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Digital Technologies in Health Services: Old and New Challenges

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Abstract

ICT developments have affected all service sectors for several decades. Special occurrences, such as the Covid-19 pandemic, have accelerated the use of technological innovations in various fields. Health services have recently been one of the areas where digitalization is expected to bring great economic and social benefits. In addition to the benefits, many difficulties and obstacles exist for all involved partners. Evidence of the benefits and challenges of digitalization in the health service is the focus of this paper. The main purpose is to present an analysis of the current situation in Albania and to highlight the opportunities for further development, especially through the education of all parties and at all levels. The discussion is focused on the role of healthcare providers and beneficiaries in the successful use of telemedicine in Albania. It is closely linked to developments in other areas, such as education, digital infrastructure, data safety and protection, social policies, etc., making necessary all stakeholders' engagement in this advancement process.

Keywords: digital technology, telemedicine, telehealth, medical education.

JEL: I1, O3

1. Introduction

Huge technological developments, especially in the field of ICT, have accompanied and, in many cases, have preceded economic, social, and geopolitical changes for several decades. Advancements in ICT and its use in the public and private sectors have stimulated fundamental changes in many areas of production and radical transformations in the provision of various services. It has brought considerable inclusion in the social life of human society, like the use of social networks as a way of communication and marketing. Digital technology has proven to offer opportunities to speed up and improve the quality of services, accompanied by changes in markets and business models in both manufacturing industries and other areas of the economy, although it has been in use only recently.

Considering the role of information systems to support health and healthcare, WHO (2016) was recommending that "…

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in the 21st century the delivery of health care and improvements of health systems must consider the contribution of ICT as an essential and central component, not an add-on."

The Covid-19 pandemic is the latest environmental factor, but apparently, with a very high impact, which is driving the use of digital technology, through the integration of technological innovations in various sectors. Affected by this global crisis, many developed and developing countries are establishing strategies to overcome the current situation and prepare for future challenges (WHO, 2020), (WEF, 2020).

The Albanian economy has been affected and is part of these changes in all sectors, although the pace of advancement is variable. Many public services, including health, are involved in this process. Digitalization in healthcare and services is expected to bring many benefits. However, their realization necessitates the recognition and fulfillment of the requirements at the institutional and individual levels. At the same time, it is accompanied by challenges for all parties involved. The main purpose of this paper is to identify and analyze the situation of digital developments in Albanian health and to emphasize the opportunities for further development, through the commitment of all stakeholders.

The paper starts with a short presentation of digital development in health services and the expected and achieved benefits at the international level. The vast global experience, enriched in galloping proportions during the pandemic, can contribute to the country's efforts toward e-health adoption.

The second part of the article is dedicated to digital developments in Albania, especially those in the health system. The analysis of primary and secondary data has enabled us to identify the opportunities for using ICT in health services and the level of recognition of its benefits. Furthermore, the difficulties and challenges faced in the Albanian environment regarding the use of digital technologies in health services have been identified. The core of the paper is a survey carried out recently with healthcare providers from the Albanian hospital system concerning their knowledge and preparedness to use telemedicine tools in current and future work. The survey results and conclusions can serve as a modest contribution to stimulating digital developments in the Albanian health sector. With this intention, the study findings are made available to regional decision-making institutions and stakeholders in the health, social protection, and education fields.

2. Research framework

New knowledge and new science are developed all the time, in the health sector as well. What remains difficult in many countries and regions within them is the access of people in need to such new knowledge, expertise, and service. Advances in ICT can and have helped overcome some of these disparities by redistributing that knowledge and expertise to when and where it is needed.

2.1. Digital health development – an international framework

The use of ICT in the medical field started in the USA, in the late 1950-s, and early 1960-s, establishing the key services developed as Telemedicine. As a generally used term even recently, telemedicine means the use of telecommunications technology for the delivery of medical care or services in cases when the medical staff and the patient aren't in the same location. According to official publications (WHO, 2010), there have been

many definitions of telemedicine. In order to avoid confusion, the World Health Organization has adopted the following broad description of Telemedicine: "The delivery of health care services, where distance is a critical factor, by all health care professionals using information and communication technologies for the exchange of valid information for diagnosis, treatment, and prevention of disease and injuries, research and evaluation, and for the continuing education of health care providers, all in the interests of advancing the health of individuals and their communities" (WHO, 2010).

