EURASIAN JOURNAL OF EMERGENCY MEDICINE
Review
DOI: 10.4274/eajem.galenos.2024.59862
Eurasian J Emerg Med. 2024;23(4): 213-23

A Telemedicine Model to Improve and Facilitate Access to Healthcare: Online Polyclinic

Behçet Al[1], Saud Alturki[2], Emre Yalçıntaş[3], Eltaf Torun[1]

[1]İstanbul Medeniyet University, Göztepe Prof. Dr. Süleyman Yalçın City Hospital, Clinic of Emergency Medicine, İstanbul, Turkey
[2]Abdulaziz Medical City, Clinic of Vascular Surgey, Riyadh, Saudi Arabia
[3]University of Health Sciences Turkey, Bursa High Specialization Training and Research Hospital, Clinic of Family Medicine, Bursa, Turkey

Abstract

Significant congestion occurs in healthcare facilities worldwide, especially in hospitals. Turkey's healthcare system has a notably higher patient density than other countries. This overcrowding is evident across all healthcare units, particularly emergency departments. A key reason is the mismatch between patients and healthcare systems, which leads to an imbalance between supply and demand. Each country seeks solutions to address this increasingly challenging problem within its resources. Finding and creating urgently needed solutions also falls under the responsibility of healthcare professionals.

In this study, we propose a model that can alleviate congestion to reasonable and acceptable levels through an online clinic. This model offers a comfortable experience for healthcare providers and recipients without obstructing the patient's need to see a physician. This unique method, the Online Polyclinic Model, leverages modern technological advancements to deliver a highly secure, accessible, and convenient healthcare service that reaches everyone, reducing healthcare costs without compromising quality while saving time and space. Patient density is often defined in the emergency department congestion literature. The examples in our study also primarily focused on emergency department congestion. However, the aim is to find a solution for congestion that affects the entire healthcare system.

Keywords: Patient congestion, solution, quality, cost, online clinic

Introduction

Emergency Department Overcrowding (EDO) refers to the inability of an emergency department (ED) to meet the demand for services within a specific time (1-4). Given its many triggering factors and consequences, EDO has become a global health issue. Given the increasing workload, healthcare systems need to provide sufficient and quality care. This problem has become a worldwide crisis affecting developed and developing countries. Since a reasonable solution that satisfies healthcare providers and recipients has yet to be found, this crisis continues to grow annually. This crisis becomes more apparent during global events like the COVID-19 pandemic, as access barriers and the risk of coronavirus transmission exacerbate EDO (5). Patients waiting in EDs are at increased risk of mortality and morbidity because of limited access to alternative healthcare units (6,7). Due to the lack of a widespread and applicable solution, the current situation has become a global public health issue (8).

The reasons for EDO have been extensively studied, and various solutions have been proposed. However, a global solution that can effectively ease this burden must be developed. Some studies have developed an input, process, and output framework to classify and measure EDO (9). The input component includes factors that increase the number of patients presenting to EDs, such as limited access to primary care, reluctance to use it, a surge in emergency visits, and inefficient triage procedures (10). Triage processes, time to diagnostic testing, and treatments administered in the

Corresponding Author: Behçet Al MD, İstanbul Medeniyet University, Göztepe Prof. Dr. Süleyman Yalçın City Hospital, Clinic of Emergency Medicine, İstanbul, Turkey
E-mail: behcetal@gmail.com **ORCID ID:** orcid.org/0000-0001-8743-8731

Cite this article as: Al B, Alturki S, Yalçıntaş E, Torun E. A Telemedicine Model to Improve and Facilitate Access to Healthcare: Online Polyclinic. Eurasian J Emerg Med. 2024;23(4): 213-23.

Received: 04.11.2024
Accepted: 03.12.2024
Published: 19.12.2024

ED are defined as the "process flow" (11). After completing these procedures, the patient's discharge or transfer to inpatient units constitutes the "output component," which reflects challenges within healthcare systems (12). Improvements in this area could reduce the waiting time for admitted patients, leading to greater satisfaction for ED and patients (12).

Research has demonstrated that EDO causes delays in treatment access, postponed discharges (13), extended procedures, and repeated emergency visits (14). Some studies have focused on optimizing the causes and effects of EDO by measuring parameters such as hospital bed occupancy, patient length of stay in the ED, and ED volume (15). These measurements will contribute to clinical practice guidelines and support research. Over the past few years, more than 200 studies have been published in different categories focusing on EDO (1).

