Derleme Makalesi / Review Article

Mobil Sağlığın Sağlık Sektöründeki Yeri, Engeller ve Fırsatlar, Mobil Sağlığın Gelişimini Etkileyen Entegre Teknolojiler ve Kullanım Alanları: Tüm Yönleriyle Literatürün Değerlendirilmesi

Muhammet DAMAR [*,a],   Oğuzhan KOP [b],   Ömer Faruk ŞAYLAN [c],
Fatih Safa ERENAY [d]

[a,*] *Dokuz Eylül Üniversitesi, İzmir, Türkiye*
[b] *Izmir University of Economics, İzmir, Türkiye*
[c] *Ege Üniversitesi, İzmir, Türkiye*
[d] *University of Waterloo, Ontario, Canada*

MAKALE BİLGİSİ	ÖZET

Mobil sağlık (m-sağlık) elektronik sağlığın (e-sağlık) önemli bir parçasıdır ve e-sağlık ise, bilgi ve iletişim teknolojilerinin sağladığı olanakların, hastalıkların teşhis ve tedavi edilmesi, sağlık hizmetlerine erişilebilirliğin arttırılması, sağlık sektöründe yer alan tüm paydaşlara kaliteli, verimli ve etkili sağlık hizmetlerin sunulması için kullanılmasıdır. M-sağlık ise, mobil telefonlar, hasta takip araçları, kişisel dijital asistanlar gibi mobil teknolojiler ve iletişim araçları ile sağlık hizmetlerinin sunulması olarak ifade edilebilir. Gün geçtikçe mobil teknolojilerin kullanımının artmasıyla mobil sağlığın, sağlık sistemleri içerisindeki yeri daha da önem kazanmaktadır. Bu çalışmanın amacı, mobil teknolojilerin mevcut sağlık sektörü teknolojileri içerisindeki yerine ilişkin kapsamlı bir literatür taraması yapmak, mobil teknolojilerin küresel sağlık sektöründeki gelişimini değerlendirmek ve bilgi teknolojileri altyapısının yanı sıra sektör için ihtiyaç duyulan yetkinlik ve kabiliyetleri değerlendirmektir. Literatür incelendiğinde, sağlık sektöründeki mobil teknolojilere odaklanan bu kapsam ve ölçekte bir araştırmaya rastlanmamıştır. Araştırmamız bu önemli boşluğu doldurmayı ve sağlık politikası yapıcıları ve düzenleyicileri için önemli bir referans sağlamayı amaçlamaktadır. Araştırmamız kapsamında Google Scholar üzerinden "Sağlık Sektörü Mobil Teknoloji" sözcükleri ile 600 üzerinde doküman ve Web of Science (WoS) üzerinden 916 dokümana erişilmiş ve araştırmacıların değerlendirmesi ve amaç edinen konu başlıklar çerçevesinde değerlendirmesi ile bir sonuç ortaya konulmuştur. Araştırmamıza WoS üzerinde araştırma makalesi ve derleme makalesi türündeki araştırmalar dahil edilmiştir. Araştırmamız doküman incelemeleri üzerinde gerçekleştirilen bir çalışmadır. Dünya genelinde sağlık hedeflerine ulaşmak için mobil ve kablosuz teknolojilerin kullanılması sağlık hizmeti sunumunun seyrini dünya çapında dönüştürme potansiyeline sahiptir. Bu gerçeğin farkında olarak literatür değerlendirilmiştir. Yapılan literatür çalışmasında 15 farklı başlıkta sağlık sektörü, sağlık araştırma alanı ve mobil teknolojinin mobil sağlık altında gruplanabileceği araştırma alanları belirlenmiştir. Her bir başlık literatürdeki uygulama alanları ile kapsamı bir şekilde değerlendirilmiştir.

DOI: 10.59940/jismar.1521397

The Place of Mobile Health in the Health Sector, Barriers and Opportunities, Integrated Technologies and Usage Areas Affecting the Development of Mobile Health: A Review of the Literature in All Aspects

ARTICLE INFO	ABSTRACT

*Corresponding Authors
e-mail:
muhammet.damar@deu.edu.tr

Mobile health (m-health) is an important part of electronic health (e-health) and e-health is the use of the opportunities provided by information and communication technologies to diagnose and treat diseases, increase accessibility to health services, and provide quality, efficient and effective health services to all stakeholders in the health sector. M-health can be defined as the provision of health services through mobile technologies and communication tools such as mobile phones, patient tracking tools, personal digital assistants. With the increasing use of mobile technologies day by day, the place of mobile health in health systems is becoming more important. The purpose of this study is to conduct a comprehensive literature review on the place of mobile technologies in current healthcare technologies, to evaluate the development of mobile technologies in the global healthcare sector, and to assess the competencies and capabilities needed for the sector as well as the information technology infrastructure. When the literature is examined, there is no research of this scope and scale focusing on mobile technologies in the healthcare sector. Our research aims to fill this important gap and provide an important reference for health policy makers and regulators. Within the scope of our research, over 600 documents on Google Scholar with the words "Healthcare Mobile Technology" and 916 documents on Web of Science (WoS) were accessed and a conclusion was drawn by the evaluation of the researchers and the evaluation within the framework of the aiming topics. Research articles and review articles on WoS were included in our research. Our research is a study conducted on document reviews. The use of mobile and wireless technologies to achieve health goals worldwide has the potential to transform the course of healthcare delivery worldwide. Recognizing this fact, the literature was evaluated. In the literature review, 15 different topics were identified under the health sector, health research area and research areas where mobile technology can be grouped under mobile health. Each title was evaluated in a comprehensive manner with its application areas in the literature.

1. *INTRODUCTION (GİRİŞ)*

Information technologies and health informatics systems play a crucial role in addressing problems within the healthcare sector. Like other industries, the healthcare sector has been significantly impacted by information technologies. The utilization of information technologies in healthcare greatly facilitates the work of healthcare professionals, allowing them to easily access needed information and enabling managers to make more effective decisions [1] The information technology sector has un-dergone a major transformation, especially after the 2000s. This transformation has affected all sectors in some way. New professions have emerged in areas that were previously unheard of, and new technol-ogies have led to the birth of new sectors or job fields. Meanwhile, some professions have faded into history [2-5] The areas where wireless technologies can be used in the delivery of public services include law enforcement, fire fighting, education systems, healthcare systems, transportation, and emergency medical aid [6] The healthcare sector is one of the most significantly impacted by this transformation. The prerequisite for continuing existence in this process is to adapt to the digital transformation brought about by technological advancement [7]

After the 2000s, the widespread use of smartphones and the health applications developed for these phones have enabled patients and healthy individuals to increase their awareness and consciousness about their health and diseases, stay closer to their doctors, track their diseases and medical data without time and distance limitations, perform preliminary tests regarding their health, schedule remote ap-pointments, and access many other services [8] Access to information from anywhere and at any time is made possible through mobile technologies. The healthcare sector is also influenced by evolving and renewing technology. The use of mobile technologies in the healthcare sector is becoming more widespread day by day. Mobile health (m-health) applications developed for patients offer various treatment opportunities and have the potential to enhance patients' quality of life [9] For doctors, caregivers, nurses, and health institution managers, mobile technology offers significant convenience due to the technological capabilities it encompasses.

The timely access to healthcare services by every individual in need, regardless of time and place, the fair use of these services, and the effective and efficient continuation of healthcare services are im-portant both for individuals and public authorities [10] The power and reach of mobile communication provide great versatility and benefits in delivering high-quality, low-cost healthcare services [11] One of the most important social duties of governments is to provide their citizens with timely and quality medical care at affordable prices, regardless of their status and social standing. The successful use of advancements in health technologies in healthcare services in many countries has accelerated the development of fundamentally new medical care organizations and methods for society [12].

Currie & Seddon [13] argue that to enhance the effectiveness of citizens in healthcare services, mobile technology needs to be part of a broader social innovation. They claim that public health culture will change with the development of a healthcare infrastructure supported by these applications. This study aims to conduct a comprehensive literature review on the place of mobile technologies within current healthcare sector technologies, evaluate the development of mobile technology within the global healthcare sector, and assess the needed competencies and capabilities for the sector, alongside the information technology infrastructure. Upon reviewing the literature, no research of this scope and scale focusing on mobile technologies within the healthcare sector was found. Our research aims to fill this significant gap, providing an important reference for health policy makers and regulators.

2. *MATERIALS AND METHOD* *(Materyal ve Metod)*

In our study, we conceptually evaluated and discussed e-health (electronic health), m-health (mobile health), their stakeholders, the benefits of mobile technologies in the health sector, technologies and usage tools that will affect the development of m-health, and the disadvantages and barriers facing m-health applications in the context of the literature. Within the scope of all field studies obtained, the topic of mobile technology was discussed under 15 headings in the discussion and conclusion section. The 916 articles accessed through WoS were first reviewed through their abstracts and then by accessing their full texts to reveal the general patterns of the topics. In the discussion and conclusion section, the prominent topics in the literature, as seen specifically in the health sector, include gamification in m-health services, m-health and the nursing field, m-health in terms of corporate m-health services, hospital and disaster management, the use of mobile technology in clinical services, the health sector and wearable technologies, mobile learning, the use of mobile technology in the education of patients and healthcare professionals, mobile technology and community health services, active patient monitoring, counseling and mobile technology, mobile technology, youth and children, mobile technology and elderly care, mobile technology and access for disabled citizens, personal applications and personal health services in m-health, other prominent applications in m-health services, disease and epidemic surveillance in m-health, ethical and legal issues in m-health, and barriers in the development of mobile technology within the health sector.

For the study, numerous different topics (such as mobile technology and the health sector) were rapidly digitized in today's world using the Google Scholar and WoS databases in both Turkish and English. The value of mobile technology applications and research within the healthcare sector for doctors, patients, hospitals, as well as policymakers was comprehensively evaluated. The research areas included in the scan on WoS are shown in Table 1.

Table 1. Research Areas in the Field of Health Included in the Search on WoS
(Tablo 1. WoS'ta Aramaya Dahil Edilen Sağlık Alanındaki Araştırma Alanları)

➢ Health Care Sciences Services	➢ Cardiac Cardiovascular Systems	➢ Radiology Nuclear Medicine Medical Imaging
➢ Medical Informatics	➢ Immunology	➢ Urology Nephrology
➢ Public Environmental Occupational Health	➢ Psychology Experimental	➢ Anthropology
➢ Nursing	➢ Endocrinology Metabolism	➢ Biotechnology Applied Microbiology
➢ Psychiatry	➢ Pharmacology Pharmacy	➢ Dentistry Oral Surgery Medicine
➢ Medicine General Internal	➢ Engineering Biomedical	➢ Emergency Medicine
➢ Clinical Neurology	➢ Obstetrics Gynecology	➢ Geosciences Multidisciplinary
➢ Health Policy Services	➢ Psychology Educational	➢ Parasitology
➢ Multidisciplinary Sciences	➢ Family Studies	➢ Gastroenterology Hepatology
➢ Oncology	➢ Geriatrics Gerontology	➢ Integrative Complementary Medicine
➢ Neurosciences	➢ Humanities Multidisciplinary	➢ Psychology Biological
➢ Medicine Research Experimental	➢ Orthopedics	➢ Rheumatology
➢ Surgery	➢ Primary Health Care	
➢ Pediatrics	➢ Psychology Applied	
	➢ Psychology Social	

In our research, over 600 documents were accessed through Google Scholar using the keywords "Health Sector Mobile Technology," and 916 documents were accessed through WoS. These documents were evaluated by researchers within the framework of the intended subject headings. Our research included

research articles and review articles from WoS. The study is based on document reviews. The subject of mobile technology was filtered in both Turkish and English, and sections related to the health sector were accessed through WoS. Relevant documents were filtered, and the focus was particularly on recent studies to inform the reader about current trends in the field.

