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Review Article

Digitalization of primary health care services in Türkiye and the integration process between levels of care

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ABSTRACT

As part of ongoing efforts to make the healthcare system in Türkiye more effective, accessible and sustainable, the digitalization of primary healthcare services is gaining increasing importance. This study explores the contribution of digital health technologies to service delivery—particularly through family health centers—along with the integration policies developed between different levels of care. The widespread adoption of systems such as electronic health records, e-Nabız, the Central Physician Appointment System (MHRS), and the Public Health Management System (HSYS) has not only improved patient-service alignment but also facilitated better coordination among healthcare professionals. Following the implementation of the Health Transformation Programme, information management systems have enabled a more holistic approach to patient follow-up, guidance, and monitoring. In 2025, the "Integration between Healthcare Levels" initiative was introduced to streamline patient transitions from primary to secondary and tertiary care in a more systematic and efficient manner. Expanding the scope of the authority of family physicians, enhancing their access to laboratory and imaging services, and promoting reciprocal information sharing with specialist physicians are expected to support a more balanced distribution of the healthcare burden and alleviate patient congestion in hospitals. These initiatives aim to shorten the time citizens wait for care, improve referral accuracy, and increase access to preventive health services. In light of these developments, it is envisioned that the future of Türkiye's healthcare system will be built upon a more innovative and integrated model, underpinned by a strengthened digital infrastructure and enhanced digital competencies among physicians.

Keywords: primary health care, health information systems, systemic integration, preventive healthcare, chronic disease management

Introduction

Effective, accessible, and sustainable healthcare services are among the primary objectives of Türkiye's people-centered health system.[1]

The healthcare structure in Türkiye is organized into three levels, each designed to enhance public health. Primary healthcare services encompass both preventive and curative care, delivered through institutions such as family health centers, healthy life centers, and community health

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centers. Secondary healthcare includes services provided by general hospitals, whereas tertiary healthcare refers to advanced inpatient care offered by institutions such as university hospitals and training and research hospitals.[2]

Primary healthcare services, which integrate preventive and promotive care with treatment and rehabilitative services, are critically important as the first point of contact between individuals and the health system. Secondary care encompasses hospital-based services requiring specialist expertise, such as surgery or radiology. Tertiary care involves highly specialized treatments in academic or research institutions, including organ transplants or neurosurgery. As emphasized in the Alma-Ata Declaration, primary healthcare aims to provide continuous, comprehensive, and coordinated services to individuals and families, serving as the foundation of public health.[3] According to the World Health Organization (WHO), one of the main objectives of primary healthcare is to improve the overall health status of the population.[4] Since the introduction of the family medicine system in Türkiye in 2010, primary healthcare services have been significantly strengthened. A wide range of services spanning from preventive care to diagnosis, treatment, and rehabilitation has been provided within this framework. In recent years, the role of primary healthcare has continued to expand. In fact, in 2023, the total number of annual visits to 28,054 family medicine units reached approximately 417 million, accounting for 43.3% of all physician visits across the country.[5] The announcement by the Ministry of Health that 1,000 new Family Health Centers will be opened in 2025 indicates a further commitment to placing these services at the core of the healthcare system.[6] In this context, the adoption of digital technologies for more effective and efficient service delivery offers significant advantages for both healthcare professionals and patients. Digitalization plays a vital role in enhancing the efficiency and accessibility of health systems.[4]

Digitalization in health: conceptual framework

Digitalization is driving radical transformations across nearly every sector today, and the healthcare industry is no exception to this global shift. With advancements in technology, substantial innovations have emerged in the delivery of healthcare services, as well as in diagnosis, treatment, and care processes. This phenomenon, referred to as "digitalization in health," encompasses a range of digital components, such as electronic health records, telehealth applications, mobile health technologies, AI-supported systems, and big data analytics.[7]

These technologies hold significant potential to enhance the efficiency of healthcare services, improve accessibility, reduce costs, increase patient satisfaction, and increase overall health outcomes. Digitalization is increasingly recognized as a strategic instrument in the transformation of healthcare systems.[8] In the near future, the widespread integration of artificial intelligence into healthcare is expected to profoundly influence how physicians engage with patients. These developments are set to fundamentally reshape the delivery of healthcare services and patient treatment processes. Furthermore, leveraging the full potential of digitalization is critically important for improving health literacy within the broader population.

