

ТЕХНИЧЕСКИЕ НАУКИ

DEVELOPMENT OF A MOBILE APPLICATION FOR HUMAN HEALTH MONITORING

¹Boranbayev S.N., ²Baigunova M.

Annotation. The article is devoted to investigation of the role of mobile medical applications in monitoring the state of human health and improving the quality of medical services. Description of the developed mobile application for human health monitoring is given below.

1. Introduction

The topic of mobile applications usage in the field of public health is becoming increasingly relevant today. In the rhythm of the modern life visiting a doctor can be quite expensive for patients in terms of money and wasted time. Hence, mobile applications development in the healthcare sector is crucial and beneficial for both patients and doctors.

Global mobile healthcare applications market is growing rapidly, and it is expected that this trend will continue. Today approximately 158,000 medical applications are available for download on Google Play that provide quick and easy access to medical information, as well as its transmission and tracking. Thereby, allowing users to improve their health and track any changes [1]. Thus, such medical applications have great potential to help a wide range of users with various health problems [2].

At the same time, medical applications in the digital health industry help doctors save plenty of time and resources. Applications help optimise doctors'

workflows, which consequently increases their productivity. As for patients, thanks to medical applications they can independently plan and, if necessary, cancel or re-schedule doctor appointments and receive timely advice, as well as undergo preventive examinations [3].

According to research conducted by Viseven, an international provider of educational mobile applications and medical products:

- 80% of doctors use smartphones and medical applications for work;
- 93% of medical representatives are confident that mobile healthcare applications will benefit the health of patients;
- 40% of doctors believe that need of personal visit will be partially reduced due to the popularisation of mobile applications usage among the population;
- 79% of respondents are more likely to trust a doctor, who will provide them with opportunity to monitor their health status via mobile applications [4].

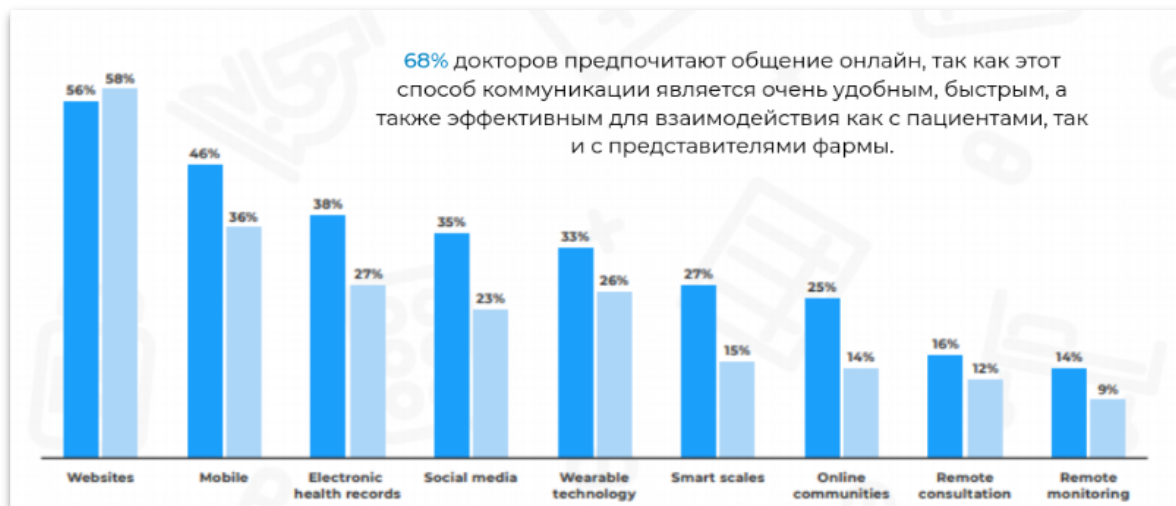


Figure 1. [4]

Here are the main benefits of using mobile apps for healthcare:

1. Time saving. Mobile applications optimise doctors' workflows, increase their productivity and support interaction with patients. Patients can easily plan and cancel their visits to doctors.

2. Availability. By means of mobile applications users can monitor their health at any time and at no additional cost, interact with medical specialists, and also receive the necessary information.

