

The effect of changing information technology on doctor–patient communication

Éva Málovics – Beáta Kincsesné Vajda

Information technology is changing rapidly worldwide and likewise in healthcare. The digital revolution will have a great impact on how physicians interact with patients. The Internet has become a powerful healthcare tool for many people. This will have an important effect on doctor-patient communication, and the transformation of these relationships has become a fundamental question. Due to these changes, an e-patient movement has evolved. This process requires a significant change in the attitude of patients as well as physicians. After a literature research, in order to explore how participants in the Hungarian healthcare system stand with this issue, we conducted in-depth interviews with six highly educated patients with serious illness and with four doctors. We used the grounded theory method to discover the characteristics in the doctor-patient communication. Our results show that some elements of becoming an e-patient have appeared on the patient side, but the habitual barriers of paternalistic doctor-patient communication overwrite these efforts on both sides.

Keywords: Information technology, communication, e-patient

1. Introduction

In a networked society, the digitization of information and communication changes the way people communicate and co-operate. E-shopping, e-banking, e-learning, and e-health are becoming increasingly important in our everyday lives. The letter 'e' mainly means 'electronic', but it involves much more than just a specific technology and refers to a series of far-reaching social and cultural changes. When it comes to e-health and e-patient, it's not just about the opportunities offered by the Internet and social media. It is also about changing the health care system, and about the opportunities that this entails in making health care more efficient and more humane.

According to Meskó (2016), the e-patient model means opening up a conservative system of health care to innovations. Why is this system so conservative? There is a consensus that this is a very high risk area. "The stakes in medicine are very high; when you apply new technology, you play with the lives of people" (Mesko 2016). But do they not play with the same stakes in our barely functioning, unworkable health care system?

In recent years, innovation in the area of healthcare robotics has shown significant growth; robotic nurses and surgical robots have been created to assist medical jobs. This poses several questions, including ethical ones, to answer. Will robots replace nurses? Can machines give the warmth humans are capable of? Do machines objectify care receivers? (Stahl–Coeckelbergh 2016)

The lack of financial viability and the crisis in health care, as well as the problems of doctor-patient communication are in fact world phenomena. In his book,

Le Fanu (2008) argues that due to the unparalleled development of modern medicine in the 20th century, health care systems face four paradoxes:

1. Disillusioned doctors, despite the success of modern medicine.
2. Worried healthy people – surveys show that the proportion of people who worry about their health has also increased.
3. The growing popularity of alternative medicine.
4. The lack of financial viability in health care.

In this paper we try to investigate the topic of becoming an e-patient in all its complexity, and to explore the factors that contribute to the fact that many find this to be a good solution to the current problems of healthcare and doctor - patient communication, as well as those factors that hinder the realization of this concept in the Hungarian health care setting.

2. Innovations in the health care industry

Technological changes and new virtual devices may greatly influence the functioning of medicine. The way Internet and social network sites operate, basically determines individuals' attitudes towards healing, doctors, and patients. Finding and sharing information has become easier than ever, and a large number of online patient forums point to this need. Patients are no longer satisfied with the information provided by doctors, and they are also interested in the symptoms of those with similar diseases or symptoms, which on the one hand can increase anxiety and on the other possibly counteract the passivity of interaction with a doctor. Properly selected pages and groups increase the possibility of self-management. In rheumatology, for example, there are solutions that use social media to promote self-management. In addition, methods (applications) with which, for example, self-evaluation or sending information remotely to the doctor becomes easier, are constantly developing. Online solutions offer many benefits not only to users but to doctors, too, in healing as well as in learning and training. Despite the many benefits of using digital devices, they have drawbacks in the healing process as well: if meetings and personal consultations are replaced by digital interactions and information transmissions, the potential in human relationships – the expression of empathy, the interpretation of non-verbal signals in conversation – will be degraded, and also, there is a need for new regulations on the adequacy of the processing of personal data in the digital space. The isolation effect of electronic devices seems to be compensated for by new forms of communication and connections; the task being to create the right boundaries for this (Berenbaum 2018). In the extension of the physical limits of care, it is important to consider how much both medical staff and patients are willing to move away from the traditional physician-patient relationship (McCabe–Timmins 2016). Our previous research suggests that there is a growing demand for patient-centred care based on partnership (Kincsesné 2014).

