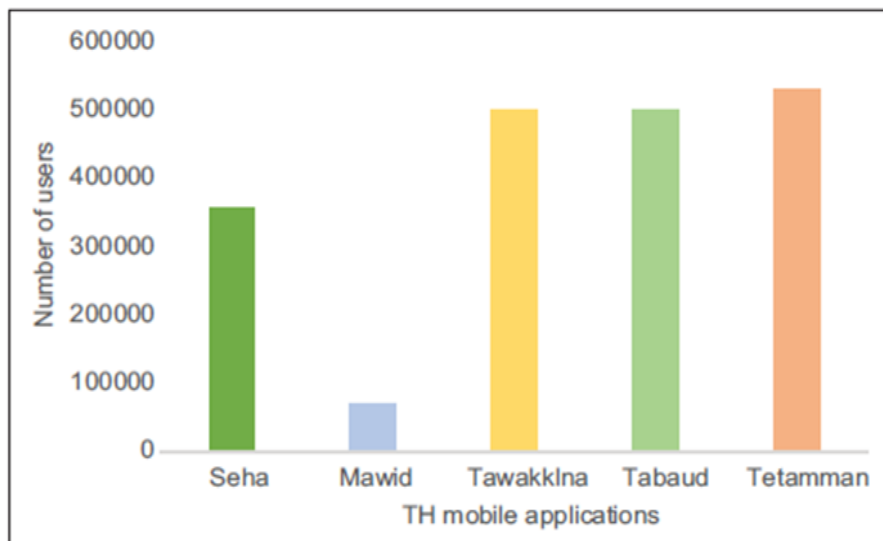
During the early 2000s, as digital technology rapidly advanced worldwide, Saudi Arabia recognized the potential to overcome its geographical challenges. The Ministry of Health (MOH) took the initiative to address healthcare disparities between densely populated cities and isolated rural areas by introducing telehealth services in the country. This initiative proved to be efficient in reducing patient expenses for healthcare services, including online consultations, prescription refills, and follow-up appointments. This move was supported by research literature, which emphasized the importance of early telehealth projects focused on delivering specialized consultations to patients residing in remote regions. (Alghamdi & others, 2022, p. 209)

In the following years, telehealth services in Saudi Arabia experienced a natural expansion. The Saudi government, acknowledging the immense potential of this technology, increased its investments in infrastructure and training. Notably, the King Faisal Specialist Hospital and Research Centre in Riyadh played a pioneering role by establishing a telemedicine unit. This unit effectively linked primary healthcare centers nationwide with specialized services available at the hospital, setting a precedent for telehealth advancements in the country. (KFSH&RC, 2015)

The Ministry of Health in Saudi Arabia is emphasizing telemedicine as part of its electronic health strategy. The National Center for Health Information is a communication hub for health information exchange and organization among healthcare sectors. It connects to the Saudi Health Council and an automated health information network with the Ministry of Health and other relevant entities. The Saudi Telemedicine Network initiative connects healthcare facilities in remote areas using telemedicine systems,

enhancing healthcare service delivery regardless of location or facility size. The Ministry of Health has launched various platforms and applications to promote communication among healthcare providers, expedite access to healthcare services, and promote telehealth. These include the "Sehhaty" platform, the "Drug Guide" application, the "Anaa" platform, and others. (The Ministry of Health in Saudi Arabia, 2024)

Figure (05): Numbers of current users of telehealth mobile applications



Source: (Alghamdi & others, 2022, p. 209)

Upon reflection, it becomes clear that Saudi Arabia's telemedicine journey, initially driven by geographic considerations, has evolved into a well-defined strategy that harnesses technology for comprehensive advancements in healthcare. The country has recognized the potential of telehealth and has strategically positioned it as an integral component of its healthcare system, enabling improved access to medical services and facilitating healthcare innovation.

III. Algerian experience in the implementation of telemedicine

III.1. The current state and condition of the health system in Algeria:

Algeria has a population of around 44 million people and covers an area of 2.4 million square kilometres, with 80% of its territory

being desert. The public sector in Algeria consists of 66,820 beds, 16 university hospital centres, 631 public health institutions (ALGERIAN MINISTRY OF HEALTH, s.d.), 54,863 general practitioners and specialists, and 80,000 nurses. The ratios are approximately 1.72 beds per 1,000 inhabitants and inhabitants per 1255 physicians. Healthcare services in the public sector are provided free of charge.