3. CONCEPTUALLY, ELECTRONIC HEALTH (E-HEALTH), MOBILE HEALTH (M-HEALTH) AND STAKEHOLDERS OF MOBILE HEALTH (KAVRAMSAL OLARAK ELEKTRONİK SAĞLIK (E-SAĞLIK), MOBİL SAĞLIK (M- SAĞLIK) VE MOBİL SAĞLIĞIN PAYDAŞLARI)

In the 1920s, a writer for 'Radio News Magazine' mentioned that a doctor could examine a patient remotely using the radio, marking the first use of mobile applications in healthcare. The initial applications, however, appeared in the 1960s, with applications developed to monitor astronauts' medical conditions from space being the first examples of m-health [8] By the 2000s, the increase in smartphone usage led to the introduction of applications that allowed people to benefit from healthcare services regardless of time and place, activating electronic appointment systems and increasing individuals' health awareness and activities [14] With the widespread use of the internet, people's mobile and digital demands and expectations have increased [15] Smartphones and computers, as powerful devices capable of accessing the internet and running various complex applications, have become attractive and widespread in the global health world [16] Innovations in mobile phone technology are transforming weak and low-performing health information systems into more modern and efficient information systems [17] Digital technologies are leading to the formation of an integrated health system that enhances digital connectivity among patients, healthcare workers, stakeholders, and companies within the health system [18]

M-health is an essential part of electronic health (e-health), which Çoban & Tüysüz [19] define as the use of information and communication technologies to diagnose and treat diseases, increase access to healthcare services, and deliver high-quality, efficient, and effective healthcare services to all stakeholders in the health sector. As the use of mobile technologies increases daily, the significance of m-health within healthcare systems is also growing. Mobile communication technologies are defined as personal and shareable technological devices used to maintain, improve, and enhance individuals' health status [20] M-health refers to the delivery of healthcare services through mobile technologies and communication

tools such as mobile phones, patient monitoring devices, and personal digital assistants [21] Mobile applications are used in various areas, including disease prevention, reduction of risk factors, enhancement of physical activity and quality of life, as well as diagnosis, treatment, feedback, and monitoring. These applications facilitate clinical data collection, record-keeping, and access to medical records anytime and anywhere, providing patients and healthcare professionals with quick and accurate information [14]

Thanks to technological advancements, smartphones have become an integral part of our lives. Nowadays, many institutions offer mobile applications for smartphones to make processes easier and faster. Operating systems have transformed smartphones from mere phones into mini pocket computers. Since these phones operate like computers, the applications developed for them are of critical value. Mobile applications are defined as software that can be downloaded to smart devices and used for a specific field, developed through the innovative transformation of mobile devices. Mobile applications are considered strategic tools in creating behavior change and improving unhealthy behaviors developed due to incorrect habits [22]

According to Giannini [23], mobile technology involves the use of smartphones for communication and documentation in patient care. M-health is a component of e-health. M-health encompasses using and benefiting from basic functions of mobile phones such as voice and short message service (SMS) as well as more complex functions and applications like general packet radio service (GPRS), third and fourth generation mobile telecommunications (3G and 4G systems, and even 5G), global positioning system (GPS), and Bluetooth technology [24] M-health is defined as the practice of medicine supported by portable diagnostic devices. The use of these devices at the point of care is leading to a shift from a healthcare delivery method created by health systems to a remote and patient-generated healthcare delivery method [25] M-health is a term that encompasses network services, medical sensors, mobile computing, and other communication technologies in healthcare [20]

M-health, or more commonly m-health, involves the use of wireless communication devices to support public health and clinical practice [26] The use of mobile and wireless technologies to achieve health goals globally has the potential to transform the delivery of healthcare worldwide. Rapid advancements in mobile technologies and applications are continuously growing with the

integration of m-health into existing e-health services [16] Mobile health (mHealth) is defined by the World Health Organization's (WHO) Global Observatory for eHealth as "medical and public health practice supported by mobile devices, such as mobile phones, patient monitoring devices, personal digital assistants (PDAs), and other wireless devices" [27] Although technological barriers exist, particularly in developing or underdeveloped countries, successful implementation can provide very cheap and effective healthcare services through mobile technologies. Furthermore, the rapid global spread of mobile technology and its use to increase health literacy, especially in rural areas or underdeveloped communities, is also possible. This can lead to the creation of a more informed patient profile and the delivery of high-quality, low-cost, flexible, and beneficial healthcare services.

4. BENEFITS OF MOBILE TECHNOLOGIES TO THE HEALTH SECTOR *(MOBİL TEKNOLOJİLERİN SAĞLIK SEKTÖRÜNE FAYDALARI)*

M-health enables more efficient collection of health data and monitoring of health status using mobile devices to facilitate faster and better treatment and enhance health protection. The mobile devices used include mobile phones, smartphones, tablets, Personal Digital Assistants (PDAs), smartwatches, smart glasses, smart TVs, wearable technologies, and any portable or implanted sensors capable of collecting, measuring, and transmitting medical data. These devices allow for the remote monitoring of medical data, the collection of significant amounts of meaningful data related to lifestyle and daily activities, sending health and treatment reminders, providing alerts, and performing certain diagnostic and therapeutic applications [8]

Figure 1. Benefits of Mobil Technology in Healthcare Application [148]
(Şekil 1. Sağlık Uygulamalarında Mobil Teknolojinin Faydaları [148])

Mobile e-health or m-health is defined by the European Union as the practice of medicine and public health supported by mobile communication devices. These technologies include mobile phones, tablet computers, and PDAs used to directly communicate with healthcare institutions to access health data and information [13]

Considering the opportunities provided by mobile technologies, m-health applications can offer high-quality, low-cost, flexible, and beneficial services. M-health services enable remote monitoring of patients' conditions, making healthcare accessible from any location and at any time [28] M-health is an umbrella term that encompasses network services, mobile programming, medical sensors, and other communication technologies in healthcare [9]

Some of the opportunities and benefits of m-health include [11]: functioning as a communication tool that shares real-time information and messages, acting as a remote monitoring tool that reduces isolation and brings care into the home, serving as a tool that can monitor and report the patient's health status in real-

time, providing a video conferencing feature that allows twoway communication between patients and healthcare professionals, and acting as a companion that motivates and reminds the user to exercise or take their medications.

M-health applications allow patients to track their doctor appointments, meals, heart rate, and exercise. They also provide personalized solutions by offering health/fitness applications suitable for individuals based on their diet, demographics, and activity levels. Some new applications allow patients to upload their prescriptions and order medications to be delivered to their homes, saving time and money from pharmacy visits. Others enable doctors to communicate directly with patients and monitor their vital parameters. Radio frequency technology allows doctors to monitor patients' locations and vital signs (such as blood sugar, blood pressure, body temperature, etc.) in realtime [12]

M-health technologies play a crucial role in the transition to patient-centered healthcare delivery. Mobile technologies can accelerate this transition by defining and directing healthcare services towards a "patient-centered" model, integrating them into the daily lives and healthcare routines of consumers accustomed to communitybased and "ondemand" services [11] General practitioners and public health experts use social media platforms, smartphone applications, and smart objects to collect data in health and medical fields, access and share medical information, deliver healthcare services, and monitor health activities, diseases, and epidemics (Lupton, 2013).

While m-health is a complementary element of healthcare, its impact area is potentially broader than that of traditional healthcare delivery due to the high penetration of mobile phones and the internet. For instance, in rural areas with low populations where doctors, nurses, or midwives may not be available, it is possible to deliver healthcare services to individuals with mobile phones. The target audience of m-health services and the institutions and organizations involved or likely to be involved in this sector include: consumers (patients, patient relatives, and healthy individuals), doctors and healthcare workers, healthcare providers (hospitals, m-health organizations, joint health and safety units, pharmacies, etc.), nursing homes, care homes, home care companies, medical call centers, reimbursement institutions (social security institutions, health insurance companies), private sector organizations, pharmaceutical and medical device companies, and healthrelated nongovernmental organizations [8] It is also useful to refer to these entities as players and stakeholders in the m-health sector.

5. INTEGRATED TECHNOLOGIES AND TOOLS THAT WILL AFFECT THE DEVELOPMENT OF MOBILE HEALTH (MOBİL SAĞLIĞIN GELİŞİMİNİ ETKİLEYECEK ENTEGRE TEKNOLOJİLER VE KULLANIM ARAÇLARI)

M-health applications have the potential to significantly digitize medical care due to their ubiquity and ease of use. Smartphones, for instance, are already being used as practical healthcare tools. They work in conjunction with specialized devices to deploy certain laboratory methods for diagnosing infectious diseases at home or in healthcare centers. They also serve as adapters with electrocardiogram electrodes to transmit data for detecting silent atrial fibrillation [29] In recent years, many devices, such as smartwatches or IoT devices that help monitor patient behaviors, have emerged as supporting elements for m-health services.
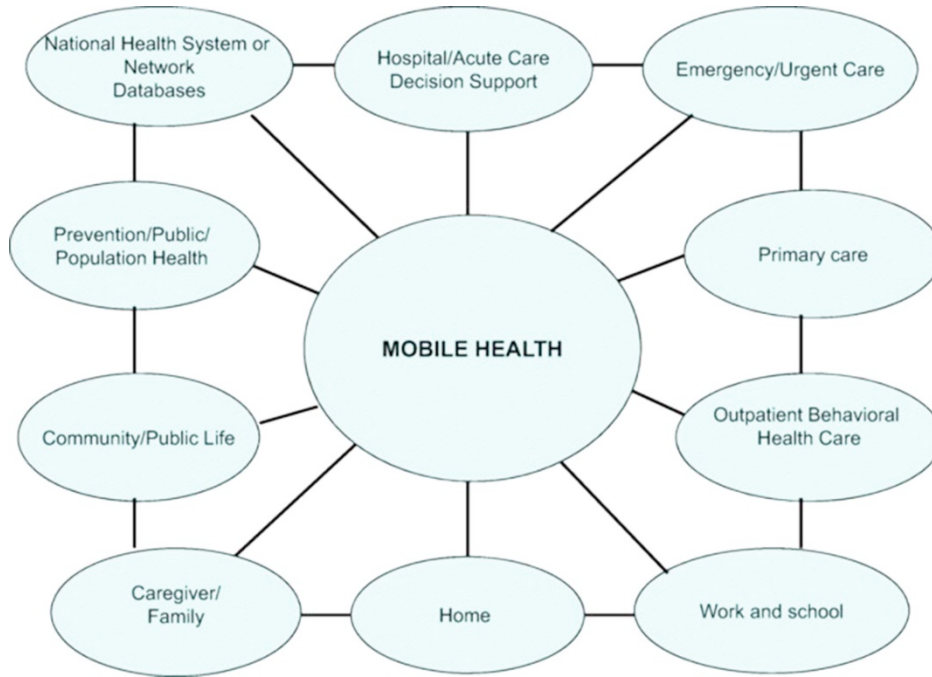
Figure 2. How mobile health, smartphone/device and apps integrate information in the digital age [149]
(Şekil 2. Mobil sağlık, akıllı telefon/cihaz ve uygulamalar dijital çağda bilgiyi nasıl entegre ediyor [149])