3. Data storage. Mobile applications provide collection and reliable storage of medical data. Therefore, it is possible to track changes in patients' health condition, analyse statistics and also provide a basis for further research.

4. Online communication. Mobile medical applications allow real-time user communication, consequently giving medical staff an opportunity to provide patients with the right treatment at any time from anywhere in the world.

2. Development of a mobile application for human health monitoring

Currently, in the Republic of Kazakhstan, if a patient needs medical care, he needs to contact a medical institution, most often, a clinic at the place of registration. Even when feeling sick patients have to wait a lot of time in line for a doctor's appointment. At the doctor's appointment, on other hand, patient can spend only a few minutes to get a consultation or referral for tests. Altogether, current situation has many drawbacks, and, therefore, needs an alternative.

This need for an alternative served as a reason for building a medical application. The experience of implementing such initiatives within former USSR countries is still rather insufficient [5].

With help of this application doctors will be able to track the following indicators such as: appointment schedule, patient record, patients list, test results. There are three languages available for user to select: Kazakh, Russian and English. When opening the web page <http://medclinica.kz/> you are greeted with an authorisation window (Figure 2).

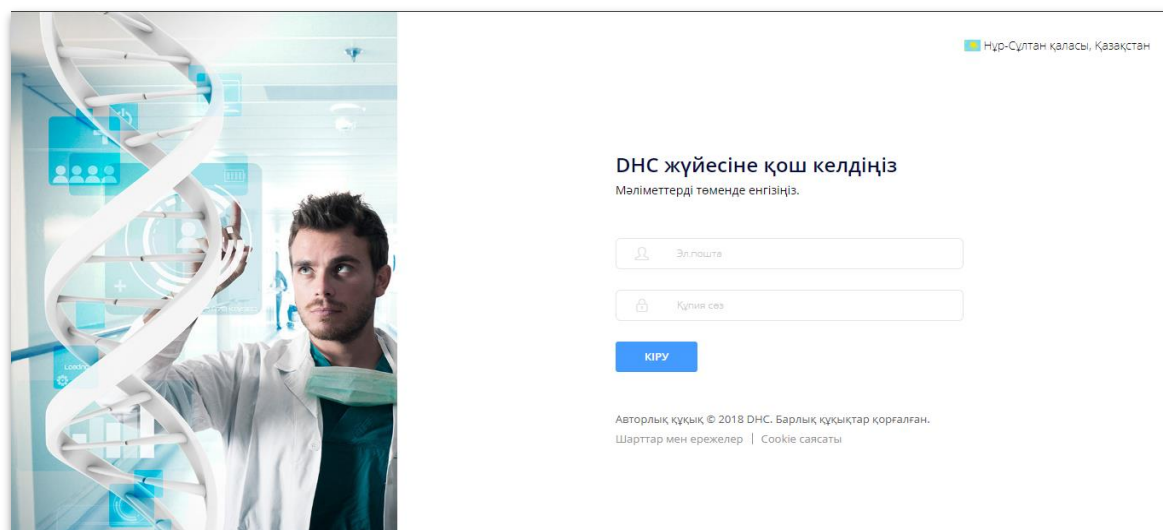


Figure 2. The authorisation window.

After authorisation doctors have an access to 5 working tabs. The first tab "Home" displays information in the form of counters. Employees of a medical institution can observe general information on

this page, such as: "Total number of tests", "Number of patients", "Registered citizens", "Number of calls". On the same page there is number of current appeals (Figure 3).

