

# MOBILE HEALTH APPLICATIONS IN DIGITAL LIFE

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## ABSTRACT

With the effect of recent rapid developments in communication technologies, every day, and various new experiences are introduced into daily life practices. The spread of smart devices and the increase in their accessibility causes a reorganization of the information concerning the daily life via smart phones, tablets, all peripheral devices which can communicate with them, and applications which are installed in these devices. There is also a rapid development in the field of health which has an important position among the fastest growing fields in digital life; and the information and possibilities which are provided by mobile health applications to people who are not health care professionals are also developing rapidly. In this study, health applications which are developed for IOS operating system and presented to the consumers through Apple App-Store on Apple I-Phone and I-Pad mobile devices are examined in order to reveal what mobile health applications as new practices of daily life offer in terms of health and how they direct the individuals towards healthy behavior; and some of the most frequently used free applications are included as sample applications. Mobile health applications offer many conveniences to the patients or the caretakers of patients such as reminding about medicines or treatments, and administering and monitoring simple treatments.

Keywords: Digital communication, mobile health applications, health communication

## INTRODUCTION

Today, with the effect of rapid developments in the communication technology, the practice of everyday life has met with new experiences different from each other every day. Thanks to new smart devices and their easy accessibility, smart phones, tablets and all peripheral devices that can communicate with them and mobile applications installed on these devices lead to the rearrangement of information about life. Information and opportunities offered to the non-health professionals by the health field as well as mobile healthcare applications also increase rapidly. Within the last decades, increasing usage of smart devices; a change in the way individuals benefit from these technologies; the change in health habits have lead to widespread use of mobile health applications. Mobile health applications are used worldwide; brought about many advantages such as appointment reminders, compliance with the treatment, monitoring and surveillance, access to information and health records; has penetrated into mobile technology in the global level.

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As it known that, face to face counselling has a great effect on developing protective behaviour for health; many disadvantages such as high cost, logistical barriers, shame because of the consultant, hesitation make it difficult to choose face to face counselling; however, it accelerates the development of mobile health applications, however (Ramanathan et al. 2013: 2). Mobile health applications help to overcome these disadvantages; and contributes to positive behaviours such as eating, physical activity, stress management, compliance to the treatment, risky behaviours, reduced use of substance; thus improving life quality.

Mobile devices can help changing the behaviour of individuals since they are always with the individuals, always on turn on mode and can be intervened in at the right time. In this study, considering mobile health applications, their advantages and disadvantages, what they offer in the field of health as well as how they encourage individuals for a healthier life will be addressed.

### **MOBILE HEALTH APPLICATIONS**

Mobile health applications or in common words, m-health, is a term supporting public health and clinical applications with wireless devices; which is portable of its nature and which covers other related network communication technology including smart phones, patient monitoring devices, mobile platforms, mobile computing, medical sensors-health applications. Mobile health applications are composed of three main components; mobile devices, wireless networks and mobile applications and accordingly, are composed of three basic technical requirements as mobile devices, software platforms (web and database) and mobile health applications (Liu et al., 2011: 2022). Mobile health applications are accessible outside the hospital, in other words, from home or at a distance. At this point, it is essential that these devices utilized in mobile health applications must have internet connections. Moreover, cellular function of these devices should include functions of text messages (SMS), photograph and video (MMS) communication, telephone, multimedia playback and software applications.

Provision of technological infrastructure and technical developments has created the suitable ground for the development of mobile applications. Parallel to this technological structure, within the last two decades with the increase of chronic diseases in worldwide, health spending has increased; consequently, new requirements and solutions have been observed. Therefore, mobile applications in the health field primarily focused on follow-up on chronic diseases, ensuring control and behaviour modification.

Changing the daily route eating habits of patients with chronic diseases such as exercise, tobacco, alcohol etc. is effective in terms of improving health and reducing costs. Following-up of patients with chronic diseases requires that a health care team work in coordination and they can make multi- directional assessments. At the beginning of the treatment of these diseases, changes in the behaviour of patients and adherence to treatment, refusal of the disease and the treatments are observed (Tobacco, diet or physical activity, self-care) (Liu, 2011: 2023; Kahn et al., 2010: 254; Wright et al., 2008: 160). In order to ensure compliance in this process, the participation of the patients and a coordinated and continuous care is effective in

terms of continuity of care. It is known that mobile applications contribute to many patients for the establishment of change in behaviour (Evans et al. 2012: 23).