The convenience and ease of accessing medical care from anywhere at any time have been made possible by advancements in health informatics, sensor technologies, and mobile devices like smartphones. Central to this approach is the principle of "enabling individuals to lead healthy, quality, and prosperous lives" [12] Technologies expected to influence the development of m-health include the Internet of Things (IoT), cloud computing, big data and big data analytics, gamification, digital twins, blockchain, portable medical devices, wearable technologies, augmented or virtual reality tools, and the metaverse where these technologies come to life. M-health tools include telehealth applications, the use of text messages, patient monitoring introduced by smartphones, tracking applications based on various parameters, and home care service applications [2-5]

The anticipated impacts of m-health can be summarized as follows: better diagnosis and treatment, individuals more engaged with their health and leading healthier lifestyles, increased preventive health practices, more effective monitoring of chronic diseases, a more efficient and sustainable healthcare system, a 30% reduction in time spent by healthcare workers on accessing and analyzing information, and reduced costs due to fewer hospital admissions [8] Nowadays, it can be said that mobile devices have become an indispensable part of our lives. In this context, it is crucial that these devices, which impact every area of our lives, also encompass and promote advancements in critical fields such as the healthcare sector. In developing countries like Turkey, frequent hospital visits can be costly. Therefore, it is more practical and economical for individuals to monitor their own health conditions. An organized health monitoring and data collection system will facilitate patient tracking and add practicality to the diagnosis and treatment processes of diseases [30]

Telehealth services, which provide remote support and assistance, are crucial for people in need, such as patients, the elderly, and vulnerable individuals, and can be considered part of m-health services. These services are delivered through information networks that guarantee timely and always-on service delivery [31] Telehealth is used by health professionals to deliver healthcare services where distance is a critical factor, to diagnose and prevent diseases and injuries, to conduct research and evaluations, and to ensure the necessary exchange of information to improve the health of individuals and communities. Telemedicine is often designed with mobile devices in mind and can be accessed from these devices. Notable telehealth services include teledermatology, telecardiology, teleophthalmology, telepsychiatry, teleradiology, and telesurgery [15].

6. DISADVANTAGES AND BARRIERS TO MOBILE HEALTH APPLICATIONS (MOBİL SAĞLIK UYGULAMALARININ ÖNÜNDEKİ DEZAVANTAJLI DURUMLAR VE BARİYERLER)

It can be stated that the most critical barrier to m-health applications is the proper integration of personal privacy with healthcare services. Personal data are crucial in environments accessible via mobile applications. Each year, the usage of mobile applications has expanded [32] The issue of digital asset inheritance and the processing of personal data through mobile applications, especially during the pandemic, has raised concerns. The processing of health data, which falls under the sensitive personal data category, has become a current topic of debate due to its widespread use for the public health benefit [33]

Although personal privacy is a highly critical area, posing legal challenges for institutions and even governments, and raising concerns about the use of technology for the benefit of patients, data privacy is not the only barrier to the development of mobile technologies. Other obstacles include the cost of mobile technology, technological infrastructure issues, evidence of mobile service effectiveness, regulations and standards, the speed of mobile technology development, low technological literacy in society, and barriers stemming from healthcare providers.

Despite the decreasing cost of technology, payment complexity for m-health technologies remains a significant issue. In m-health technologies, an individual's level of health literacy is crucial when accessing, understanding, and evaluating information. Individuals with low health literacy may not be able to use mobile technologies for their health, creating challenges for m-health. Unfortunately, there are not many outcome measures that prove the power and sufficiency of new technologies or pilot projects. This creates difficulties in proving the effectiveness of mobile technologies. Another challenge is role confusion regarding who will follow up on the developed application and how it will be monitored [21] Additionally, Silva et al. [34] highlighted shortcomings in m-health, such as battery and storage capacity issues, interference, connection disruptions, and privacy concerns due to the constant need for internet connectivity.

Atalay et al. [14] emphasized that mobile technologies and m-health applications, due to their access to personal information, must prioritize security and privacy. They stressed the importance of increasing digital literacy in society, raising patients' awareness and usage patterns, and recognizing the risks of using health applications for nutrition and exercise programs without professional support for individuals with physical problems and chronic diseases. Therefore, raising awareness and improving literacy in primary healthcare services is a critical aspect of addressing these problems.

As observed, the usage of e-health services is not widespread due to information and financial inadequacies, limited technical access, resource constraints, and a shortage of qualified professionals [1] Hence, human resources are also crucial at this point. Developing human resources aligned with current realities and initiating programs related to health in this context are seen as significant and valuable [3-4] To prevent the uncontrolled processing of personal data and potential risks, it is necessary to regulate and protect personal data and personality rights processed through smartphones and particularly mobile applications [33] Making patients' health information readily accessible poses security risks, which could negatively impact healthcare services. For the system to function correctly, the privacy of patient information must be prioritized, and necessary precautions should be taken [35] To ensure the security of health data on mobile platforms, it is essential first to secure the devices running the applications. Mobile users must prevent unauthorized access to their devices and use the access control mechanisms available on their devices. To achieve the desired outcomes from mobile applications, it is necessary to prioritize usability and user satisfaction by presenting information ergonomically with a minimalist approach, while addressing essential elements like device, application, and communication security in the designs [36]

7. DISCUSSION AND CONCLUSION (TARTIŞMA VE SONUÇ)

In our research, we observed that studies could be categorized under various headings. These prominent headings are discussed in detail below. Our analysis revealed that the use and studies of mobile technology in healthcare could be classified into 16 different categories. This evaluation, specifically conducted within the scope of Web of Science studies, can be described as the most comprehensive review in the literature on m-health. Each category is detailed below, providing a comprehensive evaluation for both domain readers and policymakers.

7.1. Gamification in Mobile Healthcare Services (Mobil Sağlık Hizmetlerinde Oyunlaştırma)

Gamebased learning uses actual games to teach knowledge and skills. A learning game is an independ-

ent unit with a definite beginning, gameplay, and end [37] It is anticipated that games and mobile applications can positively influence people's attitudes and behaviors toward diseases. An examination of the m-health application market reveals the presence of numerous applications. Recently, it has been observed that applications incorporating gamification have increasingly gained prominence in the m-health market. During the gamification process, users are provided with an active experience and are encouraged to engage more with the application. This process is structured according to the user's choices and characteristics [9] Gamification has emerged as a trend in various sectors, including business, organizational management, inservice training, health, social policy, and education [38]

In his study, Duğan [39] found that gamification applications could yield positive results in areas such as quitting smoking, combating obesity, exercising regularly, preparing balanced diet plans, adhering to hygiene rules, and brushing teeth. However, challenges such as the difficulty of adapting people from all walks of life to digital tools, concerns about increasing digital addiction, and inadequate internet and technology infrastructure are among the primary issues perceived negatively. In this context, it is emphasized that gamification in health is recognized as an important tool to support and maintain positive behavioral changes in individuals' health behaviors.

In the context of games offered for healthcare, various theories enable game researchers and designers to create desired health messages within the game. While games consist of different game mechanics coming together, it is assumed that promising health games will adhere to behavioral theory [40] In the literature, mobile applications focusing on gamification are frequently encountered. For example, the design and evaluation of a multisensory scaffolded gamified science lesson with mobile technology for totally blind students [41] and learning histology through gameased learning with mobile technology [42] are noteworthy examples.

7.2. Mobile Health and Nursing *(Mobil Sağlık Ve Hemşirelik)*

With the increasing use of mobile technologies, the role of m-health within healthcare systems is becoming increasingly significant. M-health is defined as the provision of healthcare services through mobile technologies and communication tools, such as mobile phones, patient monitoring devices, and personal digital assistants. It is believed that m-health will lead to significant advancements in raising public awareness about diseases, guiding and encouraging

individuals to maintain and protect their health. The use of mobile technologies in the healthcare system will also provide substantial advantages in effectively carrying out nursing services [21]

Mobile technology services offer benefits in nursing care processes [23] by enhancing nursing practice through the effective use of mobile technology, contributing to mobile learning, and supporting continuous professional development [43] According to Raman [44], while considerable efforts have been made to incorporate mobile technology into nursing curricula, nursing educators should be encouraged to develop strategies to address the identified concerns. Examples of mobile technology applications in nursing education include training in intensive care units [45], the use of mobile technology in clinical nursing education [46], and the use and effectiveness of mobile devices in the operating room for nursing practice [47]

7.3. Mobile Health, Hospital and Disaster Management in Terms of Corporate Mobile Health Services *(Kurumsal Mobil Sağlık Hizmetleri Açısından Mobil Sağlık, Hastane Ve Felaket Yönetimi)*

In countries prone to earthquakes, such as Turkey, the importance of mobile technologies becomes even more critical. For instance, during the Maraş earthquake, the collapse of buildings led to a significant communication problem due to the failure of mobile network equipment installed on these structures, affecting both citizens and authorities. Mobile technologies emerge as a crucial tool in saving lives during various natural disasters such as earthquakes, floods, and avalanches. The use of information and communication technologies (ICT) aids in better decisionmaking and information production for an effective disaster management system. ICTs help reduce vulnerability, enable active participation, ensure information access, enhance adaptation capacity, and support feedback. Mobile-based technologies are employed to meet needs and enhance disaster resilience [48] Additionally, Geographic Information Systems (GIS) play a crucial role throughout all stages of disaster management, from predisaster planning to response and recovery. GIS has become a critical tool for decision support and information management in disaster management. In disaster management processes, especially in post-disaster interventions, organizational shortcomings and supply chain disruptions highlight the need for effective intervention management [49] Furthermore, m-health service technology has the potential to

improve communication and clinical information management during disasters [50].