Studies evaluating patient flow and hospital occupancy rates are central to understanding EDO (16). Time is a primary factor in flow measurements, whereas non-flow measurements emphasize human count and resource usage (16). Subgroups were also evaluated according to input, process flow, and output parameters (17). Studies have measured factors like the number of patients in the ED waiting room, levels of overcrowding (18), and discharge times (19) to assess the quality of care. Global assessment tools, such as the National EDO and Emergency Department Work Index scores, are essential for evaluating the severity of EDO (16).

Causes of Overcrowding and Recommendations

Studies investigating ED overcrowding are essential to understand its impact on healthcare personnel and the healthcare system (20). Factors contributing to extended time in the ED include increased emergency admissions, rising critical illness cases related to aging, male sex, delays in discharge times, non-urgent visits, delayed imaging and lab results, insufficient bed capacity, prolonged consultation times for inpatient care, staff fatigue, and the employment of unqualified healthcare personnel (21).

Various methods have been tested to address overcrowding. Essential methods include rapid assessment, implementation of an effective triage system, and development of early diagnostic approaches. Fast-tracking of patients with minor symptoms has been shown to reduce waiting times in the ED and decrease the number of patients who leave without being seen (22). It has also been reported that implementing a triage model tailored to the facility can reduce ED mortality (23). Procedures known as "point-of-care" in the ED eliminate the need to transport samples to a central laboratory, thereby ensuring quicker results. This method was highlighted as facilitating diagnosis and preventing overcrowding (24). Each of these models has its own benefits and challenges, depending on the context, but more is needed to solve the issue of extreme overcrowding. Numerous similar solutions are mentioned in the literature; however, while some may be beneficial locally, their global impact may need to be improved.

Online Polyclinic Model

Model Name: The literature describes these services as telemedicine" or "telehealth". Due to its unique characteristics and innovations, we define our model as the "OPM".

The Online Polyclinic Model

We propose a novel approach targeting ED overcrowding and aiming to reduce the burden on primary, secondary, and tertiary healthcare facilities. The OPM prioritizes chronic disease management, preventive and routine care, and non-urgent medical consultations. This study demonstrated that the proposed service structure differs significantly from the existing configuration.

The primary features of this model, which utilize modern technological resources, are as follows:

- Convenience for healthcare recipients and providers
- Cost-effectiveness,
- Enhance the quality of patient care
- Safety,
- Ability to continually update the technology
- Offering equal healthcare services to all
- Access is independent of time and place

Primary Objective: To contribute to the future of healthcare services.

Core Features of Online Polyclinic Model

- AI-assisted Diagnosis and Treatment: AI algorithms will analyze patients to support accurate diagnoses and enhance treatment planning.

- Remote Patient Monitoring: Wearable devices can aid in managing chronic conditions.

Personalized Medicine: Customized treatment plans are implemented depending on individual health profiles.

Efficient Triage and Workflow: AI-based classification optimizes triage and reduces workload.

Virtual Assistance Support: AI-assisted virtual assistants will provide 24/7 support for patient inquiries and symptom monitoring and connect patients with relevant specialists as needed.

Target Audience: In 2024, the number of individuals visiting a doctor in Turkey is expected to exceed one billion. It is estimated that 40% (400 million) of these visits will be to the primary care setting, and 25% (250 million) will be to the ED. Including visits to outpatient clinics such as ophthalmology, ENT, internal medicine, pediatrics, and dermatology clinics, the potential patient population for this model is approximately 450 million. This 450 million constitute the primary target population of the proposed model. Primary care visits will also be addressed separately.

Common Complaints Among Target Patients: Common complaints include difficulty finding appointments, long hospital queues, lack of available beds, attending the wrong clinic, unresolved issues, and the need to return due to inadequate treatment. Our model seeks to address or reduce the underlying causes of these complaints.

How the Online Polyclinic Model Works

The model is based on providing healthcare services-primarily outpatient-through modern information and communication technologies (such as AI, virtual reality, and video) without a hospital setting. This enables the delivery of professional healthcare services by healthcare providers, including taking a patient's history, conducting physical examinations, checking vital signs, and prescribing medications, without requiring patients and providers to be in the exact location.