Mobile applications not only deal with follow-up of patients with chronic diseases, medical data and recommendations, but also play a different role in communication between the doctor and the patient. Depending on the quality of the application, the patient can take feedback from his doctor through video interview over mobile applications. This feedback will increase the trust to the doctor and patient's compliance and will reduce the number of patients in hospitals and health centres.

However, such practices can make a huge added value for the elderly or for those who have difficulty in leaving the house since it is ideal, efficient and economical to show the simple cases through cameras.

### **THE ADVANTAGES OF THE APPLICATIONS**

Since mobile devices get cheaper and more accessible, the individuals can govern themselves in an easier and economical way than the past. As mobile devices have become more economically accessible, more people start to benefit from these applications. The development of technological devices will also change the way individuals benefit from the health care applications.

Because of their feature of "always on" mode, mobile devices can follow the data of individuals; can report the behaviour of them, and can provide a self- assessment for individual (Ramanathan et al. 2013: 2). This enables self-management of the individual and makes it easy to follow and provide motivation. Furthermore, graphics supporting the positive behaviour, congratulatory messages or the opportunity to share these on social media is effective in terms of motivation.

Due to the individual usage of the mobile devices, it is important for an application to have personalized information. It is important to follow up the person based on such data as his medical history, attitudes and behaviours and objectives, to direct, measure the information and motivate. Such applications are kind of personal advisors due to their interactive feature and the constant flow of information.

The acceleration of information flow and the decision making processes, improves the quality of life of the elderly and home bound patients, who are having difficulty in reaching the physician and gives a feeling of freedom. Individual and institutional productivity increase when getting medical care gets easier, so patients can manage their own treatments and take an active role in treatment. They make contributions for individuals who are having difficulty in adjusting to the treatment such as within the busy schedule, facilitating the care and treatment services, supplying drug-related reminders and health information, organizing professional and personal life in a better way and increasing the work carried out within a certain time. In addition to these, reducing time spent in health care organizations and the number of examinations will also reduce the cost of treatment and medical care.

Mobile health applications provide a lot of facilitates for the patient himself and his relatives such as reminding medication and health information; monitoring and administering simple treatments (Karaboža, 2013; Perez et al., 2013). Mobile applications help transferring immediate health information to the health professionals or the health care providers via some vital functions (heart rate, pulse oximetry<sup>1</sup>, measures such as ECG) and via simple measurements. As a result, it makes significant contributions to the patient in particular and health professionals with functions such as accessing to the health data through mobile devices, getting information and transferring the vital signs of the patients at a real time at home, in the street, in the car or in other words; everywhere.

### **THE RISKS AND DISADVANTAGES OF THE APPLICATIONS**

Although health applications can provide many advantages to patients, it should be noted that one should not expect miracles from these applications. One should be taken advantages of being provided information on health issues, and in support behaviour change, but in emergency and acute conditions, time should be lost in obtaining health care from health care professionals. Because of lack of adequate data entry, applications have not been applied yet; they are based on limited research and especially in emergency situations are likely to cause life-threatening risks.

The quality of the devices used and the software is also important since they are related with the technology. In case the devise is old and the software is outdated, it will cause faults or interruptions in the evaluation of data.

In addition, the risks caused by the viruses should be taken into consideration and necessary measures should be taken even though there is nothing to do directly for the patient (Rice et al., 2001: 242).

Additionally, although mobile health applications contribute to change in the behaviour and have support for monitoring and management, they are still limited. For example; one should not expect exact information as much as the diagnosis of a physician or tests in the laboratory environment. Even though the names of the diseases and their treatments are given according to entered data, the process of determining diagnostics and treatment by a physician is necessary.

As a result, as frequency of use is increasing, disadvantages are likely to occur for the user, but these can also be arranged in practice.

### **TO EXPERIENCE HEALTH APPLICATIONS**

The number of mobile health applications designed to improve health care; increasing usage and usage frequency are widespread. In this study, health applications prepared for the IOS operating system, presented to consumers in the Apple App-Store have been examined with a view to addressing the opportunities of mobile health applications in the field of health and how these applications lead people

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<sup>1</sup> Pulse oximetry is a small device measuring the oxygen levels in the blood of the patient as well as the speed of pulse.

towards health and healthy behaviours; some examples have been given about certain applications most commonly used by consumers.