The advancement of mobile technologies is therefore of critical value and importance. Mobile technologies can provide significant support to public institutions and facilitate their operations in the face of natural disasters. They can also be crucial for healthcare institutions in delivering health services, preventive and protective treatments, and various forms of education. A review of the literature reveals studies focused on mobile technology applications such as reporting health data in waiting rooms [51], improving healthcare quality and patient quality of life [52], and the analysis of mobile technology policies [53] Other notable applications include integrating mobile technologies into public health practices [54], reporting within hospitals for families and patients [55], using mobile technology in disasterprone areas like earthquakes, tsunamis, and liquefaction events [56], supporting communication and care management among healthcare providers [57], and using mobilebased information and communication technologies in hospital clinics [58]

7.4. Use of Mobile Technology in Clinical Services
(Klinik Hizmetlerde Mobil Teknolojinin Kullanımı)

Due to the high demand for healthcare services, there are often instances where the needs of individuals cannot be met, leading stakeholders in the healthcare system to explore alternative solutions. The rise in chronic diseases, the increasing elderly population, and the growing number of individuals requiring healthcare services worldwide and in Turkey have prompted the development of new models for delivering healthcare services. In this context, m-health applications appear to be a solution to many of the challenges faced by healthcare systems and hospitals. Approximately 80% of healthcare managers have indicated that mobile communication technologies have the potential to be a valuable tool for delivering healthcare services [35]

In clinical studies, the successful adoption of mobile technology is noted to have three primary advantages over traditional clinical methods: more streamlined operational processes, remote data capture, and improved quality of collected studies and data [59] Additionally, mobile technology helps better understand treatment adherence [60] Remote monitoring of outpatients and inpatients, including monitoring vital signs and timely communication with healthcare providers, is crucial for both healthcare professionals and patients [61] The literature also highlights studies on the use of mobile technology to improve surgical outcomes in the perioperative setting [62], mobile applications for measuring physical activity and sedentary behavior in bariatric surgery patients [63], medication adherence and the use of mobile technology among patients with chronic conditions who do not receive services [64], smoking cessation [65], and patient acceptance of mobile technology in healthcare services [66]

7.5. Healthcare Sector and Wearable Technologies
(Sağlık Sektörü Ve Giyilebilir Teknolojiler)

Among the mobile devices used are cell phones, smartphones, tablets, PDAs (Personal Digital Assistants), smartwatches, smart glasses, smart TVs, wearable technologies, and any portable or implanted sensors capable of collecting, measuring, and transmitting medical data. With all these devices, it is possible to remotely monitor medical data, collect large amounts of meaningful data related to lifestyle and daily activities, and provide reminders about health and treatment[8] Many sensorbased electronic devices also fall into this category. The Internet of Things (IoT) has become a frequently encountered concept in our daily lives. IoT refers to a general term for devices that can send and receive data via the internet. This concept describes products capable of sending and receiving information using the internet. Through the integration of objects with each other and with the human body, wearable technological products have emerged since 2015 and have gained increasing popularity over time. These products have become one of the most significant elements in our lives after smartphones. Currently, wearable technology is one of the most frequently encountered and popular concepts among new technologies [67]

The importance of GPS and wearable technologies has notably increased in recent years. With advancements in mobile technologies and the growing number of mobile users, new opportunities for using cell phones in patient care have emerged. Information and communication technologies, enhanced by the Internet of Things (IoT), have been effective in integrating various areas of the healthcare sector with mobile technology. Consequently, technology has the potential to be a powerful medical tool supporting the healthcare sector at every level [68] For example, literature studies have shown that wearable devices and mobile technologies can be used to support behavioral weight loss in individuals with mental health conditions [69]

7.6. Mobile Learning, Use of Mobile Technology in the Education of Patients and Health Professionals
(Mobil Öğrenme, Mobil Teknolojinin Hasta ve Sağlık Uzmanlarının Eğitiminde Kullanımı)

Mobile technology (such as tablets, smartphones, and wearable devices) has the potential to play a valuable role in promoting academic learning. Mobile technology for learning offers exciting potential to support academic learning everywhere and anytime, provide personalized monitoring and counseling, and enable microlearning, where students can learn in small increments as opportunities arise [70] The literature reveals a variety of applications serving different purposes, including patient education, training for health professionals within institutions, inhouse and external training programs, student education, and periodic patient education for chronic illness management. Examples of such applications include: the use of mobile technology in students' clinical internships [71], personalized sexual assault prevention in military classroom settings [72], the use of mobile technology in undergraduate nursing programs [73], mobile technologies used to support health professionals' education and practice [74], the role of mobile technology in education [75], the use of mobile technologies in nursing education and practice [76], mobile technologies in medical education [77], the use of mobile technology for evaluating professional activities in undergraduate medical education [78], the use of mobile technology in clinical nursing education [46], and mobile applications to improve and manage sexual health for university students [79] These studies represent significant research in the relevant field as identified in the literature.

7.7. Mobile Technology and Community Health Services *(Mobil Teknoloji Ve Toplum Sağlığı Hizmetleri)*

Mobile devices, which play a crucial role in simplifying daily life, also serve an important function in the individual tracking and organization of health data. Smart health applications integrated into our lives through mobile app download portals offer convenience in areas such as reproductive health, healthy eating, disease monitoring, physical activity, and the maintenance of personal health records. There are smart applications developed both by individuals or private institutions, as well as by government entities. These governmentdeveloped applications assist individuals in managing appointment processes with public hospitals and contribute to the maintenance of various health records by the state [80]

Applications focusing on public health are particularly prominent in the literature. Examples include applications for effective family planning, smoking cessation, pregnancy monitoring, skin cancer, various cancer screenings, and mental health. For instance, studies include applications for community

health work and pregnancy monitoring [81], monitoring gestational diabetes using common mobile technology solutions [82], supporting breastfeeding through mobile applications [83], mental health services for depression management [84], applications for prostate cancer [85], genetic counseling for ovarian cancer patients [86], mobile-based patient education for earlystage breast cancer [87], mobile technology-assisted applications for family planning [139], skin cancer prevention applications [140], mobile applications for rural healthcare [141], and the use of mobile technology for epidemiological research [142] These studies illustrate the diverse applications of mobile technology in improving primary healthcare delivery, preventive treatments, and increasing health literacy and public awareness, especially in underdeveloped and developing countries.

7.8. Active Patient Monitoring, Consultation and Use of Mobile Technology *(Aktif Hasta İzleme, Danışmanlık Ve Mobil Teknolojinin Kullanımı)*

It is crucial for doctors to know whether their patients adhere to the prescribed instructions and to monitor them with accurate feedback. Active patient monitoring, providing timely and accurate data, and offering precise commands for disease management are essential aspects of the treatment process. The literature reveals numerous studies exploring the use of mobile technology in this context. For example, applications for diabetes monitoring [143-144], medication reminders, physical activity pedometers, regular sleep tracking, and interventions for managing HIV health outcomes [145] are notable. Mobile technology has also been utilized for diagnosing skin diseases [146], early detection of cognitive decline [147], prostate cancer management [85], genetic counseling for women with ovarian cancer [86], mobilebased patient education for early-stage breast cancer [87], postoperative care transitions [88], cervical cancer screening [89], selfmanagement support in chronic obstructive pulmonary disease [90], pilot structured mobile technology-based lifestyle interventions for liver disease patients [91], childhood disease management using mobile technology [92], and maternal and child health care services [93] Additionally, mobile applications for combating obesity in children and adolescents [94] have been highlighted in the literature.

Moreover, mobile technology is recognized as a critical, cost-effective tool with ease of use in healthcare, necessary for supporting daily self-management of chronic diseases [95] Alongside these applications, mobile technology has been used to improve surgical outcomes in the perioperative environment [62], measure physical activity and

sedentary behaviors in bariatric surgery patients [63], and enhance medication adherence and mobile technology use among patients with chronic conditions [64], marking important contributions to the field.

7.9. Mobile Technology, Its Use in the Field of Health for Young People and Children *(Mobil Teknoloji, Gençler ve Çocuklar İçin Sağlık Alanında Kullanımı)*

Children and adolescents have always represented a demographic with significant healthcare needs. The use of mobile technology for this demographic can be highly beneficial due to their advanced health literacy that parallels their technology literacy. They are adept at following current technological tools and applications and integrating them into their lives in ways that align with healthcare system requirements.

An examination of international literature reveals numerous applications and research focused on the use of mobile technology for children and adolescents. For instance, mobile technology is noted for its impact on posture and musculoskeletal health during the use of information and communication technologies by children [96] Examples include the use of mobile technology in child and adolescent psychiatry [97] applications highlighting potential benefits in pediatric urology [98], real-world continuous physiological monitoring applications in pediatric cardiomyopathy patients [99], asthma care applications for adolescents [100], management of childhood diseases using mobile technology [92], maternal and child health services applications [93], mobile applications for combating obesity in children and adolescents [94], hearing and vision screening applications for preschool children [101], mobile applications for asthma symptoms in adolescents [102], and care applications for children and adolescents with cancer [103]

7.10. Use of Mobile Technology in Healthcare for Elderly Care *(Mobil Teknolojinin Yaşlı Bakımı İçin Sağlık Alanında Kullanımı)*

Aging is a period in which individuals withdraw from work and social life, experience a decline in physical strength, and face increased dependency due to reduced adaptability to their external environment. During this stage, the deterioration of the immune system heightens susceptibility to diseases and the need for medication [104] The elderly population often encounters numerous challenges in meeting their needs and does not have easy access to healthcare services as healthy individuals do. Additionally, the global population, particularly in developed countries,

is aging, making the elderly a distinct demographic group. In this context, mobile technologies hold significant potential for enhancing the accessibility of healthcare services.

A review of the literature reveals several mobile applications developed specifically for the elderly across various topics. Examples include: a warning system to notify the elderly or their caregivers about any deterioration in health status [105], a mobile application for fall prevention in the elderly [106], cancer prevention and screening applications for middle-aged and older individuals using mobile technology [107], the use of mobile technology to assess balance during the sit-to-stand maneuver in elderly adults at risk of falling [108], m-health applications to improve self-care in elderly adults [109], the application of mobile devices for personal caregivers in elderly care [110], m-health applications for aging populations [111], heart failure education applications for middle-aged and elderly adults [112], and the use of mobile technology in elderly adults with heart failure [113] These applications are prominent in the Web of Science literature

7.11. Mobile Technology and Access to Disabled Citizens *(Mobil Teknoloji Ve Engelli Vatandaşlara Erişim)*

In Health is a fundamental human right inherent from birth. In the Universal Declaration of Human Rights, adopted in 1948, the right to medical care is defined as "access to health services regardless of age, gender, or economic status." Individuals with disabilities must also have access to healthcare services without any discrimination. The Convention on the Rights of Persons with Disabilities by the United Nations further emphasizes this as a defined right [114] In this context, mobile technology emerges as an opportunity to provide healthcare services to individuals with disabilities.