Services Available Via Online Polyclinic Model

1. Establishing a Medical Team: Physicians providing this service can be organized according to the need, which will be determined by the patient's clinical condition or local resources. Teams may include emergency medicine specialists, family medicine specialists, internal medicine specialists, and pediatrics specialists, or individual physicians can evaluate and manage patients independently. Physicians are not required to be in the exact location; thus, physicians can work from different cities, places, or even countries.

2. Data Recording: Depending on the authority, data entry personnel or nurses may be assigned to record patient data within groups, or physicians may record data themselves.

3. Taking the Patient's History: The system allows all patient inquiries regarding current complaints, past illnesses, family history, medications, surgeries, follow-up results, and data from e-Nabız (an electronic health system) to be collected and recorded in written, verbal, or visual format.

4. Checking Vital Signs: Technological digital tools will be available within OPM to assess vital signs, including blood pressure, temperature, pulse, respiratory rate, oxygen saturation, and blood glucose.

5. Examination: The OPM will facilitate various examinations, including skin, throat, and ear examinations; visual inspection of the thorax, abdomen, and extremities; auscultation (lungs, heart, abdomen); refractive error assessment; intraocular pressure measurement; and retinal screening. New examination options may be added as technology advances.

6. Treatment: After the examination, physicians may prescribe either collective or individual treatments. Patients will receive a prescription code that allows them to obtain their medications. In addition, the system provides various recommendations and other services, as listed below:

- Review of current medications

- Issuing new prescriptions
- Generating medication and equipment reports
- Rest, employment, sports health, mental capacity, and committee reports
- Request consultations from other specialties when necessary

1. Follow-up: Follow-up visits and monitoring of patients will also be part of the model's services. These services include the following:

- Routine check-ups,
- Monitoring treatment continuity
- Follow-up tests,
- Monitoring of vital signs
- Managing chronic illnesses
- Monitoring treatment adherence
- Weight monitoring

2. Consultation Services: The proposed model offers various medical consultation services, including:

- Supportive treatment recommendations
- Physical therapy recommendations
- Referrals to relevant clinics
- Elderly patient monitoring
- Pregnancy follow-up,

- Geriatric care,
- Well-child check-ups,
- Vaccination tracking,
- Home patient care monitoring
- Surgical follow-up,
- Arranging outpatient appointments,
- Advanced clinic services for patients with geographical barriers
- Assessing and managing other patients in the same household
- Performing self-care assessments with a focus on nutrition

The OPM can be used to achieve progress in two primary areas in Turkey and worldwide. This model is expected to benefit countries with high outpatient visit rates.

1. Primary Area: With well-established infrastructure, trained personnel and informed patients, any country with the means to implement a successful OPM service can benefit from it globally.

2. Secondary Area: Compared with global averages, Turkey has a significantly higher outpatient doctor visit rate. Therefore, the OPM is expected to provide significant benefits in Turkey. Although not limited to the following topics, critical areas of improvement include the following:

- Reduced physical visits to hospitals
- Meeting patient appointment demands more quickly
- Expand healthcare services independently of time and place to reach the entire population
- Reducing the need for physical buildings and clinics and optimizing existing ones
- Prevent unnecessary physical clinic visits
- Minimizing unnecessary clinic visits
- Reducing hospital expenses (e.g., water, electricity, fuel, space, and parking usage),
- Extending the lifespan of all hospital equipment
- Enabling patients to access healthcare professionals from all specialties as needed
- Support healthcare providers by alleviating malpractise concerns through artificial intelligence (AI)-assisted algorithms and promoting safer patient management
- Enhancing patient trust in the healthcare system through collaborative care
- Streamlining consultation services to relevant specialties
- Record the entire examination process to prevent irregular requests and actions:
  - Fraudulent report requests
  - Requests to prescribe drugs on behalf of others
  - Inappropriate medication requests
  - Irregularly requested mental capacity assessments and work entry reports
  - Unnecessary laboratory tests, imaging, and treatment
- Minimizing travel time and related productivity losses for patients and their families, thereby improving their satisfaction
- Providing equal service to all
- Allows patients to be seen by multiple physicians simultaneously
- Documenting patient history, examinations, and vital signs in an audio-visual format
- Eliminating complaints such as “the doctor did not examine me, asked few questions, or prescribed medication without examining me”.
- Preventing violence against healthcare professionals (since the interactions are recorded audio-visually);
- They protect hospitals, systems, patients, healthcare workers, and the public from contamination by infectious diseases such as the flu

Table 1 partially outlines examples of vital signs and examinations that can be detected using OPM.