Applications offered to consumers over mobile devices of Apple I-Phone and I-Pad have been observed. These applications have been divided into 24 categories in AppleStore Turkey as of July 2014: *Games, Newspaper Agency, Children, Education, Entertainment, Finance, Photograph and Video, Business, Catalogues, Books, News, Weather, Music, Navigation, Reference, Health and Exercise, Social Network, Sports, Travel, Medicine, Productivity, Lifestyle, Accessories, Food and beverages.*

In this study, of these 24 categories, Health and Exercise and Medicine have been examined; the applications in other categories practices are not included in this study. When Medicine as well as Health and Exercise are considered, there are 300 applications in total in Medicine with 150 Paid and 150 free ones, while there is a total of 300 applications in Health and Exercise with 150 paid and 150 free ones. Both categories in total have 600 applications.

### **HEALTH AND EXERCISE APPLICATIONS**

It is seen that physical exercise are greater in Health and Exercise category both with paid and free categories. Exercise practices are followed by diet, calories and form applications. Related applications like pregnancy, menstruation and the habit of drinking water are in third place. Applications such as quitting smoking, measuring pulse, does not exceed 5 applications within 300 applications.

The use of these applications in this category is rapidly gaining popularity among consumers. A program is determined according to the individual's age, sex, weight, targets. It gives feedback about the performance of the individual during the exercise time; graphing is ensured; sharing is possible on the map, greeting at the end of exercise, share as photograph and in social media are offered. Such properties of the applications have the characteristics motivating regarding the settlement of behavioural changes in individuals.

### **RUNKEEPER**

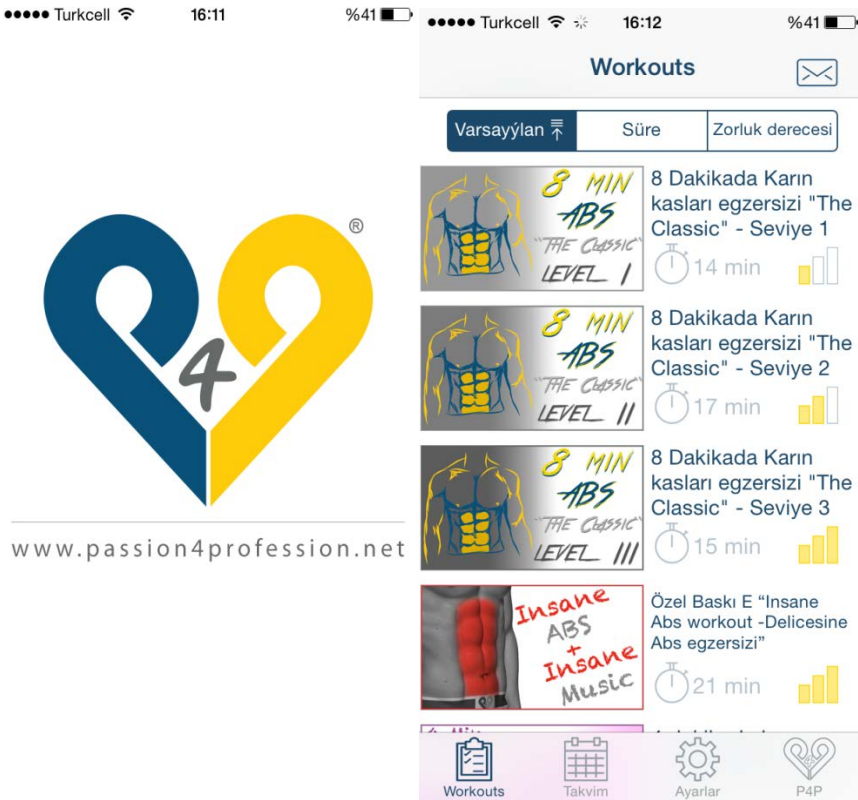
In one of the Health and Exercise applications RunKeeper (Example 1) and in similar applications, the desired type of exercise is selected, exercise duration, exercise evaluation, efficiency, speed, map records can be followed up and stored through GPS; can be shared via e-mail; individual performance analysis can be done and photos can be taken at the end of exercise and can be shared in social media.



Example 1. Runkeeper

## PASSION4 PROFESSION-ABDOMINAL MUSCLE

In exercise applications, individual motivation can be ensured and shared; it is possible to motivate friends for exercise. With these features, recently new exercise applications have emerged and different applications have been developed for those who have difficulty in exercising individually; who cannot go to a sports centre due to time limitations or for those who prefer to work with an instructor. *Passion4profession-Abdominal Muscle* is one of the most preferred applications for those who have difficulty in exercising individually; who cannot go to a sports centre due to time limitations or for those who prefer to work with an instructor (Example 2). This application includes programs in different times and at different levels for certain parts of the body. The user can perform exercises with video and animation directives depending on his preference. In the applications, motivating statements are also included.