Development of digitalization in health in Türkiye

In recent years, healthcare services in Türkiye have undergone a significant transformation, not only in terms of service delivery but also through the adoption of digital health applications. Announced in 2002, the Emergency Action Plan included e-transformation goals under the "Health for All" initiative. With the launch of the Health Transformation Programme (SDP) in 2003, basic health services and health information systems were integrated.[9]

In this context, applications such as the Core Resource Management System (ÇKYS), Doctor Information Bank (DBB), and Family Medicine Information System (AHBS) were introduced. The Turkish Health Information System Action Plan, published in 2004, aimed to enhance data quality and strengthen knowledge-based management capacity within the healthcare sector. This action plan referenced the Eighth Five-Year Development Plan's Special Expertise Commission Report on Efficiency in Health Services. The report highlighted the absence of an information-based management system in the health sector and noted that existing data were not effectively utilized by administrators because of their low quality.[10]

The Action Plan also outlined the development of several systems, including the Primary Health Statistics Module Section (TSİM), the Primary Health Care Institutions Information System (BBSK-BS), Hospital Information Systems (HBS), and the Document Information System (EBS).[11] These applications were developed over time and subsequently updated with new automation tools. The growing need to deliver and receive modern healthcare services, alongside the demand for quicker access to results and reliable information, has accelerated the development of health information systems. In 2010, the Central Physician Appointment System (MHRS)[12], which is accessible to all citizens, was launched to help physicians and patients use their time more efficiently and to reduce waiting times prior to examinations. That same year, the Pharmaceutical Tracking System (İTS)[13] was introduced to monitor the journey of medicines from production to patient delivery. In 2015, the e-Nabız platform was launched to enable individuals across the country to access their personal health data. e-Nabız is an integrated digital platform that allows individuals to view their health history regardless of the institution. The system enables access to all health-related applications made across Türkiye, including laboratory results, imaging and pathology reports, diagnoses, epicrisis reports, prescriptions, and medication information. Both individuals and authorized physicians can access these data, thereby enhancing continuity in healthcare services and improving the efficiency of diagnosis and treatment processes.[14]

Launched in 2016, the Public Health Management System (HSYS) is a modular system designed to ensure data integrity in primary care services. It includes modules for cancer screenings, physical examinations, select vaccination programs, the National Tuberculosis System (UTS), and the Examination Information Management System (MBYS). In 2017, the e-prescription system was introduced to enable the electronic prescription of medications, adjust dosages, and prevent drug misuse. In 2018, the e-Report system was developed, allowing for the electronic issuance of various reports including birth, disability, driver's license, athlete, psychotechnical, single-physician, and health board reports through the use of e-signatures.[15] In 2019, the Statistics and Causal Analyses in Health (SİNA) application was launched, providing a platform for visualizing and analyzing Ministry of Health data. In 2020, the filiation and isolation tracking system (FİTAS) was implemented as part of efforts to combat the COVID-19 pandemic. Additionally, systems such as the Vaccine Tracking System (ATS)[16], which ensures vaccine safety by monitoring temperature and stock levels and the Disease Management Platform (HYP)[17], an online system in which family physicians actively monitor chronic diseases such as hypertension, diabetes, cardiovascular conditions, and obesity and that includes a comprehensive elderly assessment module were developed. With respect to the integration process between health levels in January 2025, the Ministry of Health publicly announced the "Integration between Health Levels" project. The aim of this initiative is to establish effective integration between family physicians and healthy life centers that provide primary healthcare services and

secondary and tertiary healthcare institutions. The implementation of the family medicine model in Türkiye began in the province of Düzce in 2005. It gradually expanded to other provinces and became nationwide as of 2010.[18]

Family physicians are responsible for providing care to all members of a family—from unborn babies to the elderly—and delivering preventive health services and health counseling and refer patients to specialists when necessary. Within this framework, family health centers (ASMs) carry out many critical tasks, including vaccination tracking, infant and child health monitoring, antenatal and postnatal follow-up, elderly and chronic disease management, and cancer screenings.[19] One of the primary goals of the family medicine system is to ensure that individuals access the healthcare system at the appropriate time and at the correct level, thereby minimizing time loss and reducing the burden on higher-level healthcare institutions.[19] The number of family physicians, which stood at 20,216 in 2011[20], increased to 28,054 by 2023.[5] However, considering that some units still lack assigned physicians, it becomes evident that sufficient emphasis has not been placed on strengthening the family medicine system. Increasing the number of family physicians is critically important for reducing the population-to-physician ratio, which in turn directly enhances the quality of healthcare services. This integration project—designed to improve the effectiveness of preventive health services, establish family health centers as the cornerstone of the healthcare system, alleviate hospital overcrowding, and promote more efficient use of healthy life centers is expected to make significant contributions to the sustainability of the healthcare system, provided that it is implemented in a coordinated and effective manner by both the central and provincial branches of the Ministry of Health. Announced on 26 December 2024 through an official letter issued by the General Directorate of Public Health, the practice of integration between health levels aims to facilitate citizens' access to appropriate healthcare services and to strengthen collaboration among healthcare professionals. This system also serves to support the professional development of general practitioners and family physicians. The referral chain, one of the foundational elements of the family medicine model, was initially piloted in four provinces in 2009. However, the practice was discontinued following public backlash. In the current phase, digital integration is introduced to support the steps that could function as part of a referral chain. This integration is reinforced through health information management systems and appointment quotas specifically allocated to family physicians. By allowing family physicians to schedule appointments for their patients using dedicated quotas through the Central Physician Appointment System (MHRS), patients can be directed to the appropriate specialist at the right time, improving the coordination and organization of healthcare services. Currently, only 10 percent of appointment quotas are allocated for patients who are registered with family physicians. If this ratio is increased supported by monitoring and incentivizing effective use it would enable patients who do not require specialized care to complete their treatment in primary care settings. This would reduce unnecessary referrals to secondary and tertiary healthcare facilities and ease the burden on hospitals. In this framework, the screening of patients for cancer and chronic diseases at the family physician level is also actively encouraged. To encourage the utilization of the 10% hospital appointment quota reserved for patients referred by family physicians, amendments made to the Family Medicine Contract and Payment Regulation in November 2024 propose that patients referred via the Central Physician Appointment System (MHRS) will not be counted toward the total number of hospital admissions a new performance metric. Additionally, an amendment to the Social Security Institution (SGK) Health Implementation Communiqué, published in the Official Gazette