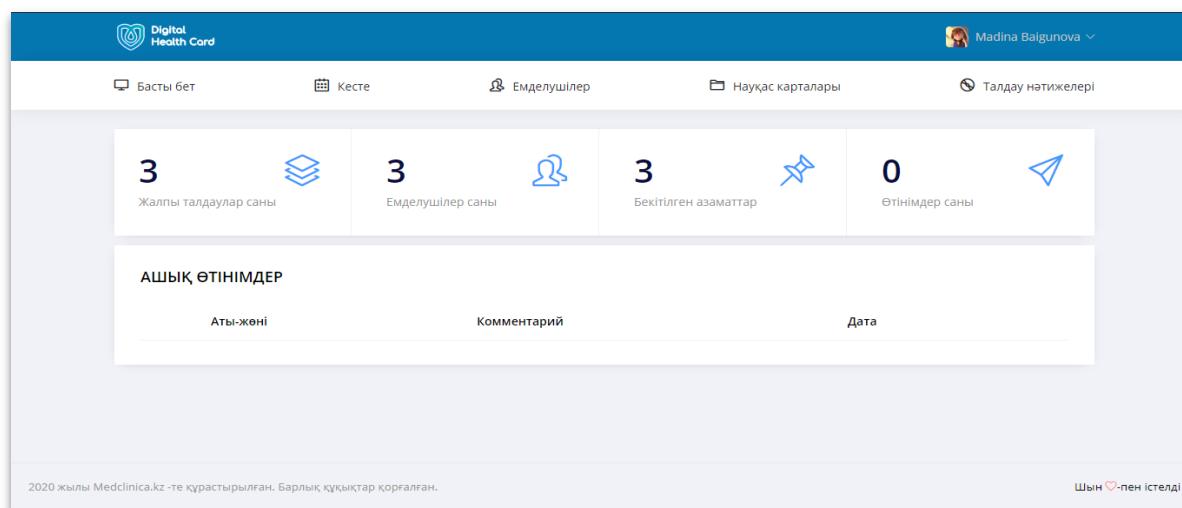


Figure 3. The main page.

On the next page "Table" doctors can see information, in tabular form, regarding the appointment: date, time, name of the patient, contact details, commentary and patient status. If you click on

the "Card" action, electronic card of the corresponding patient will open. For convenience of medical staff it is possible to select number of displayed table rows: 5, 10, 15 (Figure 4).

#	Уақыт	Емделуші	Байланыс	Комментарий	Статус
1	2020-01-17 17:00:00	Каймолла Рустем	+7 7476968089	Қан қысым 160/110	Қабылданды
2	2020-01-17 17:00:00	Каменова Мадина	87078085987744	Қан қысым 160/110	Қабылданды

Figure 4. Reception table

The next page allows the healthcare provider to create an electronic card for a new patient or open an existing one. This function is useful because polyclinics do not have to store a huge amount of paper medical

records, or in case the patient already has the card, avoid the situation when he/she forgets the card at home or loses it (Figure 5).

Figure 5. Patients

When you open the patient's card, you see 2 tabs: "Profile" and "Medical history". The "Profile" tab displays the patient's personal data: name, address, IIN,

gender, telephone, date of birth and ID number. Information on the prescribed drugs is given below (Figure 6).

Басты бет Кесте Емделушілер Науқас карталары Талдау нәтижелері

Профиль Емдеу тарихы

Аты-жөні: Каймолла Рустем **Телефон:** +7 7476968089

Мекен-жайы: Нұр-Сұлтан қаласы, Е30 көш, 5

ЖСН: 960418552244 **Туған күні:** 1996-04-18

Жынысы: Ер **Жеке куәлік номері:** 031588741

Тағайындалған дәрі-дәрмек

Атауы	Доза:
N02BE01 Парацетамол Брутто-формула: C ₈ H ₉ NO ₂ ИЮПАК: N-(4-гидроксифенил)ацетамид	2 таб/күніне
N02BE01 Парацетамол Брутто-формула: C ₈ H ₉ NO ₂ ИЮПАК: N-(4-гидроксифенил)ацетамид	1
Ацетилсалициловая кислота таблетки 0,25 № 10	2

Figure 6. Profile

The same "Profile" page provide doctor with ability to prescribe medications to the patient: select the necessary medication from attached list and indicate the required dose (Figure 7).

Дәрі-дәрмек тағайындау

Науқас

Каймолла Рустем

Дәрігер

Madina Baigulova

Медикамент

N02BE01 Парацетамол

Доза

Тағайындау

Figure 7. Prescription of medicines.

In the "Medical history" tab, you can see information on analyses with the date and time indications (Figure 8).