Mobile technology has the potential to assist individuals with mental disabilities in establishing and maintaining social connections in crucial areas of their lives, such as family, friends, and work/volunteering. Research has validated this potential [115] Similar benefits apply to individuals with other types of disabilities, such as those with autism spectrum disorders [116] Examples of applications in this domain include the development of mobile alert and navigation systems for visually impaired individuals [117], disabled-friendly mobile services in the context of smart tourism [118], radio frequency technology-based computational applications for accessibility analysis in sustainable cities [119], and the use of

mobile learning in tolerance training content for visually impaired students [120]

According to Jones et al. [121], there is currently limited knowledge about the state of m-health services for individuals with disabilities. Initial findings suggest that people with disabilities are not well represented in the growth of m-health services and particularly in the proliferation of m-health software applications for smartphones. The underrepresentation and neglect of people with disabilities in the m-health field may lead to greater health inequities. To address this disparity, they propose several solutions: (1) research: identifying the primary needs of individuals with disabilities, particularly those facing health inequities, for m-health application development; (2) development: designing, distributing, and validating new m-health solutions that address the most urgent needs of individuals with disabilities; and (3) knowledge translation: assisting consumers and healthcare providers in identifying accessible and effective m-health applications that address health inequities and improve health outcomes for individuals with disabilities [121]

7.12. Mobile Health Specifically for Personal Applications and Personal Health Services *(Kişisel Uygulamalar Ve Kişisel Sağlık Hizmetleri Özelinde Mobil Sağlık)*

Often, both private companies and individuals design personal applications to attract people's interest, focusing on tracking weight, exercise habits, walking, and sports activities. These applications may also include preventive health information. Such applications can be easily downloaded for personal use from the Apple Store or Android Market, independent of public institutions. Users can acquire these apps for a small fee and use them to manage their personal health activities more effectively. In some cases, these applications may be developed by institutions related to national health policies.

A review of the literature reveals a notable emphasis on applications related to nutritional habits. Obesity is a global epidemic with significant health impacts and costs. Mobile technologies can potentially influence weight loss and shape personal behaviors through mobile software [122] Mobile technology provides innovative methods for healthy eating interventions [123] It has been suggested that mobile technology-based interventions can facilitate healthy eating, particularly among university students with higher body mass indices [124] Consequently, numerous applications in this domain have been developed.

7.13. Mobile Health Focused on Disease and Epidemic Surveillance *(Hastalık Ve Salgın Gözetimi Odağında Mobil Sağlık)*

COVID-19 has been a pandemic that deeply affected the entire world, becoming an international emergency. Digital solutions have proven to be effective tools for managing, preventing, and overcoming the spread of infectious disease outbreaks. Consequently, the use of m-health technologies has shown potential in supporting public health, and these technologies appear to have played a positive role during the COVID-19 pandemic. Research indicates that m-health applications for COVID-19 can be categorized into four areas: prevention, diagnosis, treatment, and protection [125] For example, "Hayat Eve Sığar" is a mobile application developed by the Turkish Ministry of Health to inform, guide, minimize potential risks related to the outbreak, and prevent its spread [126]

Healthcare systems operate through communication to deliver all health services in any environment. Establishing a connection between healthcare providers and patients is a fundamental requirement. Mobile technologies have become important tools in combating chronic diseases and controlling epidemics [68] Additionally, mobile technology can assist in mapping the spread of diseases similar to COVID-19 and provides an easy way to promote awareness, encourage safety, and adopt necessary measures to reduce and halt community transmission [127]

Table 2. Important Topics About Mobil Health and Technologies and Trend Publications of Related Topics
(Tablo 2. Mobil Sağlık ve Teknolojileri Hakkında Önemli Başlıklar ve İlgili Konulara Ait Trend Yayınlar)

Rank	Topics	Publications
1	Gamification in Mobile Healthcare Services	[9], [37], [38], [39], [40], [41], [42]
2	Mobile Health and Nursing	[21], [23], [43], [44], [45], [46], [47]
3	Mobile Health, Hospital and Disaster Management in Terms of Corporate Mobile Health Services	[48], [49], [50], [51], [52], [53], [54], [55], [57], [58]
4	Use of Mobile Technology in Clinical Services	[35], [60], [61], [62], [63], [64], [65], [66]
5	Healthcare Sector and Wearable Technologies	[67], [68], [69]
6	Mobile Learning, Use of Mobile Technology in the Education of Patients and Health Professionals	[46], [70], [71], [72], [73], [74], [75], [76], [77], [78], [79]
7	Mobile Technology and Community Health Services	[80], [81], [82], [83], [84], [85], [86], [87], [139], [140], [141], [142]

8	Active Patient Monitoring, Consultation and Use of Mobile Technology	[62], [63], [64], [85], [86], [87], [88], [89], [90], [91], [92], [93], [94], [95], [143], [144], [145], [146], [147]
9	Mobile Technology, Its Use in the Field of Health for Young People and Children	[92], [93], [94], [96], [97], [98], [99], [101], [102], [103]
10	Use of Mobile Technology in Healthcare for Elderly Care	[104], [105], [106], [107], [108], [109], [110], [111], [112], [113]
11	Mobile Technology and Access to Disabled Citizens	[114], [115], [116], [117], [118], [119], [120], [121]
12	Mobile Health Specifically for Personal Applications and Personal Health Services	[122], [123], [124]
13	Mobile Health Focused on Disease and Epidemic Surveillance	[68], [125], [126], [127]
14	Other Featured Applications in Mobile Health Services	[2], [5], [60], [128], [129], [130], [131], [132], [133], [134], [135], [136], [137]
15	Obstacles in the Health Sector in the Development of Mobile Technology	[8], [12], [33], [131]

7.14. Other Featured Applications in Mobile Health Services *(Mobil Sağlık Hizmetlerinde Öne Çıkan Diğer Uygulamalar)*

In In addition to the applications mentioned above, mobile applications in various other domains also emerge. Mobile technology can enhance understanding of treatment adherence, and applications can be developed for this purpose [60] Another example includes applications related to immune system and vaccination monitoring [128] Mobile technology enables the reporting of adverse events following immunization [128] Mobile applications also have the potential to influence vaccination behavior, including timely immunization [129]

Mobile technologies are revolutionizing the field of mental health, with significant advancements particularly in addiction research and treatment [130] They are increasingly used to measure individuals' moods, thoughts, and behaviors in realtime. Current examples include the use of smartphones to collect ecological momentary assessments; wearable technologies for passive collection of objective measures of movement, physical activity, sleep, and physiological responses; and smartphones and wearables equipped with global positioning system (GPS) features to gather precise information about participants' locations [131]

A review of the Web of Science literature reveals other notable applications, such as e-mental health mobile applications [132], telemedicine integrated with mobile applications, obesity management, personal care, continuous assistance, and improved medication management [133] Additionally, emerging topics include the use of metaverse technology for the future of healthcare [2,5,134], digital twin technology [135], and blockchain technology [136-137]

7.15. Obstacles in the Health Sector in the Development of Mobile Technology *(Mobil Teknolojinin Gelişiminde Sağlık Sektöründeki Engeller)*

Ethical and legal issues have emerged as significant concerns in m-health. While advancements in mobile technology offer exciting opportunities to measure and model individuals' experiences in natural settings, they also bring forth new ethical dilemmas [131] The compliance of personal data, particularly health data, with legal standards [33] represents a critical issue in the implementation of mobile technologies.

In addition to data protection, several major obstacles hinder the m-health market. These include the lack of substantial effect/benefit analyses due to the novelty of applications, insufficient pilot projects, the need for significant behavioral changes among doctors and patients, an underdeveloped ecosystem, a lack of standards, data security and privacy concerns, and financial challenges. From a Turkish perspective, it is observed that m-health applications and the market are still in their infancy, lacking sustainable business models and financial solutions that address societal goals. However, efforts are being made by the Ministry of Health and the Social Security Institution to develop institutional solutions. Local governments, particularly municipalities, have implemented various health and disease management applications in their regions. Additionally, a limited number of m-health companies, including mobile communication operators, are providing services with different solutions in the market. Furthermore, patients with no time to wait at doctors' offices, doctors with insufficient time for their patients, device manufacturers wanting to monitor device performance, pharmaceutical companies ensuring

correct and timely medication usage, and hospitals unable to invest in additional bed capacity can all benefit significantly from these services. M-health can also be utilized for marketing purposes; for example, the "e-appointment" application allows healthcare providers to increase patient volume and reduce costs [8]

Digital technologies offer numerous opportunities to shape the future of primary healthcare services and deliver effective public health actions. They are driving digital transformation in health education, policies, and practices, creating new models for health communication, system strengthening, and patient engagement. Efforts by governments to support the use of digital technologies in health systems also promote the development of digital health systems. The vision of providing equitable services across all segments of society places digital technologies at the core of health systems [12]

REFERENCES *(KAYNAKLAR)*

[1] Coşkun, M. B. (2018). Türk Kamu Yönetimi Perspektifinden E-Sağlık Hizmetleri Ve Sağlık Politikalarındaki Yeri Üzerine Bir İnceleme. Journal of Management and Economics Research, 16(1), 289-302.

[2] Damar, M. (2021). Metaverse shape of your life for future: A bibliometric snapshot. Journal of Metaverse, 1(1), 1-8.

[3] Damar, M. (2022a). Dijital Dünyanın Dünü, Bugünü Ve Yarını: Bilişim Sektörünün Gelişimi Üzerine Değerlendirme. Nevşehir Hacı Bektaş Veli Üniversitesi SBE Dergisi, 12(Dijitalleşme), 51-76.

[4] Damar, M. (2022b). Dijital çağda bilişim sektörünün ihtiyacı olan yetkinlikler üzerine bir değerlendirme. Journal of Information Systems and Management Research, 4(1), 25-40.

[5] Damar, M. (2022c). What the literature on medicine, nursing, public health, midwifery, and dentistry reveals: An overview of the rapidly

approaching metaverse. Journal of Metaverse, 2(2), 62-70.

[6] Kushchu, I., & Kuscu, H. (2003). From E-government to M-government: Facing the Inevitable. In the 3rd European Conference on e-Government (pp. 253-260). MCIL Trinity College Dublin Ireland.

[7] Damar, M, & Çiçek, O. (2023). Kavramsal Olarak Dijital Dönüşüm Ve Sağlık Sektörüne Yansımaları. Editör, Prof. Dr. Ahmet Özen, Doç. Dr. Muhammet Damar. Dijital Dönüşüm Ve Değişen Uygulamalar. İstanbul: Efe Akademi.

[8] Tezcan, C. (2016). Sağlığa Yenilikçi Bir Bakış Açısı: Mobil Sağlık. İstanbul: TÜSİAD. https://afyonluoglu.org/PublicWebFiles/ict/TUSI AD/2016-03%20TUSIAD-Mobil%20Sağlık%20Raporu.pdf

[9] Güler, Ö. G. E. (2015). Mobil sağlık hizmetlerinde oyunlaştırma. Açıköğretim Uygulamaları ve Araştırmaları Dergisi, 1(2), 82-101.

[10] Kılıç, T. (2017). e-Sağlık, iyi uygulama örneği; Hollanda. Gümüşhane Üniversitesi Sağlık Bilimleri Dergisi, 6(3), 203-217.

[11] Greenspun, H., & Coughlin, S. (2012). mHealth in an mWorld: How mobile technology is transforming health care. Deloitte Center for Health Solutions. https://www2.deloitte.com/content/dam/Deloitte/ us/Documents/life-sciences-health-care/us-lhsc-mhealth-in-an-mworld-103014.pdf

[12] Şimşir, İ., & Mete, B. (2021). Sağlık hizmetlerinin geleceği: Dijital sağlık teknolojileri. Journal of Innovative Healthcare Practices, 2(1), 33-39.

[13] Currie, W. L., & Seddon, J. J. (2014). Social innovation in public health: can mobile technology make a difference?. Information Systems Management, 31(3), 187-199.