The screenshot displays the 'Workouts' section of the Passion4profession app. At the top, there are navigation options like 'Ayrıntılar' and 'Ön izleme'. The main content area features several workout cards, each with a title, duration, and a small bar chart. The cards include:

- '8 Dakikada Karın kasları egzersizi "The Classic" - Seviye 3' (4 min)
- 'SUPER FAST 3 MIN ABS' (4 min)
- '8 Dakikada Karın kasları egzersizi - Hip Hop Versiyonu' (14 min)
- 'Six Pack - "Şekli Karın bölgesi"' (9 min)
- '8 Min ABS Rock Edition' (14 min)

Below the workout cards, there is a section for 'Önerilen Program' (Recommended Program) with a table showing a 4-week schedule. The table has columns for days of the week (P, S, Ç, P, C, C, P) and rows for weeks (1 hafta to 4 hafta). A green button labeled 'Program Oluştur' is positioned below the table. Below the table, there are icons for a person, a clock (15 min), and a bar chart. A paragraph of text explains the benefits of the workout, followed by 'Ücretsiz' (Free) and 'Satın al' (Buy) buttons. At the bottom, there is a video player showing a person performing an abdominal exercise, with a progress bar and a timer (00:00 to 14:32).

	P	S	Ç	P	C	C	P
1 hafta	✓		✓		✓		
2 hafta	✓	✓		✓	✓		
3 hafta	✓		✓		✓		✓
4 hafta	✓	✓		✓	✓		✓

Example 2. Passion4profession- Abdominal muscle

### MEDICAL APPLICATIONS

In the medical category, pharmacy practice seems to come forward among free applications. Hospital-physician search, medication reminders, anatomy, blood pressure meter applications are the applications that follow the pharmacy practice. Medication reminders, eye test, ECG, stethoscope, medicine information system, medical dictionary are applications that stand out among paid applications. By category, the majority of applications can be said to have been designed for health professionals.



## PHARMACY

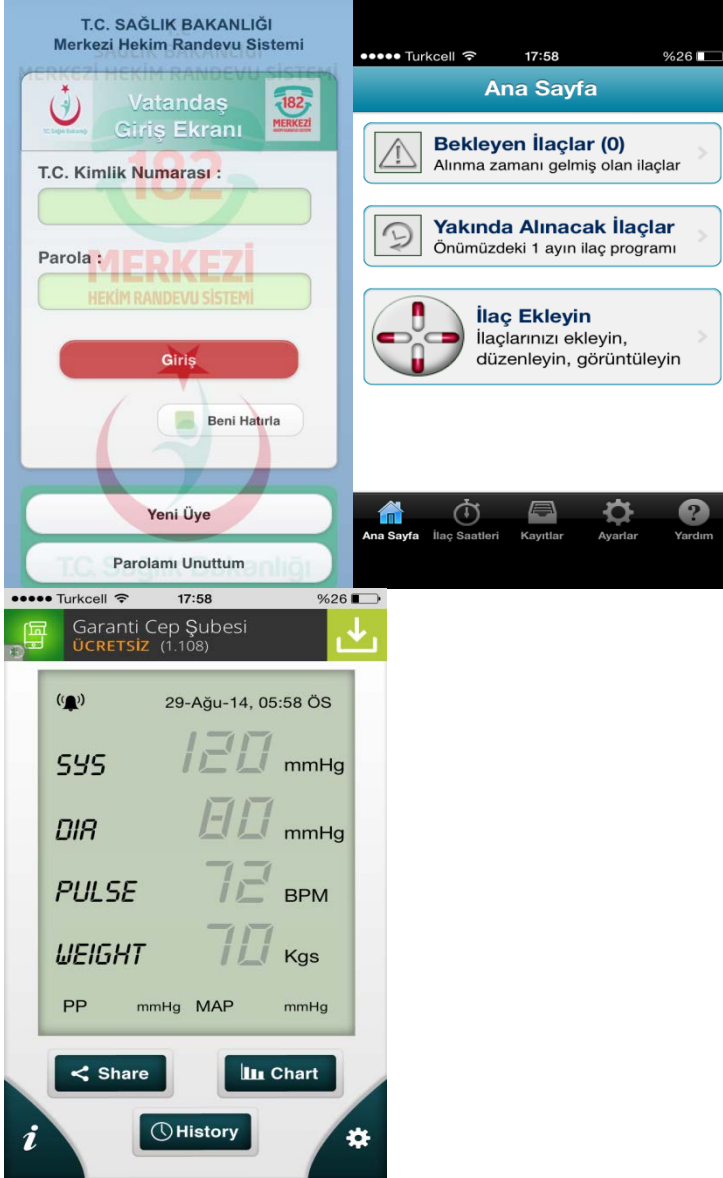
In pharmacy applications, the most practiced applications in the medical category, (example 3), it is possible to find the nearest pharmacy and emergency pharmacies in the provinces and districts by searching. From the most commonly used applications like pharmacy application, "Find a doctor" and "find a hospital" applications are also included.