Басты бет Кесте Емделушілер Науқас карталары Талдау нәтижелері

Профиль **Емдеу тарихы**

2020-01-23 00:00:00

- Общий анализ крови
 - Проверка на эритроциты

Madina Baigulova - АО "Клиника кардио медицины"

Figure 8. Information about the analyses.

In the same tab doctor is able to assign an analysis from the list to the patient. This list, if necessary, can be updated by administrator. When prescribing tests the

name of the doctor, who assigned the analysis, is recorded (Figure 9).

Figure 9. Assignment of analyzes.

Next page: Patient Records. Previously, doctor managed to open patients' cards' from other pages. This was done for convenience of user and to avoid necessity to open a separate tab every time after creating a new card or after viewing the list of patients

registered for appointments. But separate tab should exist, so doctor is able to find a card of any patient, even if there is record in the list of current appointments (Figure 10).

#	Емделуші	Дәрігер	Туған күні	Мекен-жайы	Жынысы	ЖСН	
1	Каймолла Рустем	1	1996-04-18	Нұр-Сұлтан қаласы, Е30 көш, 5	Ер	960418552244	Толығырақ
2	Каменова Мадина	1	1998-09-08	Енесай 2/1	Әйел	980908754201	Толығырақ
3	Ауэзов Бауржан Ауэзович	1	1999-06-16	Кенесары 2	Ер	990616452578	Толығырақ

Figure 10. Patient records.

The next tab “Test Results” allows doctor to see information on test results. Patients, whose results are entered into the database, are highlighted with a green

color. Patients, who received analysis referral, but do not have test results ready, are white (Figure 11).

#	Емделуші	Дәрігер	Дата	Мекен-жайы	Тип	ЖСН
#INV-1	Каймолла Рустем	Madina Baigunova	2020-01-20 06:12:00	Нұр-Сұлтан қаласы, Е30 көш, 5	Қан талдауы	960418552244
#INV-2	Каймолла Рустем	Madina Baigunova	2020-01-25 22:54:04	Нұр-Сұлтан қаласы, Е30 көш, 5	Диабетке тест	960418552244
#INV-3	Каймолла Рустем	Madina Baigunova	2020-01-27 16:00:23	Нұр-Сұлтан қаласы, Е30 көш, 5	Қан талдауы	960418552244
#INV-4	Каймолла Рустем	Madina Baigunova	2020-03-07 22:58:10	Нұр-Сұлтан қаласы, Е30 көш, 5	Қан талдауы	960418552244
#INV-5	Каменова Мадина	Madina Baigunova	2020-03-07 23:20:16	Енесай 2/1	Диабетке тест	980908754201
#INV-6	Ауэзов Бауржан	Madina Baigunova	2020-03-07 23:20:31	Кенесары 2	Эритроцит талдамасы	990616452578
#INV-7	Ауэзов Бауржан	Madina Baigunova	2020-03-07 23:20:36	Кенесары 2	Қан талдауы	990616452578

Figure 11. Test results.

If you go further the following window opens with test results shown. If test results are not average (normal) , then in the column “Deviation” the results are highlighted in red (Figure 12).

Талдау #INV-1

"Medclinica" ЖШС
 Нұр-Сұлтан қаласы 010000,
 Бөгенбай даңғылы, 25
 +7 7172 325874

Каймолла Рустем
 Нұр-Сұлтан қаласы, Е30 көш, 5
 +7 7476968089.

Талдау датасы: 2020-01-20 06:12:00

#	Көрсеткіш атауы	Нормаль	Мөлшер	Ауытқу
1	Қан талдауы	4.3	3.5	-0.8

Емдуші дәрігер: Madina Baigunova
 Емделуші: Каймолла Рустем
08-03-2020

Талдаумен бөлісу | Басып шығару

Figure 12. Deviation from the norm above the permissible limits

If deviation from average range is absent or slight, then results are highlighted in green (Figure 13).