[14] Atalay, E. S., Uyaroğlu, M. B., Koyutürk, G., & Akçay, S. (2022). Mobil teknolojilerin sağlıkta kullanımı. Bandırma Onyedi Eylül Üniversitesi Sağlık Bilimleri ve Araştırmaları Dergisi, 4(1), 67-75.

[15] Uysal, B., & Ulusinan, E. (2020). Güncel Dijital Sağlık Uygulamalarının İncelenmesi. Selçuk Sağlık Dergisi, 1(1), 46-60.

[16] Özdemir, C., & Şendir, M. (2020). Hemodiyaliz hastalarında fistül bakımı ve mobil sağlık uygulamaları. Nefroloji Hemşireliği Dergisi, 15(3), 251-259.

[17] Zhang, X. Y., & Zhang, P. Y. (2016). Mobile technology in health information systems: A review. Eur Rev Med Pharmacol Sci, 20(10), 2140-2143.

[18] Hudes, M. K. (2017, February). Fostering innovation in Digital Health a new ecosystem. In 2017 Pan Pacific Microelectronics Symposium (Pan Pacific) (pp. 1-6). IEEE.

[19] Çoban, Ç., & Tüysüz, M. F. (2019). E-Sağlık ve Güvenlik: Riskler, Fırsatlar ve Çözüm Önerileri. Academic Perspective Procedia, 2(3), 925-934.

[20] Liu, C., Zhu, Q., Holroyd, K. A., & Seng, E. K. (2011). Status and trends of mobile-health applications for iOS devices: A developer's perspective. Journal of Systems and Software, 84(11), 2022-2033.

[21] Ardahan, M. & Akdeniz, C. (2018). Mobil sağlık ve hemşirelik. Sürekli Tıp Eğitimi Dergisi, 27(6), 427-433.

[22] Burke, L. E., Styn, M. A., Sereika, S. M., Conroy, M. B., Ye, L., Glanz, K., ... & Ewing, L. J. (2012). Using mHealth technology to enhance self-monitoring for weight loss: a randomized trial. American journal of preventive medicine, 43(1), 20-26.

[23] Giannini, R. C. (2022). The Inpatient Nursing Leadership Perspective of Using Mobile Technology at the Bedside. CIN: Computers, Informatics, Nursing, 40(11), 763-768.

[24] WHO, (2011). mHealth New horizons for health through mobile Technologies. Erişim Tarihi: 02/07/2024.https://iris.who.int/bitstream/handle/10665/44607/9789241564250_eng.pdf?sequence=1&isAllowed=y

[25] Kumar, S., Nilsen, W. J., Abernethy, A., Atienza, A., Patrick, K., Pavel, M., ... & Swendeman, D. (2013). Mobile health technology evaluation: the mHealth evidence workshop. American journal of preventive medicine, 45(2), 228-236.

[26] Kahn, J. G., Yang, J. S., & Kahn, J. S. (2010). 'Mobile'health needs and opportunities in developing countries. Health affairs, 29(2), 252-258.

[27] Bradway, M., Carrion, C., Vallespin, B., Saadatfard, O., Puigdomènech, E., Espallargues, M., & Kotzeva, A. (2017). mHealth assessment: conceptualization of a global framework. JMIR mHealth and uHealth, 5(5), e7291.

[28] Özdamar Keskin, N., (2010). Akıllı telefonlar ve tablet cihazlar için geliştirilen mobil sağlık uygulamalarına genel bakış. İçinde T. V. Yüzer, G. T. Yamamoto, ve U. Demiray Türkiye'de e-Öğrenme: Gelişmeler ve Uygulamalar IV (ss. 243-261). Eskişehir: Anadolu Üniversitesi.

[29] Black, A. D., Car, J., Pagliari, C., Anandan, C., Cresswell, K., Bokun, T., ... & Sheikh, A. (2011). The impact of eHealth on the quality and safety of health care: a systematic overview. PLoS medicine, 8(1), e1000387.

[30] Hayıt, T., & Ergün, U. (2016). Sağlık Sektöründe Geliştirilen Mobil Uygulamaların İncelenmesi Ve Mobil Cihazlar İçin Hasta Takip Uygulaması Örneği. : Online Academic Journal of Information Technology, 3-18.

[31] Keskin, H. G., & Özhelvacı, İ. (2022). Tele sağlık sistemi ve hemşirelik. Paramedik ve Acil Sağlık Hizmetleri Dergisi, 3(1), 36-45.

[32] Daçe, R., & Nardalı, S. (2021). Markaların Mobil Uygulamalarının Satın Alma Eğilimi Üzerine Etkisi Ve Starbucks Örneği. Journal of Business Innovation and Governance, 4(1),12-26.

[33] Ibrahim, M. A. K., & Gökdaş, E. F. (2024).Büyük Veri Ve Mobil Uygulamalarda İşlenen Kişisel Verilerin (Sağlık Verileri) Hukuka Uygunluk Sorunu. Adalet Dergisi, (72), 543-570.

[34] Silva, B. M., Rodrigues, J. J., Canelo, F., Lopes, I. M., & Lloret, J. (2019). Towards a cooperative security system for mobile-health applications. Electronic Commerce Research, 19, 629-654. https://doi.org/10.1007/s10660-018-9296-9

[35] Demir, H., & Arslan, E. T. (2017). Mobil sağlık uygulamalarının hastanelerde kullanılabilirliği: hastane yöneticileri üzerine bir araştırma. Karamanoğlu Mehmetbey Üniversitesi Sosyal ve Ekonomik Araştırmalar Dergisi, 19(33), 71-83.

[36] Kutlay, A., Özgiray, S., Yücecengiz, I., Öztörün, S., & Yaldız, B. (2016). Kurumsal mobil sağlık bilgi sistemi: yaklaşım ve deneyimler. 10th Turkish National Software Engineering

Symposium. Canakkale, Turkey, October 24-26, 2016.

[37] Kapp, K. M. (2012). What is gamification. The gamification of learning and instruction: game-based methods and strategies for training and education, 1-23. Erişim Tarihi: 09/07/2024. https://www.cedma-europe.org/newsletter%20articles/Clomedia/Gamification%20-%20Separating%20Fact%20from%20Fiction%20(Mar%2014).pdf

[38] Caponetto, I., Earp, J., & Ott, M. (2014, October). Gamification and education: A literature review. In European conference on games based learning (Vol. 1, p. 50). Academic Conferences International Limited.

[39] Duğan, Ö. (2022). Dijital Çağda Öğrenme Aracı Olarak Oyunlaştırmanın Sağlık Okuryazarlığı Üzerindeki Rolü. TRT Akademi, 7(14), 262-285.

[40] Michie, S., & Prestwich, A. (2010). Are interventions theory-based? Development of a theory coding scheme. Health psychology, 29(1), 1-8.

[41] Chang, C. H. S., Kuo, C. C., Hou, H. T., & Koe, J. J. Y. (2022). Design and evaluation of a multi-sensory scaffolding gamification science course with mobile technology for learners with total blindness. Computers in Human Behavior, 128, 107085.

[42] Rojas-Mancilla, E., Conei, D., Bernal, Y. A., Astudillo, D., & Contreras, Y. (2019). Learning histology through game-based learning supported by mobile technology. International Journal of Morphology, 37(3).

[43] Mather, C. A., Gale, F., & Cummings, E. A. (2017). Governing mobile technology use for continuing professional development in the Australian nursing profession. BMC nursing, 16(17), 1-11.

[44] Raman, J. (2015). Mobile technology in nursing education: where do we go from here? A review of the literature. Nurse education today, 35(5), 663-672.

[45] Ghafari, S., Yazdannik, A., & Mohamadirizi, S. (2020). Education promotion based on "mobile technology" in the critical care nursing department: Four-phase intervention. Journal of Education and Health Promotion, 9(1), 325.

[46] O'connor, S., & Andrews, T. (2015). Mobile technology and its use in clinical nursing education: a literature review. Journal of Nursing Education, 54(3), 137-144.

[47] Sergeeva, A., Aij, K., Van den Hooff, B., & Huysman, M. (2016). Mobile devices in the operating room: Intended and unintended consequences for nurses' work. Health informatics journal, 22(4), 1101-1110.

[48] Tarhan, Ç., & Aydın, C. (2017). Bilişim Sistemleri Kullanılarak Afet Direnci Artırılabilir Mi?. 4. Uluslararası Deprem Mühendisliği Ve Sismoloji Konferansı 11-13 Ekim 2017, Anadolu Üniversitesi, Eskişehir.

[49] Höl, H., & Tarhan, Ç. (2024). Afet Sonrası Etkin Müdahale için CBS Tabanlı Yönetim Sistemi Önerisi. Resilience, 8(1), 57-71.

[50] Case, T., Morrison, C., & Vuylsteke, A. (2012). The clinical application of mobile technology to disaster medicine. Prehospital and disaster medicine, 27(5), 473-480.

[51] Reychav, I., Arora, A., Sabherwal, R., Polyak, K., Sun, J., & Azuri, J. (2021). Reporting health data in waiting rooms with mobile technology: Patient expectation and confirmation. International journal of medical informatics, 148, 104376.

[52] Hill, S.R., Troshani, I., Goldberg, S., Wickramasinghe, N. (2014). Improving Healthcare Service Quality and Patients' Life Quality Through Mobile Technologies: The Case of Diabetes Self-management. In: Wickramasinghe, N., Al-Hakim, L., Gonzalez, C., Tan, J. (eds) Lean Thinking for Healthcare. Healthcare Delivery in the Information Age. Springer, New York, NY. https://doi.org/10.1007/978-1-4614-8036-5_20

[53] Krell, K. (2018). Discourse and politics in Alberta's Health System: An analysis of mobile technology policy. Health policy and technology, 7(1), 7-14.

[54] Lefebvre, C. (2009). Integrating cell phones and mobile technologies into public health practice: a social marketing perspective. Health promotion practice, 10(4), 490-494.

[55] Bardach, N. S., Stotts, J. R., Fiore, D. M., Sarkar, U., Sharma, A. E., Boscardin, W. J., ... & Rosenbluth, G. (2022). Family Input for Quality

and Safety (FIQS): Using mobile technology for in-hospital reporting from families and patients. Journal of Hospital Medicine, 17(6), 456-465.

[56] Yulianto, E., Utari, P., & Satyawan, I. A. (2020). Communication technology support in disaster-prone areas: Case study of earthquake, tsunami and liquefaction in Palu, Indonesia. International journal of disaster risk reduction, 45, 101457.

[57] Gonçalves-Bradley, D. C., Maria, A. R. J., Ricci-Cabello, I., Villanueva, G., Fønhus, M. S., Glenton, C., ... & Shepperd, S. (2020). Mobile technologies to support healthcare provider to healthcare provider communication and management of care. Cochrane Database of Systematic Reviews, (8), CD012927.

[58] Jen, W. Y., Chao, C. C., Hung, M. C., Li, Y. C., & Chi, Y. P. (2007). Mobile information and communication in the hospital outpatient service. International Journal of Medical Informatics, 76(8), 565-574.