Telemedicine provides "in-distance" diagnosis and clinical treatment through ICT. Some of the telemedicine types are store and forward (mainly used in radiology, dermatology, anatomy- pathology), remote monitoring (mainly using smart monitoring devices for patients), real-time interacting services through online systems, telephones, or videoconferences.

The continuous development of ICT tools and the multiple ways they are applied in the health sector and in different countries have caused several terms to be mostly used interchangeably, although they differ from each other. Telemedicine (as the first term), telehealth, telecare, eHealth, and mHealth are among them. As WHO itself accepts "the many definitions highlight that telemedicine is an open and constantly evolving science, as it incorporates new advancements in technology and responds and adapts to the changing health needs and contexts of societies" (WHO, 2010).

Telehealth is a broader concept than telemedicine, as it includes non-clinical services, such as continuing education and health training, information and education of the population, online pharmacies, and laboratory services. Going further, always referring to WHO, "eHealth is the cost-effective and secure use of information and communication technologies (ICT) to support health and related fields. It encompasses multiple interventions including telehealth, telemedicine, mobile health (mHealth), electronic medical or health records (eMR/eHR), big data, wearable devices, and even artificial intelligence." (WHO/WP).

For the purpose of this paper, the terms telemedicine, telehealth, and eHealth are used in accordance with the above definitions.

However, before the start of the COVID-19 Pandemic, the health sector was among the sectors with the least use of digitalization, lagging behind other service sectors such as Tourism, Trade, Automotive Industry, Retail, etc. (The Economist, Dec. 2020).

This extraordinary global situation encouraged and emphasized the need for and importance of the spread of Digital Technology in the health sector, which included the public sector, the private healthcare sector, as well as manufacturers of medical instruments, providers of online services, etc. Observations during 2020 provide examples of significant advancement in this sector, noting that telemedicine use in the USA increased 30 times from January to June. There was also an increase in the use of diagnostic applications, online medical consultations and visits, the use of electronic prescriptions, and other medical needs, according to a survey conducted in May 2020 by Gartner (The Economist, Dec. 2020). Innovations applying Cloud-Computing and data-Analytics for medical use are being integrated with screening and diagnosis, well-being, research, and financial operations in health activities.

The interest in using telemedicine both in developed and developing countries – and not only in pandemic conditions – is related to the expected benefits from it. The main ones, mentioned in the literature and realized in practice include:

- greater access to medical care for patients, especially in remote and/ or rural areas (Hjelm, 2005), improved access to medical specialists and opportunities to distribute their knowledge to other colleagues (Eze et al, 2020), greater convenience and timely service for patients (Park et al, 2021), as well as other advantages to medical care units (Hicks and Boles, 2004), all at a potentially lower financial cost (Maia et al., 2019). The experts point out that if the new generation of digital technologies is to thrive it must "improve health, not increase costs" (The Economist, Dec. 2020).

Cost is not the only concern. Despite the high interest and use of some remote health services on a broad scale, the legal issues are attracting close attention. Regulators around the world are pressing healthcare providers to open up their siloed systems - a precondition for digital health to flourish. The EU is promoting an electronic standard for medical records. Apple, with its reputation for protecting users' privacy, is also championing a common standard. A combination of such efforts and regulatory pressure heralds "a new era" for digital medicine.

Still, there remains a difference between countries, regarding the importance and scope of legal issues, depending on their development status. The findings from the WHO Global Observatory on eHealth (2nd survey, 2010) show that developed countries are more likely to consider legal issues surrounding patient privacy and confidentiality, competing health system priorities, and a perceived lack of demand to be barriers to telemedicine implementation. On the other hand, developing countries are more likely to consider resource issues such as high costs, underdeveloped infrastructure, and lack of technical expertise to be barriers to telemedicine. Consequently, this affects the list of drivers and challenges considered for digital health development in countries like Albania, including this survey. Considering comprehensive legal issues that arise from the use of telemedicine is a must for policymaking in the future and requires expertise that goes beyond the scope of this study.