Nowadays, the individual data collected by wearable sensors or activity trackers (e.g. step counter, sleep monitor) provide an opportunity for certain groups

in society to monitor and improve their fitness, and hence their health. The ability of the individual to be responsible for - and actually an administrator of - the improvement of their own health is called "self-quantification", which can be realized here through a system that helps the individual to gather relevant information for self-reflection and self-awareness. Related research has looked at the effectiveness of activity trackers from many aspects, and, according to some results, systems that are easy and enjoyable to use - making it easier and more enjoyable to improve fitness and health - are more likely to be recommended to acquaintances, and the likelihood of this is increased by the perception that the device has a positive effect on behaviour and by gamification as well. Social effects can also act paradoxically in this case – encouraging each other or engaging in common challenges may increase, while social pressure may reduce motivation (Ilhan–Henkel 2018).

Wearable technology (WT) not only includes activity trackers and smartphones. These only represent one category that works independently or is connected to other devices in order to convey information. In the other category, there are tools that record specific activity or measures (such as a heart rate monitors worn around the chest) that transmit data to some other primary device. A third category, now unspecified, consists of so-called smart textiles, the scope of which makes them a key future innovation. Wearable devices, after their appearance, almost immediately entered the area of health care, but there are still problems with the separation of healthcare-related and general use and with the clarification of classification for clinical use (Godfrey et al. 2018).

Technological solutions play an important role not only in prevention but also in patient care. Nisar–Shafiq (2018) in their research found that new generations of healthcare staff are eager to use the Internet and online social networks to communicate health-related information. They refer to prior research in which about sixty percent of physicians and sixty-five percent of nurses admitted using social network sites for professional purposes; and add that patients also feel that accessing information this way facilitates the understanding of treatment methods and thus promote better health outcomes. Therefore, it is becoming increasingly common for health information to be obtained from the Internet rather than from physicians. As a result, hospitals around the world have started using social media to communicate with patients. In developing countries, this type of information access is particularly important, as people in underdeveloped areas have easier access to information from professionals working in developed countries.

3. The effect of technological development on the doctor-patient relationship

Professionals generally draw attention to the fact that new technologies present both opportunities and dangers, which is also true for changes in access to health data. New technologies provide an opportunity to solve old problems in a new way, optimize communication processes, change old roles and hierarchies, improve the efficiency and quality of health services, and enable people to rethink / reconsider how they treat their health and illness (Meskó 2016).

The prevalence of blogs, webpages, customizable search interfaces and forums dealing with health care, diseases and prevention have led to more conscious consumers who access a significantly bigger mass of information, and for whom it is easier to get advice from other users. While doctor-patient relationships were previously characterized by the fact that all knowledge and information was in the hands of the physician, now the appearance of Internet has resulted in a shift, so that patients in an initiating role can even start a dialogue on their optimal health solution (PWC 2018).

Many doctors have a very negative opinion on patients using Google to answer healthcare questions, which is probably due to a variety of reasons. Doctors we interviewed justified rejecting 'internet' patients by claiming that this avenue resulted in patients receiving misinformation, and that it is intrinsically time-consuming to answer such questions. There were no mentions, however, of the fact that information received this way may be useful not only for patients but for doctors too. Knowledge sharing has at least two sides; on the one hand, knowledge is power, so if we share it, we seem to share our power. On the other side, knowledge is the only good that multiplies with sharing, and thus, its quality can improve (Davenport–Prusak 1998). On the basis of this, it would surely seem worth sharing knowledge with each other. However, for healthcare providers who are accustomed to hierarchy and to a monopoly of knowledge, it is clearly difficult to lose authority, despite it possibly leading to benefits such as better quality knowledge and service, greater consumer satisfaction, and adherence to health advice.