At the national level, the public sector faces numerous issues: imbalance in the distribution of health institutions, a lack of qualified personnel, inadequate quality of education, and a brain drain (15,000 doctors working abroad). In remote regions, the problems are more acute: a lack of motivation to work in the south despite incentives and a shortage of medical expertise. If the private sector provides any support, it is primarily located in the northern part of the country. Patients are forced to undertake long journeys and bear the associated expenses (Lahchem & kaci , 2020, p. 197). In the face of the problems mentioned above and the challenges of technology, telemedicine is one of the alternatives to ensure quality treatment, especially for populations. (Mahrez & Baali, 2019,p. 268)

III. 2. Chronology of Telemedicine Instauration in Algeria:

Algeria initiated the telemedicine project in 2007, led by the Center for Advanced Technology Development, with assistance from the International Development Center in Canada. The project involved key partners such as the El-Hadjira Health Center, Algerian Telecommunications for Satellites, and four hospitals (Bir Tarraria, Hassan Badi, Ouargla, and Adrar) that played a significant role in launching and implementing this project in reality (Cherair & Hamidouch, 2017,p. 301).

The Algerian experience in the field of telemedicine can be described as follows: (Marizq, 2012,p. 641)

- In 2007, telemedicine was utilized between two hospitals - Bir Tarraria Hospital in the capital and Ouargla Hospital, located over 800 kilometers south of the desert. The process included a lecture delivered by Professor Musa Ashir from Bir Tarraria Hospital, which was attended by many doctors from Ouargla Hospital.

- December 4, 2007: Remote medical session prepared by Bir Tarraria Hospital and Ouargla Hospital, along with the diagnosis of a 10-year-old child's condition.
- December 11, 2007: Presentation of four critical cases between Bir Tarraria Hospital and Ouargla Hospital.
- December 23, 2007: Surgical operation conducted at Ouargla Hospital by Professor Musa Ashir, facilitated by the Center for Advanced Technology Development (CDTA).
- Since December 2007: Three healthcare centers have been equipped.
- In November 2015, the Tamanrasset Public Hospital connected with the Mustapha Pasha University Hospital through telemedicine technology. Real-time audio and video communication allowed doctors to provide instructions and guidance to their colleagues on caring for a 14-year-old patient. (Cherair & Hamidouch, 2017,p. 301)
- In 2016, several significant developments occurred in Algeria's telemedicine efforts. A new experimental telemedicine platform was launched, linking the Regional Military Hospital of Ouargla (HMRO) and the Central Arni Hospital (HCA) in Algiers. Lieutenant General Ahmed Gaïd Salah inaugurated the telemedicine room at HMRO, where specialists from HCA provided remote consultations and accurate diagnoses. The first remote medical examination also took place in March, connecting the Tamanrasset Public Hospital with the Nadir Mohamed University Hospital in Tizi Ouzou, involving a patient with a heart condition. These advancements highlighted Algeria's commitment to improving healthcare access in remote areas.(Mahrez & Baali, 2019,p. 269)
- January 8-9, 2022: Experts gathered to discuss integrating technology in healthcare. The Ministry of Health is implementing initiatives like electronic medical records and telemedicine for digitization. Goals include improving training, management, and organization to meet healthcare needs. Participants highlighted the importance of a secure internet network and modern medical technologies. (Algerian News Agency, 2022)

- September 21, 2023: The General Director of the National Agency for Healthcare Digitization, Lamiaa Taleb, announced that the healthcare sector is accelerating its digitization efforts to improve management efficiency and patient care. This includes telemedicine services and organizing treatment appointments between healthcare institutions, which has led to better information exchange and emphasis on prevention. The agency's strategy is based on an international approach through digitizing documentation, and four successful training and monitoring projects have already been implemented. (Algerian News Agency, 2023)

III .3. The perspective of Algerian telemedicine:

Telemedicine is an innovative medical technique evolving in Algeria over the years, as previously discussed. Its adoption in public health institutions promises to improve health services and promote fairness in treatment. This technique is expected to be implemented in all health institutions to expand its reach. The potential perspective of telemedicine includes: (Lahchem & Kaci, 2020, p. 199)

- ✓ The implementation of an electronic medical record containing all patient information is critical to success.
- ✓ Telemedicine through phone applications will enable remote monitoring of patient's health.
- ✓ The use of telemedicine is an example of developing pilot projects focusing on disciplines that lack human resources (specialists).
- ✓ Strengthening public health services and intensifying the use of electronic health through cooperation between the private sector and information technology and communication associations.
- ✓ Finally, although telemedicine should not change medical practice, it can change the model of care, as new structures with all the necessary means, tools, information technology, and communication must be established. To successfully operationalize this technology and create new doctors, especially young doctors, who are more accepting of the various modern technologies that will inevitably be dealt with in the future, specialists and doctors with experience in telemedicine must be

used through partnerships between Algeria and European Union countries. (Chirifi Alaoui, 2011, p. 95)

IV .Results and discussion:

- ❖ The first hypothesis was confirmed: one of the main challenges in implementing telemedicine in the public healthcare sector is the acceptance of digital technology.
- ❖ The second hypothesis was confirmed: India has utilized telemedicine to provide healthcare services and reach patients across its dense population and diverse demographics. Meanwhile, Saudi Arabia has adopted telemedicine to distribute healthcare services effectively across its vast geographical area
- ❖ The third hypothesis was confirmed: Algeria's public healthcare sector has made significant progress in integrating telemedicine

Conclusion:

Given public health's socioeconomic importance, telemedicine warrants special attention. With rapid technological advancements, governments have to consider how the convergence of diverse technology streams might generate new opportunities.

Technologies such as distributed spatial data portals and geospatial libraries are on the verge of changing traditional public healthcare into ubiquitous healthcare. Health grids and high-speed connectivity will help to facilitate this shift by allowing for the seamless flow of critical information across countries and continents. Despite the shifting landscape of information and communication technology (ICT) and healthcare needs, developing and integrating a comprehensive and responsive domain of public health informatics is both challenging and achievable.

❖ Results:

- Telemedicine is a modality of service that is centered around a patient.
- Telemedicine is a healthcare delivery modality that utilizes technology as a prime component for exchanging medical information.
- Telemedicine offers cost savings and improves healthcare access, quality, and efficiency. It also facilitates continuous medical education and training.

- Telemedicine establishes a connection between medical consumers and healthcare service providers.
- Telemedicine can be used to respond to the healthcare provision crisis. Public policies are being developed to promote teleconsultation, tele-expertise, tele monitoring, tele surgery, and regulation.
- Telemedicine implementation in the public sector faces challenges such as high system development costs, system implementation, low digital literacy, resistance to digital technology acceptance, and low diagnostic accuracy.
- The development of telemedicine is closely tied to telecommunications technologies. As these technologies continue to evolve, telemedicine adapts and progresses accordingly. This means that telemedicine's evolution is largely influenced by its core component - communication technologies - which are constantly changing.
- In India, the telemedicine project aims to improve healthcare delivery by providing healthcare services to patients in their respective locations. This project established a comprehensive network of healthcare facilities and a digital library, as well as a system for archiving medical images and analyses. Healthcare professionals can access patient records, provide their input, and offer suitable treatment regardless of the patient's or doctor's location.

❖ Recommendations:

After analyzing two international experiences in the field of telemedicine, we have come up with certain recommendations that we believe will help promote telemedicine adoption in Algeria. These recommendations are listed below:

- Telemedicine technology must be adopted to improve healthcare delivery in the public sector.
- gradually equipping hospitals with the necessary technological instruments to perform this type of medical service.
- Creating a complete information network in public healthcare institutions, as well as a system for preserving medical photographs, radiology reports, and any other medical services

supplied to patients. To provide necessary information to virtual doctors.