2.2. Telehealth in Albania

Albania has started the process of health digitization with the project ''Integrated Telemedicine and e-Health in Albania'' as part of the strategy of healthcare reforms by the Ministry of Health of Albania in cooperation with USAID since 2008. The project contributed to the establishment of the National Telemedicine Center of Albania in Tirana and 12 regional telemedicine centers (Latifi et al., 2015). The program was designed to install (1) a nationwide telemedicine network, (2) clinical programs, (3) educational programs, and (4) the e-library. They were completed in the period from 2008 to 2014 and the Telemedicine service has been in operation since then (Musta et al., 2015). The map of telemedicine centers on the Albanian territory is shown in Figure 1.

Fig.1. The map of telemedicine in Albania
(source Ministry of Health and Social Protection, http://www.biomedical.gov.al/)

Public investments done up to date in Telemedicine, Telecommunications, electronic prescriptions (system of health insurance and network of pharmacies included) (e-Albania, 2017), and setting up public hospital information systems have created an online experience and work culture. We can practically talk about telehealth in Albania.

The pandemic also brought developments in the private sector, mainly with initiatives that use mobile telephony, bringing services closer to a large number of users and reaching a wide territory of the country. Digital medical services through mobile phone (mHealth) by the Albanian Red Cross and Vodafone-Albania (www.vodafone-Albania), "Call a doctor" by Sigal Uniqa (sigal.com.al), Teledoc by OTP Bank (www.otpbank.al) are some of them.

However, the telehealth field is highly dynamic, and the telemedicine system installed in the national and regional centers (by 2014) needs a continuous update, as well as qualified staff that can advance simultaneously with the technology for getting the most of its advantages and avoiding the pitfalls.

There is experience and vast international literature about the preparedness of medical

staff to use all the available telemedicine instruments, while there are only a few studies related to Albanian telemedicine (Latifi et al., 2015), (Musta et al., 2015). Our work intends to modestly contribute to this field of study.

3. Methods

The recruitment and retention of qualified medical staff in regional health institutions remain a real challenge, especially when considering the demographic changes and the emigration trend of medical staff from Albania, mainly to EU countries. This trend recently highlighted and analyzed by foreign and local authors (Schmitz-Pranghe et al, 2020), (Gedeshi and King, 2018), makes the issue of capable human resources the key driver to better exploit digital health opportunities. This has brought us to the research question that is: how much the human resources in the Albanian hospital system are prepared to support and push forward the use of telemedicine.

Some auxiliary questions have been constructed to achieve the objectives of this paper on digital developments in health care:

- to what extent telemedicine is recognized by the staff in the health sector at the regional level,
- what are the possibilities of using ICT in the Albanian health service, considering the legal and administrative aspects,
- how much the expected benefits and challenges of using digital technologies in the Albanian environment are known to the staff of the health service.

The questionnaire. The study is based on primary data, collected through a questionnaire purposedly designed, and on secondary data from international literature. The design and construction of the questionnaire were based on the literature consulted and adapted to the specific case and nature of both the professional and social character of this paper. It is divided into three parts:

The first part intends to get general information about the respondents regarding gender, profession/ specialization, work experience, job position, etc.

The second part is built to get information about knowledge on telemedicine, staff perception of the usefulness of telemedicine, awareness about disadvantages, and knowledge gained about the safety of using digital technology in medical service.

The third part is structured to highlight the relationships between the reason for using telemedicine services, the difficulties that accompany it as well as the frequency of use.

The questionnaire was designed to be as easy and concise as possible in terms of its completion by all respondents, in order to obtain the most complete and useful information. Special attention was given to enabling the reliability of data produced by the questionnaire, as well as the validity of the questions, which were both checked with relevant experts during the preliminary testing.