Operating Mechanism of the System and Its Benefits

The OPM operation is anticipated by following the points highlighted below. By following these steps, it will be possible to provide care and improvement for patients much better than physical clinic conditions.

- The patient will make an appointment for an online examination by following a pathway like MHRS (Central Hospital Appointment System used in Turkey).
- A link indicating the specific time and minutes of the examination will be sent to the doctor and patient before the examination.
- A secure area is created using a peer-to-peer protocol, in which communication between two individuals is encrypted at an advanced level to ensure that no one else can intervene.

Table 1. Vital signs and examinations that can be detected using Online Polyclinic Model

Examples of technological tools for online clinic models		
Vital signs • Blood pressure • Temperature • Pulse • ECG • Oxygen saturation • Respiratory function tests • Using camera • Hearing tests	**Virtual reality glasses and artificial intelligence** • Refractive errors • Intraocular pressure measurement • Retina screening	**The future of technology** • By integrating new players in the augmented reality technology economy, it is possible to achieve much more with this system

ECG: Electrocardiogram

- The patient's history will be recorded during the online examination, and the necessary vital signs will be obtained using a vital sign monitor.
- When sufficient evidence for diagnosis and treatment is obtained, a prescription will be issued; if necessary, a report can be prepared.
- If follow-up is necessary, an appointment will be made for a follow-up examination. If a physical exam is required, an appointment will also be made.
- Pre-prepared videos regarding lifestyle changes and supportive therapies related to the patient's illness will be sent to the patient (e.g., drink plenty of fluids and rest for a cold).
- Information on how to use medications obtained from the pharmacy (as paid for by the patient) will be sent via video (e.g., take on an empty stomach, after a meal, etc.).
- The top professionals will provide health recommendations.
- The patient's complaints will be recorded using voice recognition systems during the examination. With the support of artificial intelligence, possible diagnostic suggestions related to the complaints will be given to the doctor.
- Algorithms to be followed for the patient's diagnosis will be presented to the doctor.
- If requested, records of the patient's past vital signs and test results will be presented to the doctor with graphical support (e.g., blood pressure records for a patient wishing to renew their blood pressure report; past blood sugar measurements for a patient whose sugar medications will be checked).
- Prescriptions for reported medications used for chronic diseases will be issued online if no additional tests are required.
- If there is a need for follow-up after examination and treatment, the patient will be notified, and a follow-up appointment will be arranged. If tests are required before follow-up, they will be entered online into the system.
- The patient will undergo blood testing directly at a blood collection center without visiting any clinic. After recording the results, the patient can undergo a follow-up examination.
- In addition, with a system adapted to technological tools, fatal arrhythmias like ventricular fibrillation and ventricular tachycardia, and deadly conditions like hypoglycemia can be detected and reported to the physician. This could reduce the risk of sudden death and sequelae.

Comfort: Numerous studies have examined factors affecting the satisfaction and, consequently, comfort of healthcare providers and recipients. Generally, trust, quality, quick results, intensity, staff quality, and direct patient interaction emerge as prominent factors (25). Studies have also been conducted to examine satisfaction in the field of telehealth (26). For this reason, we emphasize this point in the model we present. The most significant advantage of OPM is the ease of use. Below are some examples of how comfort can be achieved:

- OPM services can be provided 24/7, independent of time and place.
- Patients can benefit from this service whenever they want, without giving up their work or other commitments, traveling long distances, or dealing with stressful traffic.
- Physicians can provide this service at any time and place (at home, while traveling, or on vacation) and receive compensation.
- Each treated patient can be recorded in the current system using a point system for the physician.
- Patients' relatives will be relieved of the burden of taking patients to the hospital. This will also be recorded as a gain in time and space for the patient's relatives.
- This will provide economic savings for both the service providers and recipients.
- OPM's operational secure flow chart was clarified in Figure 1.