- The health staff should be motivated and promoted to use telemedicine, and government doctors should be rewarded with extra emoluments for using telemedicine to increase their engagement in telemedicine.
- Monitoring advances in information and communication technology (ICT) in order to implement the most cutting-edge technologies for providing the highest quality healthcare services.
- Establishing a set of legal frameworks to regulate telemedicine services, protect healthcare providers, and ensure patients' rights to optimal healthcare.

Referrals and references:

apho ly , B., & Touré, M. (2022, December). Telemedicine Definition: The First Barrier To Its Use, health sciences & disease. *Health Sciences & Disease*, 23(12), 62-64.

Manus, J.-M. (2021, April). Télémédecine hier, et aujourd'hui avec la Covid. *Revue Francophone Des Laboratoires*, 2021(531).

ALGERIAN MINISTRY OF HEALTH. (s.d.). Consulté le April 01, 01, sur sante.gov.dz: <https://sante.gov.dz>

Algerian News Agency. (2022). Consulté le March 23, 2024, sur Digitizing the healthcare sector is a necessity imposed by the current reality: <https://www.aps.dz/ar/sante-science-technologie/122940-2022-03-15-11-14-12>

Algerian News Agency. (2023). Consulté le March 23, 2024, sur The healthcare sector is accelerating the implementation of digitization as an "added value" for effective management: <https://www.aps.dz/ar/sante-science-technologie/149066-2023-09-22-11-12-05>

Alghamdi , S., & others. (2022, December). Current status of telehealth in Saudi Arabia during COVID-19. *Journal of family and community medicine*, 27(3).

Almutairi, A., & others. (2023). Telehealth in Saudi Arabia: Its Evolution, Present Infrastructure, and forward- Looking Implications. *Global Journal of Health Science*, 15(12).

census of INDIA. (s.d.). Consulté le March 15, 2024, sur censusindia.gov.in: <https://censusindia.gov.in/census.website/data/tables>

Cheraïr, S., & Hamidouch, A. (2017). Information and Communication Technology and Its Role in Improving the Level of Health Services. *Journal of New Economy*, 8(1), 291-304.

Chirifi Alaoui, A. (2011). La télé-médecine en néphrologie, thèse doctorat. faculté de médecine et pharmacie, Maroc: université SIDI Mohamed ben Abdallah.

Health Institutions. (2024, 04 15). Récupéré sur ALGERIAN MINISTRY OF HEALTH: <https://sante.gov.dz/etablissements-de-sante/>

Khemapech, I., & others. (2019, May). Telemedicine- Meaning, Challenges and Opportunities,. *SIRIRAJ MEDICAL JOURNAL*, 71(3), 246-252.

Kustwar, R., & Suman , R. (2020). EHealth and Telemedicine in India: An Overview on the Health Care Need of the People. *Journal of Multidisciplinary Research in Healthcare*, 6(2).

Lahchem , K., & kaci , Y. (2020). Télé-médecine et introduction des TIC come outil de développement du système sanitaire en Algérie. *MAAHEF*, 15(02).

Lo, S., & others. (2024). Ghana 3D Telemedicine International MDT: A proof- of- concept study. *Journal of plastic, Reconstructive Et Aesthetic Surgery*(88), 425-435.

Mahrez, S., & Baali, H. (2019). The role of knowledge management and information technology in improving the quality of health services in Algeria. *Beam Journal for Economic Studies*, 3(2), 257-272.

Marizq , A. (2012). Artificial Intelligence and Telemedicine in the Field of Healthcare: An Overview of the Algerian Reality,. *Journal of Advanced Social Research*, 2, 622-644.

Ministry of External Affairs. (s.d.). Consulté le March 21, 2024, sur Government of India: <http://www.mea.gov.in>

MINISTRY OF HEALTH & FAMILY WELFARE. (s.d.). Consulté le March 21, 2024, sur E-HEALTH & TELEMEDICINE: <https://main.mohfw.gov.in/?q=Organisation/departments-health-and-family-welfare/e-Health-Telemedicine>

Nidhi, D., & others. (2016). *GIS and Telemedicine: eHealth tools for Public*. Consulté le 03 15, 2024, sur www.researchgate.net: <https://www.researchgate.net/publication/283791280>,

Population of India. (s.d.). Consulté le March 21, 2024, sur <https://www.worldometers.info/world-population/india-population>