on 25 January 2025, reduced the copayment for specialist consultations performed with a referral from a family physician by 50%. This change is significant in terms of fostering a patient's habit of consulting their family physician first and then, if needed, receiving a formal referral to a hospital. Furthermore, in departments where it is typically difficult to secure appointments, the ability of family physicians to directly schedule appointments for their patients offers considerable convenience. The prioritization of patients referred by family physicians for hospital treatment is expected to make this system more attractive, thus increasing the utilization rate of the allocated quota over time. As demand increases for both patients and family physicians, the current 10% quota is likely to require expansion. Integration also facilitates an efficient flow of information between hospital physicians and family physicians through shared notes on health information management systems. The sharing of data such as preliminary diagnoses and reasons for referral enables specialist physicians to manage their time more effectively. In turn, the ability of specialist physicians to provide digital feedback to family physicians following patient evaluations enhances the continuity of patient monitoring and treatment. With the integration between healthcare levels, family physicians will be able to request certain laboratory and imaging tests in hospital settings without the need for reexamination. For instance, the international normalized ratio (INR) of a patient on anticoagulants can be monitored by a family physician under the guidance of a specialist, and dose adjustments can be managed within the Family Health Centre (ASM). The test results will be transmitted to the family physician via the digital system, allowing timely interventions. Additionally, family physicians will be authorized to request scheduled imaging procedures such as mammography and developmental hip dysplasia screenings through hospital systems. This will contribute to the broader implementation of cancer screenings and help alleviate overcrowding in neonatal outpatient clinics. Expanding the authority of family physicians to order diagnostic tests will increase access to healthcare by eliminating the need for patients to undergo unnecessary hospital visits, make repeated appointments, or endure redundant examinations. This system is expected to save time, lower costs for both patients and healthcare providers, and reduce the burden on secondary and tertiary care services. As part of the integration initiative, it is also intended to broaden preventive healthcare services such as those targeting healthy nutrition, physical activity, mental health, and child development by facilitating referrals from physicians at all levels of the healthcare system to Healthy Life Centers (SHM). Improved communication between physicians and SHM personnel, including responsible physicians, dietitians, psychologists, social workers, physiotherapists, and child development specialists via shared information notes will streamline treatment processes and enhance the quality of preventive services. SHM staff, including responsible physicians and dietitians, will be able to access results from certain tests and analyses performed in other healthcare institutions. This prevents unnecessary test duplication and promotes more efficient use of both time and resources. In turn, citizens will benefit from more effective and targeted counseling services. Furthermore, with the "Communiqué Amending the Social Security Institution Health Implementation Communiqué," published in the Official Gazette dated 25 March 2025 (No.32852), the number of hypertension and cholesterol medications that can be prescribed by family physicians has increased, thereby expanding the scope of primary healthcare services.[21]

The expansion of prescriptive authority should also be extended to medications for chronic diseases such as diabetes, which is highly

prevalent in the population. Current limitations affect family physicians' ability to effectively manage the treatment of their chronically ill patients and often result in increased referrals to hospitals. Allowing family physicians to prescribe antidiabetic medications and insulin under the coverage of the Social Security Institution (SGK) would enhance the effective utilization of their competencies in managing diabetes. Ultimately, early control of diabetes will help prevent long-term complications such as chronic kidney disease, diabetic foot disease, diabetic neuropathy, and cardiomyopathy and contribute to a reduction in overall healthcare expenditures.

Discussion

Integration practices between different levels of healthcare services are strategically important for strengthening primary healthcare and positioning family health centers at the core of Türkiye's health system. This holistic approach presents a valuable opportunity to enhance service quality and facilitate access across all levels of care. In particular, prioritizing family health centers as the foundation of the system represents a critical step for advancing public health.