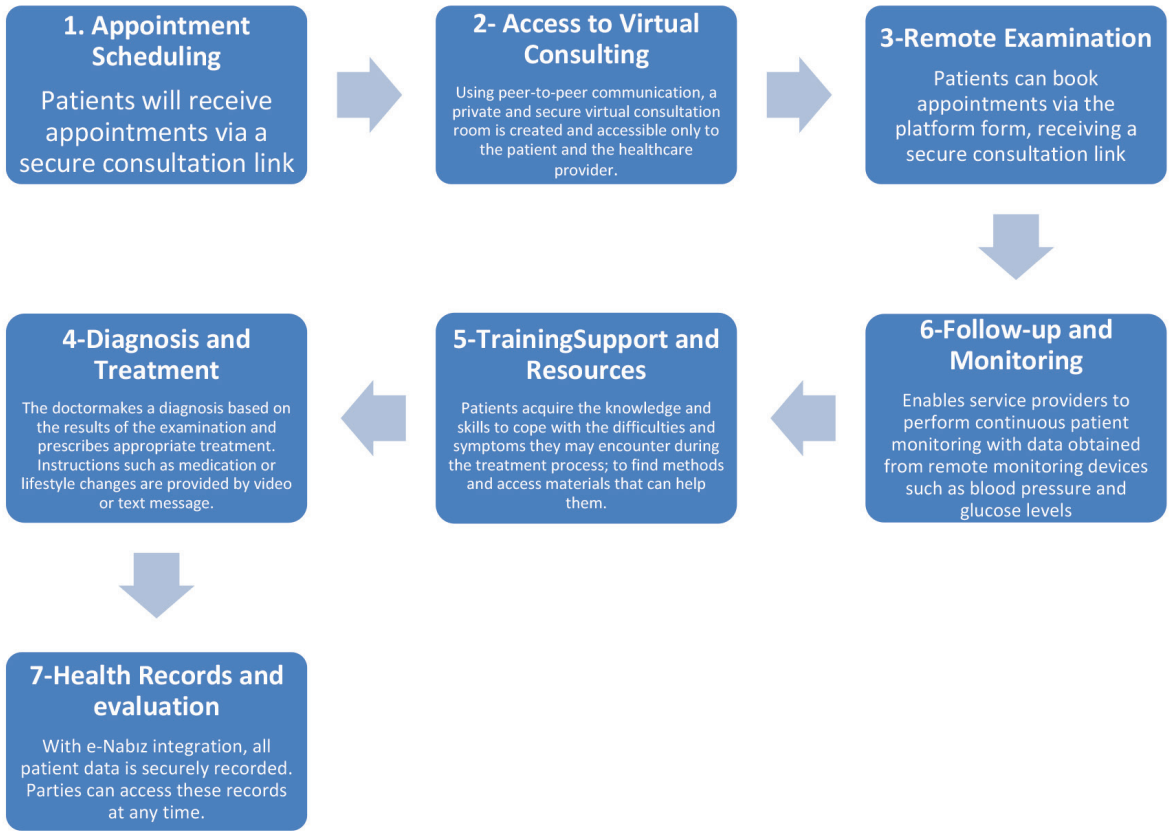

Figure 1. Online Polyclinic Model's operational secure flow-chart

Challenges in Online Polyclinic Model (Table 2): All new systems will face presentation and practical implementation challenges. The essential point is to anticipate these challenges and take measures to minimize damage. The potential challenges we might encounter in OPM will be explained under the following five headings.

1. Reliability and Identity Verification: Healthcare services should be maintained by models with high-reliability capacity that can overcome challenges, are accountable, and ensure continuous communication among strong core operators (27). In digital systems, providing personal data protection is critical for success. Reliability is essential for healthcare providers and recipients. Healthcare workers who believe their data could be more secure want to provide services only if the situation is comfortable. Even if society knows a hundred benefits, they may want to avoid such healthcare services. OPM will ensure a secure registration system by using applications that successfully use TC identity card verification, facial recognition, and voice recognition systems, separately or together.

2. Sustainability: Although sustainability has different meanings, it can be briefly described as the ability to be permanent. The balanced provision of change in an environment demonstrates the potential to meet human needs and desires, appropriate resource utilization, correctly directing investments and technological development, and ensuring that institutional change is in harmony (28). Given this definition, the need for a sustainable system is crucial. The necessity and severity of the need for healthcare services are indisputable. Current systems that meet this need must be developed to ensure that life can continue. The online polyclinic is designed as a model for the sustainability of healthcare services. After implementation, it can be improved with necessary adjustments to make it more qualified.