Example 3. Pharmacy

### OTHER MEDICAL APPLICATIONS

Physician Appointment System of the Ministry of Health Medication Reminder, Blood Pressure Meter in the Medical category are among the preferred applications (Example 4). Medication reminder application especially has a greater ease of use during the day for patients who take different doses, different medicine. Moreover, medicine reminder applications remind the patient to take his medicine. For the continuity of treatment, the contribution of such practices is important.



Example 4. Examples of applications

## **EVALUATION**

With increasing use of smart devices; a change in the way individuals benefit from these technologies; the change in health habits led to the widespread use of mobile health applications. Mobile health applications are accessible outside the hospital, in other words, from home or at a distance. Applications have been directed at monitoring and imaging services as well as the patient of chronic diseases in recent years. Research and development is continuing at full speed in order to provide patients monitoring with remote testing, diagnosis and treatment, and ingestible sensors or smart contact lenses .n the near future. It is obvious that mobile health applications will continue to play a more important role than today. Such applications will provide a relatively low cost units and efficiency, benefit and convenience since they are mobile in favour of the users.

In this study, health applications which are developed for IOS operating system and presented to the consumers through Apple App-Store on Apple I-Phone and I-Pad mobile devices are examined in order to reveal what mobile health applications as new practices of daily life offer in terms of health and how they direct the individuals towards healthy behaviour; and some of the most frequently used free applications are included as sample applications. It is clear that there is a total of 600 paid and free applications under two categories of "Health & Fitness" and "Medicine". In Health & Fitness category, exercise and nutritional/dietary practices are much found. Change existing attitudes and behaviours of individuals in the treatment of chronic diseases is essential.

Therefore, the fact that the number of exercise and nutrition / diet increases and is preferred whether due to a chronic disease or to learn and maintain healthy lifestyle behaviours is a positive development. However, because being healthy is associated with dieting and fitness, such applications are much preferred at the first hand than the ones including essential health information and first aid. The medical applications are not yet well established. These applications in a wide range of variety from pharmacy practice, medication reminders to the monitoring of patients will become widespread in the near future. It should be noted that there is a suitable environment for the health applications which are expanded at limited terms to develop in Turkey.

Although the fact that the demand for mobile health applications is uncertain and irregular gives the impression that a slow progress is recorded in the field, digital solutions leads to significant improvements in the health sector; global mobile health market is growing and hence mobile health application market is also growing. Due to the market developments and the increasing number of chronic diseases, mobile health applications are important in Turkey as in many countries in the world and significant investments are made in this respect. Although the digital infrastructure and improvements can be performed rapidly in Turkey, in order to generalize the data which are used in the applications, much more users and much more data entry is needed.

Mobile health applications are yet a new field but include some opportunities for future research and studies. For example; it will be beneficial to develop applications

with a purpose of training and information for the patients. It is necessary to improve the current limited application for patients with hearing loss and sight. Applications for sight and hearing impaired are almost scarce. It will be useful to create applications for disable patients while taking them as a target audience.

It is necessary to follow and minimize the risks in mobile health applications. When the health is an issue, it is essential to make a rigorous evaluation for application. Randomized and controlled studies, experiments should be done so that they can be expanded. For example, extensive studies with the support of the World Health Organization and sharing of data will make great contributions.

Economic impact of mobile health applications is also important. The application must be measurable and have an economic impact on the improvement of health. In this economic evaluation, many issues such as the intended clinical outcomes, potential adverse effects, interventions, their costs and sustainability should be included.

To sum up, the number of mobile health applications is increasing as a convenient area for development and expansion. With a change in the needs and the majority, different and qualified applications are being developed. Good analysis of the needs of the target audience, monitoring of current and potential health problems, keeping up with the developments in the world and being aware of the characteristics of the future products introduced into the market by major manufacturers will give direction to the design of new applications. It should be underlined that mobile health applicants, although contributing to the compliance of the patient to the treatment and life quality, may have some risks on the human health; therefore, they should be carefully designed.

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