The sample. Unlike a previous study that focused on the Tirana region, (Musta et al, 2015), where the main telemedicine center is located and where most of the employees are highly qualified, our survey was carried out in the southern area of the country, where two of the regional telemedicine centers are located (ref. Fig.1 above). It is in line with our objective to explore the coverage of the whole country in terms of health care provided in the secondary hospital service. Around 9% of the country's population is living in the chosen area and it is distributed in a territory of about 20% of the country's surface (INSTAT, Population of Albania, 2021). This choice serves the purpose of the

paper to assess the readiness of the system even in remote / less-favored areas. The two public regional hospitals serving this area's population do employ around 820 persons, medical and non-medical staff closely related to telemedicine use (excluding the auxiliary services staff that has no direct relation and influence on it). They have been the target of our survey, as their knowledge and capabilities affect the potential and efficiency of using available and future digital health tools in the region. It was not possible, and even not economical, to obtain the opinion of all the employees. Consequently, the questionnaire was distributed to 267 persons (going for a confidence level of 95% and confidence interval of 5), randomly chosen during their working shifts in a week, in order to make it representative of the population (Saunders et al, 2009). The questionnaires were returned completed by 104 of them, with a survey participation rate of 38.9%. All of them were fully filled in and valid to be considered for processing.

The sample composition regarding gender, profession, and work experience is as follows:

- 72% of the respondents are female, while 28% are male,
- Around 30 % are physicians and specialist doctors; 49% are physician assistants, and the other part is non-medical staff, including managerial and finance staff, law specialists, social workers, etc. Although this last target group is not directly providing services through digital tools, they play a crucial role in ensuring the consideration of legal and safety issues, creating and maintaining the right infrastructure, as well as supporting the staff-patient relations in the framework of telemedicine functioning. This reasoning has led us to consider their opinion side by side with that of medical professionals on all the issues the survey covers.
- Most of the respondents have at least more than 5 years of work experience in the sector (77%). Almost 20% of them have been working for more than 20 years, a fact that contributes to a higher average age of the medical staff in Albania.

The survey was designed to process the collected data by descriptive statistics and to visualize them with graphs and charts. The attitudes of different groups by profession and by age are examined, as well as their opinion regarding different factors driving the use of telemedicine. The correlation and regression analysis has not been used in this case.

However, the results of the analysis have provided useful information to enable discussion and response to the research question.

4. Results and discussion

Health is a high costs sector, for clinical, diagnostic, therapeutic services, as well as for preventive activities (vaccines and screenings) and education (health information and promotion). This necessitates a) investments in the maintenance of information systems and the inclusion of innovations and b) the preparation of medical staff for their use, increasingly including telemedicine.

For decades, the emigration of medical personnel has been a challenge in the health sector. The lack of health personnel in rural areas, and missing specialist doctors in regional hospitals, were caused initially by the migration of medical personnel to large urban centers, mainly in Tirana (Nuri, 2002), and then to EU countries (Gedeshi I, King R., 2018). This has led to a shortage of qualified staff and

specialists and an increase in age groups, who are less flexible in technology use.

Despite all of the above, the survey shows that respondents have good knowledge of telemedicine (Fig.2.). Such results answer our first auxiliary question, indicating that there are good opportunities for expanding the use of telemedicine. Moreover, even personnel with longer work experience, presumably of an older age, have knowledge in Telemedicine above the average level, even though these technological innovations have been used only during the last decade in the Albanian health system. The mean level of knowledge about telemedicine for all the respondents is 3,2 (out of 5), based on a five-point Likert scale.