3. Accessibility: Accessibility refers to making services and environments as rational, meaningful, and usable as possible for as many people as possible. It is essential to distinguish between the problem and the goal correctly. Providing equitable access regardless of the abilities or circumstances of those in need, forms the essence and spirit of accessibility (29). One of the most critical steps in OPM is accessibility. For this purpose, modern technological facilities aim to reach everyone under equal or acceptable conditions, regardless of age: adults, hearing-sight-speech impaired individuals, bedridden patients, and irrespective

Table 2. Challenges encountered by Online Polyclinic Model and strategies to mitigate them

Challenges For OPM and strategies to mitigate them		
Challenge	**Definition**	**Mitigation Strategy**
Patient identity verification and security	Remote verification of patient identities is crucial for preventing unauthorized access and ensuring data security	Multifactor authentication (e.g., national ID, facial recognition, voice recognition) to secure access, ensure patient privacy, and build patient trust
Infrastructure and internet access	Limited internet connectivity in rural areas can hinder access to telemedicine applications	Collaborate with telecommunications providers to improve connectivity in underserved areas, including low-bandwidth options like text-based support for wider accessibility
System reliability	Reliable and consistent telemedicine access is vital because service interruptions can disrupt patient care	Establish a dedicated IT support team for care and rapid issue response. Perform routine performance checks to ensure system stability
Financial constraints	High initial infrastructure, licensing, and support costs can complicate nationwide scaling	Seeking government funding and private partnerships. Highlight the long-term benefits of telemedicine, such as reduced facility strain and resource optimization, to ensure sustainable funding
Cultural acceptance and patient engagement	Trust in telemedical treatment is particularly important because the Turkish culture values face-to-face interactions and family involvement	Implement a cultural integration strategy: facilitate familiarity with local providers, encourage family participation in consultations, and inform the public about the safety and convenience of telemedicine

OPM: Online Polyclinic Model

of short or long distances. 24/7 accessibility will be provided for those who wish to be examined without working hours. Parents can receive support from their pediatric patients and family members when they experience communication problems. The availability of the Internet is crucial for accessibility. As of 2023, the Turkish Statistical Institute reported that the internet access rate in Turkey was 95.5%, and the smartphone usage rate was 92% (30). It is assumed that a significant proportion of the remaining population lives with another individual who uses a smartphone at home. These results indicate that OPM can easily access the Internet.

4. Cost: According to 2022 data from the Turkish Statistical Institute, healthcare expenditures increased by 71.5% to 7,141 TL per capita; the total healthcare expenditure was 606 billion 835 million TL (31). It is critical for forward-looking financial planning in healthcare management to keep costs at the same level or reduce them without compromising the quality and quantity of treatment. The primary purposes of cost calculations in healthcare include determining total and unit costs, monitoring expenditures, increasing efficiency, improving planning quality, conducting benefit-cost comparisons, and performing income-expense-volume analyses (32). The use of new technological developments in disease diagnosis and treatment has increased healthcare costs worldwide (33). By leveraging the power of technology, the delivery of telehealth services can be redesigned. Increased accessibility and reduced travel can enhance productivity for healthcare providers and recipients, reduce service costs, and increase sensitivity to the needs of special populations (34). In OPM, we believe that analyses, infrastructure studies, target audience selection, and appropriate personnel employment will reduce healthcare service costs. The benefits related to time and space, reduced personnel expenses and employment, accessibility and special patient groups, and increased employee-patient satisfaction will positively impact costs. Considering that the rate of outpatient visits in our country is very high and involves at least 450 million trips in our target audience, we believe that the model has a high chance of success in terms of cost. If OPM's contributions regarding costs are exemplified, the subject will be clarified. The average prescription cost in Turkey is expected to reach 300 TL by 2024.

- Travel costs for those living in rural areas requiring physical examination facility.
- The loss of workforce for those living in cities.
- Relapses and flare-ups of diseases requiring advanced treatment because healthcare services are not accessible at the right time, leading to complications.
- Annual expenses for providing physical space.
- The financial burden is imposed on the state and individuals due to the stress, fatigue, and time loss experienced when dealing with all these issues.

Providing the healthcare services people need at a comfortable cost and without interruption is a significant gain. OPM precisely aims to realize this gain.