Innovations implemented within these centers will not only increase service quality but also ensure that all segments of society have access to equitable, comprehensive, and continuous healthcare. These centers enable individuals to monitor their health more effectively while simultaneously reinforcing the preventive and promotive aspects of healthcare delivery. Digital health integration should aim not only to improve existing services but also to guarantee the continuity and sustainability of digital transformation. Strengthening technological infrastructure will streamline patient treatment processes, reduce healthcare professionals' workload, and enhance overall service quality. Empowering family health centers is essential for improving public health outcomes. In this context, it is crucial for family physicians to be equipped with up-to-date knowledge in light of evolving diagnostic and therapeutic approaches, disease patterns, and technological advancements. Identifying the most frequently referred specialties and designing targeted training programs for family physicians in these areas can reduce the prevalence of defensive medical practices and enhance physician–patient communication. For instance, refreshing core knowledge in high-demand specialties such as cardiology, dermatology, and psychiatry will facilitate timely and accurate referrals and enable more effective treatment. Family physicians serving large populations of neonatal, pediatric, elderly, or chronically ill patients could benefit from rotational training—up to two months in internal medicine or pediatrics and one month in other relevant departments—on the basis of their individual needs and institutional capacity. Furthermore, monitoring and screening chronic diseases through family health centers with the Health Management Platform (HYP) offers a holistic perspective and aligns with international best practices. Countries such as Germany (with the German Disease Management Programmes, 2001), the United Kingdom (with the National Service Frameworks, 1997), and the Netherlands (with the Maastricht Project, 2000) have incorporated primary care-led chronic disease management systems.[22] Turkey's HYP platform shares similarities with Germany's disease management programs (DMPs) in terms of chronic disease monitoring but lacks the structured patient education modules of the DMP. The Netherlands Maastricht Project (2000) demonstrates how primary care-led models reduce hospital admissions, a strategy Turkey could adopt. Recognizing chronic disease monitoring as a performance metric in the Family Medicine Contract and Payment Regulation will incentivize increased screening of healthy individuals and effective patient follow-up. This

approach will also promote seamless integration between the secondary and tertiary care levels. A sustainable and cost-effective healthcare system depends on the reliable documentation of HYP data and the continuation of early diagnosis, long-term treatment, and patient follow-up within a primary care-based, integrated framework. As in other chronic disease management programs, data analysis plays a vital role here. Moreover, managing the diagnosis and long-term treatment of chronic illnesses can be conceptualized as an ongoing model of medical education.[23]

In the future, with the anticipated increase in the number of specialist physicians, the scope of integration between care levels could be expanded by establishing formal pairings between family health centers and hospitals, as well as between family physicians and specialists. Such a system would allow specialists to act as consultant physicians, supporting family physicians in diagnostic and therapeutic processes. This model could also serve as a form of interactive, practice-based training. Delivering such training in various formats face-to-face in outpatient settings, interactively through a client-consultant model, and digitally via continuous education platforms would improve the quality of healthcare services and patient satisfaction while significantly enhancing the overall efficiency of the health system. Data privacy concerns and the digital divide must be mitigated to ensure equitable access to e-health platforms such as e-Nabız. Future iterations of Turkey's digital health framework could explore blockchain for secure patient data sharing, aligning with EU standards.

Conclusion

These integration initiatives should be viewed as a significant advancement in Türkiye, where previous efforts to implement referral chains between healthcare service levels have not been successful. The digitalization of primary healthcare services and the integration of various levels of the healthcare system represent pivotal breakthroughs in enhancing accessibility, coordination, and sustainability within the Turkish health system. Through the deployment of digital health systems and integrated information management infrastructures, patients can now access healthcare services more promptly and accurately. Moreover, information exchange among healthcare professionals has become more efficient, and service delivery has been significantly streamlined. Tangible achievements such as strengthening the role of family physicians, expanding preventive health services, and alleviating hospital overcrowding demonstrate the direct impact of this transformation on public health outcomes. To ensure the effective delivery of health services within this evolving digital ecosystem, it is essential to continuously enhance technological infrastructure, improve physicians' digital literacy, and design systems that are user friendly. These ongoing developments not only enable more effective responses to current healthcare demands but also lay the foundation for future innovations in the health sector. These include AI-supported clinical decision-making tools, personalized monitoring and treatment protocols, and data-driven public health applications.

Ethical approval

Since ethical approval is not required for review articles, no ethics committee approval was obtained for this study.

Author contribution

The authors declare contribution to the paper as follows: Review conception and design: ARB; literature review: MC; draft manuscript preparation: HAG. All authors reviewed the results and approved the final version of the manuscript.

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Conflict of interest

The authors declare that there is no conflict of interest to disclose.

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