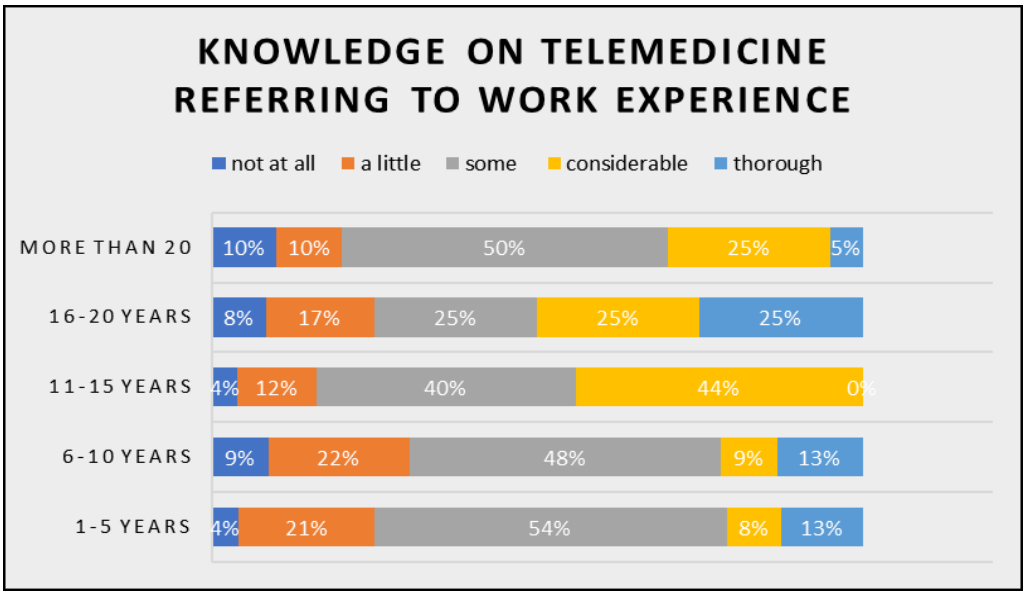

Figure 2. Knowledge on telemedicine referring to work experience.

Due to the Covid-19 pandemic, the experience of the last two years is mainly in the use of medical services through mobile telephony. Nevertheless, such experience has contributed to a better understanding of the opportunities for ICT use in health services even for the staff of the hospital's system. According to the respondents, there is a wide range of services telemedicine can be used for (Fig.3). We consider it more than a simple confirmation of the uses it has worldwide. Such awareness gives rise to the chances of using telemedicine through the systems installed in the regional hospitals in Albania, which corresponds to the objectives set by the USAID project. The use of those systems has been limited up to now, according to the opinion of the medical staff contacted to carry out our survey. However, measuring the intensity of using those services goes beyond the intention and capabilities of this survey.

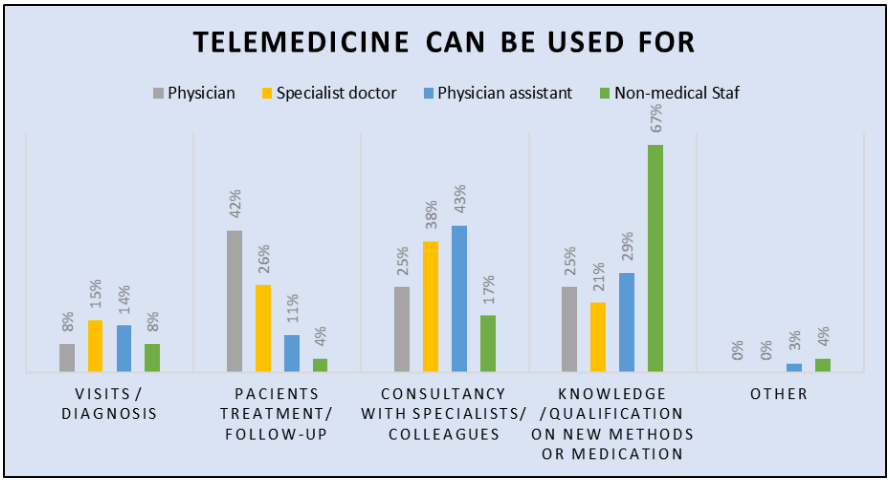

Figure 3. Services telemedicine can offer to patients, personnel, and the population.

When considering the benefits of telemedicine use, 63% of the respondents confirm it is effective (from some to thorough) in reducing the costs of patient care in hospitals. Telemedicine is accepted as a means to save doctors' time by 78% of the respondents, while 22% of them do not agree with this. Up to now, there is no local evidence regarding these expected benefits in the hospital centers, however, the existing belief is a driver for increased use.