Long-Term Benefits: The long-term economic benefits of OPM are explained in six steps with brief descriptions.

a. Cost Savings for Patients and the System: Reducing travel and visit expenses benefit patients financially while minimizing system expenses by reducing face-to-face demand.

b. Optimized Resource Allocation: Reduced facility density extends the lifespan of infrastructure and allows for focused resource use in high-priority cases.

c. Enhanced Provider Productivity: Explains how AI technology is used in healthcare services and how it contributes to the triage process. AI organizes patient flow, allowing healthcare workers to effectively attend to more patients. This technology can also assist in making initial treatment decisions, enabling faster and more precise actions.

d. Minimized Complications: Long-term effective service delivery reduces the incidence of complications from untreated conditions, which can lead to significant healthcare expenses.

e. Increased Patient Retention: Patients who receive timely treatment are more likely to continue using healthcare services and remain loyal to their service providers. This loyalty translates into increased revenue in the long run.

f. Proactive Health Management: The preventive care approach adopted by OPM aims to detect health issues early, potentially lowering long-term treatment costs.

5. Legal Framework: A system requires a legal framework that is both beneficial and successful without leading to abuse. This is also true for healthcare services. Every person who possesses universal moral and legal rights should be protected and able to receive the treatment they deserve under equal conditions. The principles of minimizing harm in healthcare, ensuring justice, doing good, and respecting individuals' privacy can only be secured through legal regulations. Legal regulations worldwide have transformed patients from passive recipients of healthcare services to active partners in decision-making (35).

In addition, AI has become a popular area of interest globally and in almost every field. It has also begun to be widely used in healthcare services. Therefore, it is natural for both producers and consumers in this field to expect governments and relevant companies to develop protective mechanisms. Healthcare systems, physician groups, health insurance companies, and other stakeholders have explored AI's potential to improve various aspects of healthcare services. Therefore, they are interested in this topic. However, new legal risks and challenges emerge daily (36). AI has the potential to positively affect healthcare outcomes, reduce costs, and improve patient lives; thus, it will inevitably be widely used in this field. In this regard, users must implement legal regulations in advance.

In our study, we will benefit from technologies such as AI and virtual reality within the framework of the principles of not harming healthcare, ensuring justice in services, contributing to better healthcare, and respecting patients' privacy. The Ministry of Health has some legislative provisions regarding the remote provision of certain healthcare services remotely (37). We believe that with a few additions to these provisions, the legal foundation of OPM can also be strengthened. The points referred to as challenges are not limited to these five items; these are the essentials.

Some of the challenges that OPM may encounter in practice, along with their solution strategies, are presented in Table 2.

Implementation Stages

This subsection explains how OPM operates by ensuring smooth and secure interactions between service providers and recipients. It comprises four phases:

6. Pilot Phase: Initial implementation begins in large cities such as Istanbul and Ankara. Comprehensive training is provided to healthcare workers to effectively manage OPM services and establish a secure digital infrastructure.

7. Implementation Phase: Basic telemedical services are expanded to other urban centers, the infrastructure is strengthened; protocols are improved based on initial pilot feedback; seamless connectivity is ensured, and the user experience for both service providers and recipients is enhanced.

8. The Scaling Phase: Telemedical access is expanded to rural and underserved areas; partnerships with telecommunications companies are formed to close connectivity gaps. The focus is on expanding network capacity and providing technical support for broader access.

9. Evaluation Phase: Continuous evaluations are conducted to measure patient satisfaction, the impact of implementation, and treatment outcomes. Feedback is provided; continuous updates and improvements are made to adequately meet health service needs.

Like a deep river flowing slowly on flat land, suddenly gaining speed downhill, everything in life has started to flow rapidly in recent years. The knowledge that took fifty years can now be accessed in fifty minutes. Human needs have increased

from five to 100. The number of diseases has increased from approximately twenty to one hundred and twenty. Medicine and all its parameters are the fields most affected by these changes and are followed by the most significant interest. It would have been inconceivable. From this perspective, three methods can be used to meet people's health needs. The first step is to bring people to healthcare institutions. Until now, only this method has been valid because certain circumstances required it. The second is to partially bring healthcare services to people. Our capabilities now allow this. This trend became particularly prominent during the COVID-19 pandemic. The third approach is to use both methods in a complementary manner. The OPM views the service provided by the first method as significant; it strengthens the second and proposes the third.