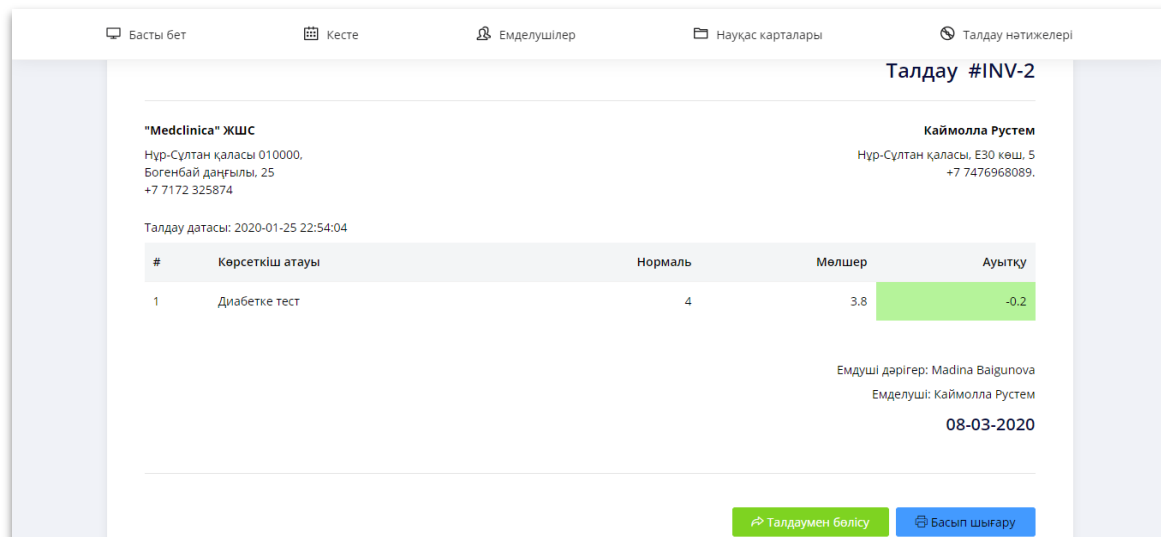


Figure 13. Deviation from the norm within the permissible limits

Also, if necessary, doctor is able to print test results or send them to another doctor as a link to this page (Figure 14).