As evidenced by the following graph, those respondents who think that telemedicine almost doesn't provide better, and faster medical care (11% and 25%) are consistent when answering the question on the extent to which telemedicine reduces the efficiency of patient care (29% and 43%) (Fig.4). Meanwhile, those choosing the above for the role of telemedicine in the provision of better and faster medical care consistently accept that telemedicine maintains the efficiency of patient care.

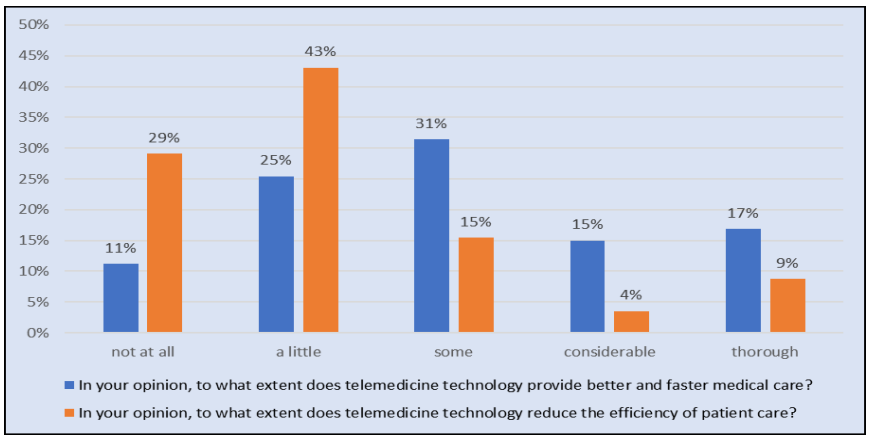

Figure 4. Benefits and risks of using telemedicine for patient care.

A deeper analysis of the responses shows that such consistency in having (or lacking) confidence in telemedicine is related to the profession and the experience of the respondents. Specialist doctors and physicians mainly are confident that the use of telemedicine is worthwhile, as it provides good medical care without compromising patient care. Non-medical staff and physician assistants have expressed their concern about these benefits and risks. In our opinion, this is related to their limited information, knowledge, and experience in the field.

There are several legal issues treated in the survey, with the intention to bring them to the attention of telemedicine providers and users, for actual and future actions. The safety issue is a concern even for the medical staff, although from the results (Fig.5) 52% of respondents think that Telemedicine does not endanger patient privacy and there is no need for a legal framework to avoid data breaches for 27% of them. Similarly, the need for legal clarifications for patients seems not important for 59% of the sample. As to the requirement for a formulated and clear framework to access medical information when using telemedicine services, 66% of the respondents consider it important. In any case, the law "On personal data protection" has entered into force in Albania since 2008 and it necessarily affects the health sector as well. Physical and electronic data storing requires long-term technical solutions in terms of protection from hackers, information leakage, and systems maintenance.

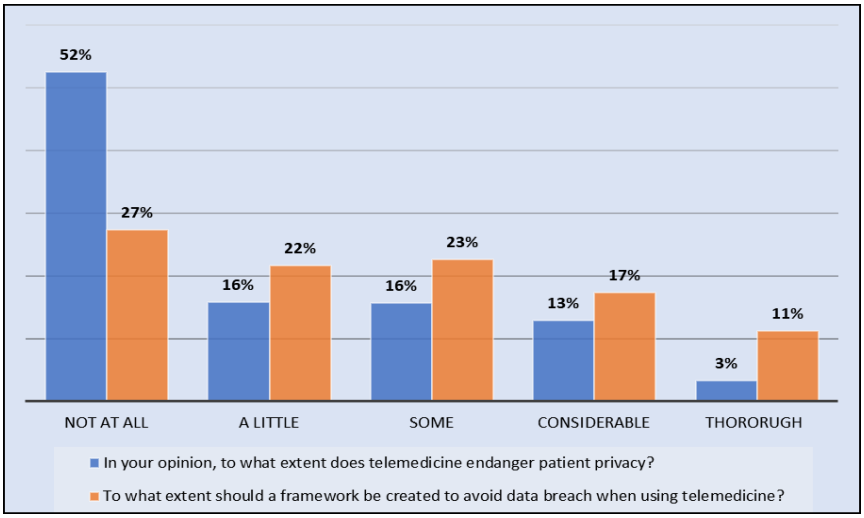

Figure 5. Safety concerns and telemedicine.