Developments in nanotechnology, information technology, genetic technology, synthetic biology, regenerative medicine, robotic applications, neurotechnology, artificial intelligence, and virtual reality have accelerated at a tremendous pace in recent years (38). These technologies developed in the medical field are accelerating the diagnosis and treatment of diseases, aiming for a more robust and healthier life. Utilizing these technologies in a timely manner and benefiting from their potential is crucial to achieving the intended outcome. To avoid being a hundred days behind developments, one must start a day earlier. An OPM was prepared and presented for this purpose.

Obtaining a detailed patient history and conducting a complete physical examination are essential in the medical profession. Patients have always trusted physicians who listen to their stories and possess stronger communication skills than others (39). However, keeping pace with technological developments in medicine has become a necessity for all healthcare providers. Those who need help along this path will struggle to pursue and protect their profession. Unexpected severe healthcare issues can also lead to innovations. The COVID-19 pandemic has confined people to their homes to protect them from the risk of contagion. This phenomenon was one of the reasons for the rapid increase in virtual or telehealth visits (40). Development also brings about doubts and discussions. While discussions often minimize the shortcomings of developments, they can sometimes lead to unnecessary and difficult-to-repair resistance. This situation is valid for both telehealth and OPM. Physicians' sense of security regarding telehealth depends on their ability to behave objectively and improve their skills (41). In virtual visits, a complete history can be obtained, and physical examination can be performed alongside medication inquiries. Requesting tests suitable for physical examination and history can also help in starting treatment. Experiences gained during the pandemic demonstrate that patients responded positively to these applications. In regular outpatient clinics, physicians gather information about the patient's clinical status by observing the patient's movements, such as walking, sitting, and other movements. The likelihood of obtaining such information during telehealth visits may decrease. If doctors review in advance what information they want from remote examinations, they can minimize this issue. Knowing their limits and capabilities during video examinations, experienced and trained physicians can make the process easier by asking the right questions for proper guidance. The success rate increases when these evaluations are supplemented with measurements of vital parameters like blood pressure, oxygen saturation, pulse, respiratory rate, and temperature (42).

Various recommendations for the use of telemedicine can be found in different studies. During the COVID-19 pandemic, recommendations were made for telemedicine usage to monitor weight, blood pressure, jugular venous distention, pulse oximetry, and temperature (43-45), and to identify arrhythmias (46). Benziger et al. (42) proposed a ten-step algorithm for physical examination via telemedicine. When technological advancements, human needs, the necessity to meet those needs, experienced and trained healthcare professionals, scientific study results, and courageous proposals come together, providing healthcare services with OPM becomes a necessity rather than a dream.

Studies on hospital congestion generally continue through emergency services. Although our study covers the congestion of all steps in the healthcare system, examples have been provided primarily through emergency services. The shortcomings could not be indicated because it was written before the pilot application was submitted. The literature does not include many comprehensive and practically ongoing applications like the online outpatient clinic model. For this reason, the comparisons in the discussion section are weak.

Conclusion

Healthcare services will inevitably evolve into a new form by collaborating with advancing technologies. OPM will yield beneficial results in providing services under more comfortable conditions, saving time and space, ensuring 24/7 continuity, ensuring high-level security, being accessible, reducing healthcare costs, providing measurable outcomes, being continuously updatable, offering healthcare services to everyone by the principle of equality, increasing the satisfaction of both healthcare providers and recipients, and being a solution to increasing hospital congestion and facilitating the monitoring of chronic diseases. In cases like a pandemic, earthquake, or flood, OPM emerges as the safest haven to provide comfortable healthcare

services for patients who need home care, are bedridden, or can only reach doctors by covering long distances and enduring hardships. During applications, there may be challenges, such as ensuring information security due to insufficient experience and training, identity verification processes, accessibility, legal infrastructure, and costs.

Ethics

Acknowledgments

We thank Dr. Habib Yılmaz for his encouragement and moral support in continuing this study.

Footnotes

Authorship Contributions

Surgical and Medical Practices: B.A., E.Y., S.A., Concept: B.A., E.Y., S.A., Design: B.A., E.Y., S.A., Data Collection or Processing: B.A., E.Y., S.A., E.T., Analysis or Interpretation: B.A., E.Y., Literature Search: B.A., E.Y., E.T., Writing: B.A., E.Y., S.A.

Conflict of Interest: Behçet Al, MD, Editor in Chief Eurasian Journal of Emergency Medicine. He has no involvement in the peer-review of this article and had no access to information regarding its peer-review.

Financial Disclosure: The author declared that this study received no financial support.

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