[59] McKenna, K. C., Geoghegan, C., Swezey, T., Perry, B., Wood, W. A., Nido, V., ... & Corneli, A. L. (2021). Investigator experiences using mobile technologies in clinical research: qualitative descriptive study. JMIR mHealth and uHealth, 9(2), e19242.

[60] Menditto, E., Costa, E., Midão, L., Bosnic-Anticevich, S., Novellino, E., Bialek, S., ... & MASK group. (2019). Adherence to treatment in allergic rhinitis using mobile technology. The MASK Study. Clinical & Experimental Allergy, 49(4), 442-460.

[61] Singh, A., Wilkinson, S., & Braganza, S. (2014). Smartphones and pediatric apps to mobilize the medical home. The Journal of pediatrics, 165(3), 606-610.

[62] Huynh, B., Barrett, J., Joachim, A., Smith, D., Stafford, L. C., Abbott, D. E., & Alagoz, E. (2021). Patient and provider perceptions on utilizing a mobile technology platform to improve surgical outcomes in the perioperative setting. Journal of Surgical Oncology, 123(5), 1353-1360.

[63] Bond, D. S., & Thomas, J. G. (2015). Measurement and intervention on physical activity and sedentary behaviours in bariatric surgery patients: emphasis on mobile technology. European Eating Disorders Review, 23(6), 470-478.

[64] Hincapie, A. L., Gupta, V., Brown, S. A., & Metzger, A. H. (2019). Exploring perceived barriers to medication adherence and the use of mobile technology in underserved patients with chronic conditions. Journal of pharmacy practice, 32(2), 147-153.

[65] Spears, C. A., Abroms, L. C., Glass, C. R., Hedeker, D., Eriksen, M. P., Cottrell-Daniels, C., ... & Wetter, D. W. (2019). Mindfulness-based smoking cessation enhanced with mobile technology (iQuit Mindfully): Pilot randomized controlled trial. JMIR mHealth and uHealth, 7(6), e13059.

[66] Alexander, S. M., Nerminathan, A., Harrison, A., Phelps, M., & Scott, K. M. (2015). Prejudices and perceptions: patient acceptance of mobile technology use in health care. Internal Medicine Journal, 45(11), 1179-1181.

[67] Çakır, F. S., Aytekin, A., & Tümençin, F. (2018). Nesnelerin interneti ve giyilebilir teknolojiler. Sosyal Araştırmalar ve Davranış Bilimleri Dergisi, 4(5), 84-95.

[68] Sharma, S., Kumari, B., Ali, A., Yadav, R. K., Sharma, A. K., Sharma, K. K., ... & Singh, G. K. (2022). Mobile technology: A tool for healthcare and a boon in pandemic. Journal of family medicine and primary care, 11(1), 37-43.

[69] Naslund, J. A., Aschbrenner, K. A., Scherer, E. A., McHugo, G. J., Marsch, L. A., & Bartels, S. J. (2016). Wearable devices and mobile technologies for supporting behavioral weight loss among people with serious mental illness. Psychiatry Research, 244, 139-144.

[70] Mayer, R. E. (2020). Where is the learning in mobile technologies for learning?. Contemporary Educational Psychology, 60, 101824.

[71] Law, J. K., Thome, P. A., Lindeman, B., Jackson, D. C., & Lidor, A. O. (2018). Student use and perceptions of mobile technology in clinical clerkships–Guidance for curriculum design. The American Journal of Surgery, 215(1), 196-199.

[72] Eckhoff, R., Boyce, M., Watkins, R. L., Kan, M., Scaglione, N., Pound, L., & Root, M. (2022). Examining the use of mobile technology to deliver tailored sexual assault prevention in a classroom environment in the military: development and usability study. JMIR mHealth and uHealth, 10(11), e41455.

[73] George, T. P., DeCristofaro, C., Murphy, P. F., & Sims, A. (2017). Student perceptions and acceptance of mobile technology in an undergraduate nursing program. Healthcare, 5(3),35.

[74] Guo, P., Watts, K., & Wharrad, H. (2016). An integrative review of the impact of mobile technologies used by healthcare professionals to support education and practice. Nursing Open, 3(2), 66-78.

[75] Bernacki, M. L., Greene, J. A., & Crompton, H. (2020). Mobile technology, learning, and achievement: Advances in understanding and measuring the role of mobile technology in education. Contemporary Educational Psychology, 60, 101827.

[76] Asiri, H., & Househ, M. (2017). The use of mobile technologies in nursing education and practice. In Health Professionals' Education in the Age of Clinical Information Systems, Mobile Computing and Social Networks (pp. 421-433). Academic Press.

[77] Masters, K., Ellaway, R. H., Topps, D., Archibald, D., & Hogue, R. J. (2016). Mobile technologies in medical education: AMEE Guide No. 105. Medical teacher, 38(6), 537-549.

[78] Duggan, N., Curran, V. R., Fairbridge, N. A., Deacon, D., Coombs, H., Stringer, K., & Pennell, S. (2021). Using mobile technology in assessment of entrustable professional activities in undergraduate medical education. Perspectives on medical education, 10, 373-377.

[79] Richman, A. R., Webb, M. C., Brinkley, J., & Martin, R. J. (2014). Sexual behaviour and interest in using a sexual health mobile app to help improve and manage college students' sexual health. Sex Education, 14(3), 310-322.

[80] Kopmaz, B., & Arslanoğlu, A. (2018). Mobil sağlık ve akıllı sağlık uygulamaları. Sağlık Akademisyenleri Dergisi, 5(4), 251-255.

[81] Cramer, M. E., Mollard, E. K., Ford, A. L., Kupzyk, K. A., & Wilson, F. A. (2018). The feasibility and promise of mobile technology with community health worker reinforcement to reduce rural preterm birth. Public Health Nursing, 35(6), 508-516.

[82] Wickramasinghe, N., & Gururajan, R. (2016). Innovation practice using pervasive mobile technology solutions to improve population health management: a pilot study of gestational diabetes patient care in Australia. The Journal for Healthcare Quality (JHQ), 38(2), 93-105.

[83] Topkara, N., & Özerdoğan, N. (2024). Emzirmenin Desteklenmesinde Mobil Uygulama Kullanımı. TOGÜ Sağlık Bilimleri Dergisi, 4(2), 211-222.

[84] McCall, T., Foster, M., & Schwartz, T. A. (2023). Attitudes toward seeking mental health services and mobile technology to support the management of depression among black American women: cross-sectional survey study. Journal of Medical Internet Research, 25, e45766.

[85] Paterson, C., Jones, M., Rattray, J., Lauder, W., & Nabi, G. (2016). What is the mechanism effect that links social support to coping and psychological outcome within individuals affected by prostate cancer? Real time data collection using mobile technology. European journal of oncology nursing, 21, 126-133.

[86] Vogel, R. I., Niendorf, K., Lee, H., Petzel, S., Lee, H. Y., & Geller, M. A. (2018). A qualitative study of barriers to genetic counseling and potential for mobile technology education among women with ovarian cancer. Hereditary cancer in clinical practice, 16, 1-7.

[87] Morgan, E. R., Laing, K., McCarthy, J., McCrate, F., & Seal, M. D. (2015). Using tablet-based technology in patient education about systemic therapy options for early-stage breast cancer: a pilot study. Current Oncology, 22(5), 364-369.

[88] Diehl, T. M., Barrett, J. R., Van Doorn, R., Stafford, L. M. C., Hanlon, B. M., Weber, S. M., ... & Abbott, D. E. (2022). Promoting patient engagement during care transitions after surgery using mobile technology: Lessons learned from the MobiMD pilot study. Surgery, 172(1), 219-225.

[89] Zhang, D., Advani, S., Waller, J., Cupertino, A. P., Hurtado-de-Mendoza, A., Chicaiza, A., ... & Braithwaite, D. (2020). Mobile technologies and cervical cancer screening in low-and middle-income countries: a systematic review. JCO global oncology, 6, 617-627.

[90] McCabe, C., McCann, M., & Brady, A. M. (2017). Computer and mobile technology interventions for self-management in chronic

obstructive pulmonary disease. Cochrane Database of Systematic Reviews, (5),1-34.

[91] Tincopa, M. A., Lyden, A., Wong, J., Jackson, E. A., Richardson, C., & Lok, A. S. (2022). Impact of a pilot structured mobile technology based lifestyle intervention for patients with nonalcoholic fatty liver disease. Digestive Diseases and Sciences, 67(2), 481-491.

[92] Shao, A. F., Rambaud-Althaus, C., Samaka, J., Faustine, A. F., Perri-Moore, S., Swai, N., ... & D'Acremont, V. (2015). New algorithm for managing childhood illness using mobile technology (ALMANACH): a controlled non-inferiority study on clinical outcome and antibiotic use in Tanzania. PloS one, 10(7), e0132316.

[93] Balakrishnan, R., Gopichandran, V., Chaturvedi, S., Chatterjee, R., Mahapatra, T., & Chaudhuri, I. (2016). Continuum of Care Services for Maternal and Child Health using mobile technology–a health system strengthening strategy in low and middle income countries. BMC medical informatics and decision making, 16, 1-8.

[94] Quelly, S. B., Norris, A. E., & DiPietro, J. L. (2016). Impact of mobile apps to combat obesity in children and adolescents: a systematic literature review. Journal for Specialists in Pediatric Nursing, 21(1), 5-17.

[95] Merck, S. F. (2017). Chronic disease and mobile technology: an innovative tool for clinicians. In Nursing Forum, 52(4), 298-305.

[96] Ciccarelli, M., Chen, J. D., Vaz, S., Cordier, R., & Falkmer, T. (2015). Managing children's postural risk when using mobile technology at home: Challenges and strategies. Applied ergonomics, 51, 189-198.

[97] Gipson, S. Y. M. T., Torous, J., & Maneta, E. (2017). Mobile technologies in child and adolescent psychiatry: pushing for further awareness and research. Harvard Review of Psychiatry, 25(4), 191-193.

[98] Mozafarpour, S., Abbasioun, R., & Kajbafzadeh, A. M. (2017). The mobile technology era: Potential benefits in pediatric urology. Journal of Pediatric Urology, 13(5), 529-530.

[99] Lebo, C. A., Lin, K. Y., & Rossano, J. W. (2019). Real-world continuous physiologic monitoring in paediatric cardiomyopathy patients: a safety and feasibility study. Cardiology in the Young, 29(11), 1400-1401.

[100] Schneider, T., Panzera, A. D., Martinasek, M., McDermott, R., Couluris, M., Lindenberger, J., & Bryant, C. (2016). Physicians' perceptions of mobile technology for enhancing asthma care for youth. Journal of Child Health Care, 20(2), 153-163.

[101] Eksteen, S., Launer, S., Kuper, H., Eikelboom, R. H., Bastawrous, A., & Swanepoel, D. W. (2019). Hearing and vision screening for preschool children using mobile technology, South Africa. Bulletin of the World Health Organization, 97(10), 672.

[102] Mulvaney, S. A., Ho, Y. X., Cala, C. M., Chen, Q., Nian, H., Patterson, B. L., & Johnson, K. B. (2013). Assessing adolescent asthma symptoms and adherence using mobile phones. Journal of medical Internet research, 15(7), e141.