The legal issues are not the only challenge for digital technology in Albanian health services. Likewise in other countries, economic and social factors should be taken into consideration, including high costs of digital instruments (smartphones, remote sensors) and services, access, and availability of internet service. From a narrower point of view, the survey points out the following difficulties as most influential regarding the use of telemedicine: patients' and medical

staff' lack of access and/or knowledge, and shortcomings of administrative nature (Fig. 6).

Improving patients' access to and /or knowledge of ICT in medical service involves the public and private ICT infrastructure, combined with education issues. In our opinion, there is an obvious need for much greater engagement on the part of public and private education institutions, which would contribute to reducing the digital divide of the population and better preparation of new generations for a digital society.

As part of the whole survey, we got some suggestions from the interviewees regarding ways to improve the use of telemedicine in the future. In their opinion, an increase in the level of professionalism of the medical staff would contribute to their availability for an extended use of telemedicine, which confirms the research question of this study. Equal chances for training for all stakeholders and higher budgets are also needed for facing the new challenges ahead.

If considered, these suggestions can cause the reduction of obstacles of administrative and legal nature and can also give rise to the increased trust of patients in remote health services.

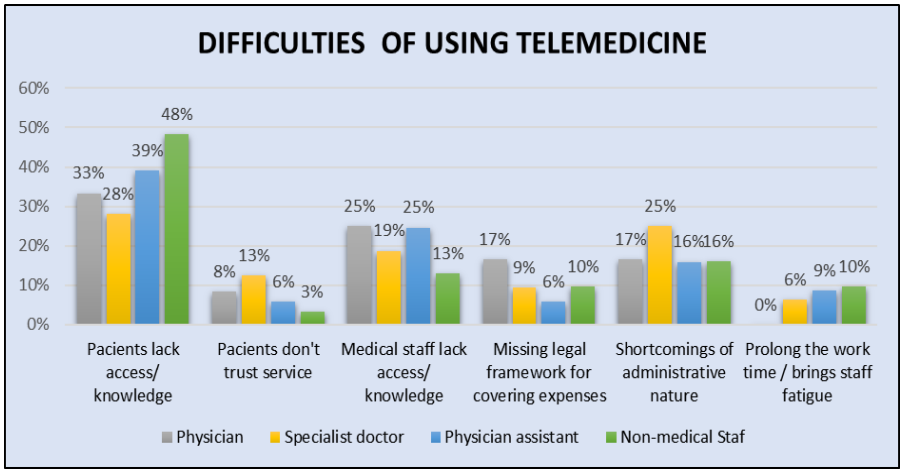

Figure 6. What hinders the broader use of telemedicine.

Furthermore, the public regional hospitals in Albania, especially those in the peripheral areas, have many similarities in terms of organization and staff characteristics (age structure, qualification levels, training opportunities, rewarding policy, etc.). This can permit a generalization of the survey results and recommendations for central and local decision-making institutions.

5. CONCLUSIONS

Innovative strategies in telemedicine and e-health are considered optimum choices to mitigate inadequate access to specialized healthcare and inequitable distribution of health services. Telemedicine has played a key role in expanding such healthcare access in many developing countries and remote areas around the world, however, the full potential of utilizing what telemedicine can offer has not been realized.

Strengthening the use of Telemedicine will bring long-term benefits to the health service, as a result of earlier diagnosis and treatment, especially for chronic diseases that have high treatment costs. The importance is further

emphasized as the demographic changes of the aging population and the emigration of health workers are taking place.