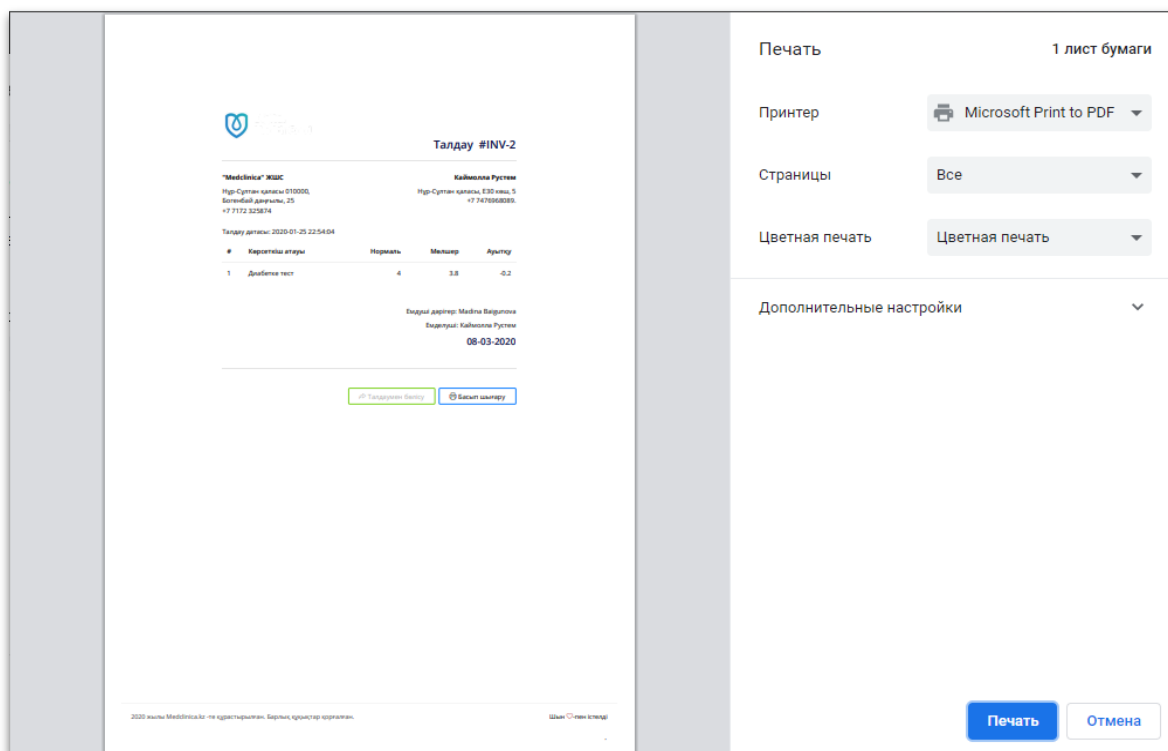


Figure 14. Test results for printing.

3. Conclusion

The benefits of using mobile and web technologies in the medical realm are apparent. On one hand, technologies can make healthcare more understandable, convenient and accessible for patients. Moreover, use of mobile medical applications positively affect users' health-related behavior. On the other hand, technologies ensure convenient service for doctors, which ultimately leads to significant medical services quality improvement.

The developed mobile application potentially will help to reduce the level of discomfort and stress from long doctor appointment queues, avoid possibility of viral diseases infection from sick people sitting in lines, and save patients' time. As for doctors, application will automate and facilitate their daily routine, consequently bringing positive impact on their work.

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ГИДРОИЗОЛЯЦИЯ ОБОРУДОВАНИЯ ЛЕГКОЙ ПРОМЫШЛЕННОСТИ

Тойбаев Кенжехан Дуйсебаевич

*доктор технических наук, академический профессор,
Казахская головная архитектурно-строительная академия
г. Алматы*

Закеров Мадияр Серикбаевич

*магистрант, факультет общего строительства,
Казахская головная архитектурно-строительная академия
г. Алматы*

WATERPROOFING OF LIGHT INDUSTRY EQUIPMENT

Toybaev Kenzhehan

*doctor of technical Sciences, academic Professor,
Kazakh Leading Academy of Architecture and Civil Engineering, Almaty*

Zakerov Madiyar

*graduate students, faculty of General construction,
Kazakh Leading Academy of Architecture and Civil Engineering, Almaty*

Аннотация. В статье рассмотрены методы гидроизоляции оборудования и их использования в легкой промышленности.

Abstract. The article discusses methods of waterproofing equipment and their use in light industry.

Ключевые слова: гидроизоляция, оборудования, климат, эксплуатация, материалы, полимербитум.

Keywords: waterproofing, equipment, climate, operation, materials, polymer bitumen.

Гидроизоляция оборудования нужна для защиты сооружений от разрушительного воздействия влаги. Грамотная обработка и защита оборудования позволит продлить срок эксплуатации, сделает их более надежными и долговечными.

Выбор гидроизоляционных материалов и методы из использования (нанесения) окрасочная, обмазочная, оклеечная, литая, пропиточные методы и конструирование гидроизоляции для различных сооружений в каждом конкретном случае требует анализа климатических факторов строительства и специфики работы каждого сооружения. Однако наряду со специфическими требованиями, предъявляемыми к гидроизоляционным материалам, должны учитываться и общие.

Основные требования для гидроизоляции оборудования.

В различных нормативных документах приводятся требования к гидроизоляционным материалам. Однако эти требования включают широкий перечень показателей свойств

гидроизоляционных материалов для всех климатических зон Казахстана. В связи с этим показатели свойств могут колебаться в широких пределах. В данной работе приводятся только основные требования, которым должны отвечать гидроизоляционные материалы в зависимости от условий их эксплуатации. Кроме того, эти требования сформулированы для материалов, применяемых в условиях РК.

Из определения гидроизоляционных материалов, как обеспечивающих защиту строительных конструкций от вредного воздействия воды и красителей, а также солей, следуют основные требования: повышенная водонепроницаемость и водоустойчивость при длительном воздействии воды. Кроме того, гидроизоляционные материалы должны быть теплостойкими, иметь хорошее сцепление с основанием, обладать деформативной способностью при расчетной температуре. Поэтому вначале были сформулированы основные технологические и эксплуатационные требования к материалу гидроизоляционных конструкций в