[103] Baggott, C., Jibb, L., Parker, R., Stinson, J., & Linder, L. (2020). Technology to support the care of children and adolescents with cancer. Pediatric Oncology Nursing: Defining Care Through Science, 131-152.

[104] Gökçen, Ö., & Ünal, Z. B. (2023). Yaşlılık ve Giyilebilir Teknolojiler. Düzce Üniversitesi Bilim ve Teknoloji Dergisi, 11(1), 89-98.

[105] Bousquet, J., Meissonnier, M., Michalet, V., Toupnot, A., Paccard, D., Noguès, M., ... & Duranton, L. (2019). A novel approach to integrated care using mobile technology within home services. The ADMR pilot study. Maturitas, 129, 1-5.

[106] Hsieh, K. L., Chen, L., & Sosnoff, J. J. (2023). Mobile technology for falls prevention in older adults. The Journals of Gerontology: Series A, 78(5), 861-868.

[107] Purnell, J. Q., Griffith, J., Eddens, K. S., & Kreuter, M. W. (2014). Mobile technology, cancer prevention, and health status among diverse, low-income adults. American Journal of Health Promotion, 28(6), 397-402.

[108] Gray-Miceli, D., Patel, N., Sekar, A., & Smith, M. L. (2019). Using mobile technology to assess balance during a sit-to-stand maneuver among older adults with fall risk: a pilot study. Journal of gerontological nursing, 45(10), 18-23.

[109] Rostam Niakan Kalhori, S., Rahmani Katigari, M., Talebi Azadboni, T., Pahlevanynejad, S., & Hosseini Eshpala, R. (2023). The effect of m-health applications on self-care improvement in older adults: A systematic review. Informatics for Health and Social Care, 48(3), 292-331.

[110] Brimelow, R. E., Gibney, A., Meakin, S., & Wollin, J. A. (2019). Accessing care summaries at point-of-care: Implementation of mobile devices for personal carers in aged care. Health informatics journal, 25(1), 126-138.

[111] McKay, E., & Martin, J. (2014). mHealth for Aging Populations: Community, Participation, Connectivity, and Mobile Technologies for Older People. In mHealth Multidisciplinary Verticals (pp. 391-412). CRC Press.

[112] Tarte, V. P., & Amirehsani, K. A. (2019). Perceptions of mobile technology for heart failure education and self-management among middle-aged and older adults. Journal of Gerontological Nursing, 45(11), 30-38.

[113] Cajita, M. I., Hodgson, N. A., Budhathoki, C., & Han, H. R. (2017). Intention to use mHealth in older adults with heart failure. Journal of Cardiovascular Nursing, 32(6), E1-E7.

[114] Karatana, Ö., & Gür, K. (2019). Engelli bireylerin sağlık hizmetlerine erişimi ve engelleri. Halk Sağlığı Hemşireliği Dergisi, 1(1), 43-53.

[115] Martin, A. J., Strnadová, I., Loblinzk, J., Danker, J. C., & Cumming, T. M. (2021). The role of mobile technology in promoting social inclusion among adults with intellectual disabilities. Journal of Applied Research in Intellectual Disabilities, 34(3), 840-851.

[116] Øhrstrøm, P. (2012). Persuasive Mobile Technology Developed for Young People with an Autism Diagnosis. In Touching the Future Technology for Autism? (pp. 36-57). IOS Press.

[117] Ünal, E., & Yüce, H. (2017). Görme engelli bireyler için mobil uyarı ve yönlendirme sisteminin geliştirilmesi. Marmara Fen Bilimleri Dergisi, 29(3), 102-110.

[118] Topsakal, Y. (2018). Disabled-friendly mobile services in the context of smart tourism: Recommendations for Turkey tourism. Journal of Tourism Intelligence and Smartness, 1(1), 1-13.

[119] Gilart-Iglesias, V., Mora, H., Pérez-delHoyo, R., & García-Mayor, C. (2015). A computational method based on radio frequency technologies for the analysis of accessibility of disabled people in sustainable cities. Sustainability, 7(11), 14935-14963.

[120] Akcil, U. (2018). The use of mobile learning for visually impaired learners school in tolerance education contents. Quality & Quantity, 52(Suppl 2), 969-982.

[121] Jones, M., Morris, J., & Deruyter, F. (2018). Mobile healthcare and people with disabilities: current state and future needs. International journal of environmental research and public health, 15(3), 515.

[122] Bacigalupo, R., Cudd, P., Littlewood, C., Bissell, P., Hawley, M. S., & Buckley Woods, H. (2013). Interventions employing mobile technology for overweight and obesity: an early systematic review of randomized controlled trials. Obesity reviews, 14(4), 279-291.

[123] Rodgers, R. F., Franko, D. L., Shiyko, M., Intille, S., Wilson, K., O'Carroll, D., ... & Shoemaker, H. (2016b). Exploring healthy eating among ethnic minority students using mobile technology: Feasibility and adherence. Health informatics journal, 22(3), 440-450.

[124] Rodgers, R. F., Pernal, W., Matsumoto, A., Shiyko, M., Intille, S., & Franko, D. L. (2016a). Capitalizing on mobile technology to support healthy eating in ethnic minority college students. Journal of American College Health, 64(2), 125-132.

[125] Asadzadeh, A., & Kalankesh, L. R. (2021). A scope of mobile health solutions in COVID-19 pandemics. Informatics in medicine unlocked, 23, 100558. https://doi.org/10.1016/j.imu.2021.100558

[126] HayatEveSığar, (2024). Hayar Eve Sığar Yardım Sayfası. Erişim Tarihi: 10/07/2024. https://hayatevesigar.saglik.gov.tr/

[127] Verma, J., & Mishra, A. S. (2020). COVID-19 infection: Disease detection and mobile technology. PeerJ, 8, e10345.

[128] Wilson, K., Atkinson, K. M., Deeks, S. L., & Crowcroft, N. S. (2016). Improving vaccine registries through mobile technologies: a vision for mobile enhanced Immunization information

systems. Journal of the American Medical Informatics Association, 23(1), 207-211.

[129] Atkinson, K. M., Westeinde, J., Ducharme, R., Wilson, S. E., Deeks, S. L., Crowcroft, N., ... & Wilson, K. (2016). Can mobile technologies improve on-time vaccination? A study piloting maternal use of ImmunizeCA, a Pan-Canadian immunization app. Human vaccines & immunotherapeutics, 12(10), 2654-2661.

[130] Swendsen, J. (2016). Contributions of mobile technologies to addiction research. Dialogues in clinical neuroscience, 18(2), 213-221.

[131] Roy, A. L. (2017). Innovation or violation? Leveraging mobile technology to conduct socially responsible community research. American journal of community psychology, 60(3-4), 385-390.

[132] Kowalski, R. M., Morgan, M., & Taylor, K. (2017). Stigma of mental and physical illness and the use of mobile technology. The Journal of Social Psychology, 157(5), 602-610.

[133] Wal, A., Khandai, M., Vig, H., Srivastava, P., Agarwal, A., Wadhwani, S., & Wal, P. (2022). Evidence-Based Treatment, assisted by Mobile Technology to Deliver, and Evidence-Based Drugs in South Asian Countries. Archives of Pharmacy Practice, 13(4-2022), 63-73.

[134] Yılmaz, F., Mete, A. H., Türkön, B. F., & İnce, Ö. (2022). Sağlık hizmetlerinin geleceğinde metaverse ekosistemi ve teknolojileri: uygulamalar, fırsatlar ve zorluklar. Eurasian Journal of Health Technology Assessment, 6(1), 12-34.

[135] Damar, M., & Özdağoğlu, G. (2023). The Digital Twin Case in the Technological Transformation Process: Research Articles, Academic Collaborations, and Topics. In Digital Twin Driven Intelligent Systems and Emerging Metaverse (pp. 3-38). Singapore: Springer Nature Singapore.

[136] Ozdagoglu, G., Damar, M., & Ozdagoglu, A. (2020). The State of the art in blockchain research (2013–2018): scientometrics of the related papers in web of science and scopus. Digital Business Strategies in Blockchain Ecosystems: Transformational Design and Future of Global Business, 569-599.

[137] Alıcı, S., Damar, M., & Gökşen, Y. (2024). Blok Zincir Teknolojisine Akademik Yönden Ne Kadar Hazırız: Türkiye Adresli Blok Zincir Konusundaki Uluslararası Yayınların Analizi ve Alanın Gelişimine Yönelik Öneriler. Journal of Information Systems and Management Research, 6(1), 40-62.

[138] Lupton, D. (2013). The digitally engaged patient: Self-monitoring and self-care in the digital health era. Social Theory & Health, 11, 256-270.

[139] Peterson, S. F., & Fok, W. K. (2019). Mobile technology for family planning. Current Opinion in Obstetrics and Gynecology, 31(6), 459-463.

[140] Finch, L., Janda, M., Loescher, L. J., & Hacker, E. (2016). Can skin cancer prevention be improved through mobile technology interventions? A systematic review. Preventive medicine, 90, 121-132.

[141] Ni, Z., Wu, B., Samples, C. and Shaw, R. J. (2014). Mobile Technology For Health Care in Rural China. International Journal of Nursing Sciences, 1(3), 323-324.

[142] Neto, O. B. L., Loyo, R., Albuquerque, J., Perazzo, J., Barbosa, V., & Barbosa, C. S. (2015). Using mobile technology to conduct epidemiological investigations. Revista da Sociedade Brasileira de Medicina Tropical, 48(01), 105-107.

[143] Frandes, M., Deiac, A. V., Timar, B., & Lungeanu, D. (2017). Instrument for assessing mobile technology acceptability in diabetes self-management: a validation and reliability study. Patient preference and adherence, 259-269.

[144] Lee, J. M., Hirschfeld, E., & Wedding, J. (2016). A patient-designed do-it-yourself mobile technology system for diabetes: promise and challenges for a new era in medicine. Jama, 315(14), 1447-1448.

[145] Saberi, P., Eskaf, S., Campbell, C. K., Neilands, T. B., Sauceda, J. A., & Dubé, K. (2022). Exploration of a Mobile Technology Vulnerability Scale's association with antiretroviral adherence among young adults living with HIV in the United States. Mhealth, 8(23),1-9.

[146] Goceri, E. (2021). Diagnosis of skin diseases in the era of deep learning and mobile technology. Computers in Biology and Medicine, 134, 104458.

[147] Allard, M., Husky, M., Catheline, G., Pelletier, A., Dilharreguy, B., Amieva, H., ... & Swendsen, J. (2014). Mobile technologies in the early detection of cognitive decline. PloS one, 9(12), e112197.

[148] Sharma, I. (2023). 11 Benefits Of Using Mobile Technology in Healthcare. Accesed Date: 13/10/2024. https://www.tatvasoft.com/outsourcing/2022/05/ mobile-technology-in-healthcare.html

[149] Hilty, D. M., Chan, S., Torous, J., Luo, J., & Boland, R. J. (2019). A telehealth framework for mobile health, smartphones, and apps: Competencies, training, and faculty development. Journal of Technology in Behavioral Science, 4, 106-123.