Albania has entered the road of health digitization and the human resources it engages are knowledgeable and willing to advance it, as this survey reveals. The pace should be accelerated by adopting best practices through the engagement of policymakers, businesses, civil society, and especially higher education institutions.

Acknowledgments

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6. REFERENCES

Eze N.D., Mateus C., Cravo Oliveira Hashiguchi T., (2020) Telemedicine in the OECD: An umbrella review of clinical and cost-effectiveness, patient experience and implementation. PLoS ONE 15(8): e0237585. https://doi.org/10.1371/journal.pone.0237585

Gedeshi I, King R., (2018) New trends in potential migration from Albania, Friedrich Ebert Stiftung publication, Tirana

Hicks L.L, Boles K.E., (2004) A comprehensive model for evaluating telemedicine, E-Health: Current status and future trends, IOS Press, USA.

Hjelm N.M., (2005) Benefits and drawbacks of telemedicine, Journal of Telemedicine and Telecare, UK.

Latifi R. et al (2015) Telemedicine as an Innovative Model for Rebuilding Medical Systems in Developing Countries Through Multipartnership Collaboration: The Case of Albania, Telemedicine and e-Health, June 2015.

Maia M.R., Castela E., Pires A., Lapao L.V., (2019) How to develop a sustainable telemedicine service? A Pediatric Telecardiology Service 20 years on - an exploratory study, BMC Health Services Research (2019) 19:681.

Musta Xh., Rama R., Boci A. (2015) Njohurite, qendrimet dhe praktika e punes se ofruesve te sherbimit te telemjekesise ne Shqiperi, Tirane. (Knowledge, attitudes, and work practice of telemedicine service providers in Albania).

Nuri, B. In: Tragakes, E., (2002) ed. Health care systems in transition: Albania. Copenhagen, European Observatory on Health Care Systems, 4(6).

Park H-Y. et al. (2021) Satisfaction survey of patients and medical staff for telephone-based telemedicine during hospital closing due to Covid-19 transmission, telemedicine, and e-Health, vol.27, no.7, July 2021.

Saunders M. Lewis P., Thornhill A., (2009) Research methods for business students, 5-th ed. Pearson Education, UK, ISBN: 978-0-273-71686-0.

Schmitz-Pranghe C., Mielke K., Ibricevic A., (2020) Making sure that the emigration of healthcare personnel works for all, BICC, Germany, ISSN (online) 2521-7801

The Economist, The dawn of digital medicine, December 2-nd, 2020.

WEF (2020), Digital Transformation, Building the healthcare system of the future.

WHO (2010), Telemedicine, Opportunities and development in Member States, Report on the 2nd global survey on eHealth, ISBN 978 92-4-156414-4.

WHO (2016), Global diffusion of eHealth: making universal health coverage achievable. Report of the third global survey on eHealth, ISBN 978-92-4-151178-0.

WHO (2020), Strengthening the health systems response to Covid-19, Regional Office for Europe, 17 June 2020.

WHO/WP, https://www.who.int/westernpacific/activities/using-e-health-and-information-technology-to-improve-health

e-Albania: https://e--albania-al.translate.goog/eAlbaniaServices/UseService.aspx?service_code=6088&_x_tr_sl=sq&_x_tr_tl=en&_x_tr_hl=en&_x_tr_pto=sc

www.kksh.org.al/kryqi-i-kuq-shqiptar-projekti-telemjekesia-nepermjet-telefonise-celulare/-

https://sigal.com.al/teleshendet/

USAID, https://ata.gov.al/2020/04/09/usaid-rrjeti-i-telemjekesise-i-rendesishem-ne-kohen-e-pandemise-dhe-te-distancimit-social/

https://www.otpbank.al/sq/lajmet/telemjekesia-banka-otp-albania-investon-ne-zgjidhje-mjekesore-inovator-per-punonjesit/

https://www.vodafone-albania/articles-al/telemjeksia-nprjet-celularit

https://shendetesia.gov.al/telemjekesia-inovacion-per-sherbim-cilesor-te-kujdesit-shendetesor

www.qsut.gov.al/telemjekesia