So, patients have more information about their own condition which leads to a completely new doctor-patient relationship: they may become partners. However, not only the increasing amount of available information plays a role in the transformation of medicine, but also technological development. With the development of smartphones and wearable smart watches, this awareness has entered a new level: consumers are not only able to read about the topics they are interested in, but they can also analyse easily available, objective and measurable data about their physical condition (Chiauzzi et al. 2015). Sooner or later, the usual medical visit will not begin with a personal meeting of the physician-patient; instead, the first step will be an e-mail exchange by which patients send their sleeping curves, cardiogram, blood oxygen level or even blood count recorded for weeks on their smart devices. These devices nowadays got within reach; it is no extraordinary anymore to see touchscreen gadgets on one's arm or wrist that records data twenty-four hours a day. And all this comes with a completely new patient-doctor relationship, as the information will be available to both sides, so that they will face each other as partners. More and more consumers are turning to dr. Google with the aim of prevention or self-diagnosis - this process cannot be stopped. There is a need for reliable, smart-tech, wearable or always available consumer applications and solutions (Wu-Luo (2019).

According to Fox (2008), those people who feel they have a lot at stake (e.g. users living with a disability or a chronic disease) are more likely to engage intensely with online resources. The author refers to a research in which 75% of e-patients with

a chronic condition stated their last health search affected a decision about how to treat an illness or condition and also calls our attention to the fact that the impact of an online search is proven to be more useful than harmful. Being an experienced e-patient in his words also means posting technical advice online about how to manage a certain disease as well as advising people about how to communicate with health care staff.

The emerging world of e-patients, according to Ferguson–Frydman (2004) can be characterized by the following phenomena:

- clinicians underestimate the benefits and overestimate the risks of the cases when patients use online health resources
- online support groups have become a significant source of information and emotional support, especially for those living with a serious or a rare disease, sometimes having an even more important role than medical staff
- net friendliness of physicians have become an important aspect of health-care quality.

The aforementioned trends are still highly disputed today; health care systems are known to be conservative and slowly changing, and many of the service providers do not want to accept these changes. This is a natural consequence of change; the first reaction of people as well as organizations, due to their basic need for homeostasis, is resistance to new things (Atkinson et al. 2002).

This situation is further complicated by the fact that healthcare-related work usually involves very high levels of risk, but risk perception of the parties varies greatly, as service providers are professionals, whereas patients are lay. Thus, thoughtful risk communication would be needed in many areas. Healthcare providers often perceive high-risk and high-responsibility solutions as barriers to new opportunities offered by technology (Yarbrough–Smith 2007).

4. Methodology and sample

Our research question is whether new directions that are predicted and considered important by technological changes can be discovered in physician-patient communications. One side of communication is represented by the patient: by his or her information, and where he/she obtains knowledge about the illness and its cure. The other party is the doctor and what he/she thinks about the changes in communication with patients in the light of the present technological changes.

Due to the complexity of our research subject, the qualitative part of our empirical research is made up of in-depth interviews, analysed by the grounded theory method. This method have several trends; in our research, we have used the improved version provided by Strauss and Corbin, according to which concepts already used in the literature may be used during the coding process, and both inductive and deductive logic are allowed. The validity of the research results is ensured by the fact that two researchers independently analyse the transcripts of the interview and then negotiate their analysis results. With a thorough study of the transcripts, the researchers search

for codes that are relevant to the research question in the text, and note all thoughts and ideas that emerge in the form of memos. After studying the first results they form categories from related concepts and explore the interrelationships between categories and search for key categories for answering the research question. Based on the relationships between the categories, the results are outlined in a research model (Charmaz 2013).

The analysis of our interviews was carried out in a constructivist interpretative approach: we studied the reports, intentions, actions of the subjects, and tried to follow the direction from the data. (Horváth–Mitev 2015) According to the interpretive approach, people are not only passively reacting to external reality, but through their inner perceptions and thoughts they examine the outside world, thus actively creating their own reality. It follows from the above that we do not intend to test hypotheses with the grounded theory method, but it is possible to formulate statements about how the subjects of the research interpret reality (Horváth–Mitev 2015).

Sampling was done with a snowball method, and we also used the quality sampling of the Grounded theory method, which means that the data that are already being prepared during the analysis of the interviews also direct us to who and what to ask. We have conducted interviews with 4 doctors and 6 patients. The grounded theory method does not require extensive interview structures, and we conducted the interviews along our research questions.

During sampling, our goal was to ask highly educated patients with severe illness because we supposed that the severity of the illness would provide sufficient motivation for getting information on possible therapies on the internet and that they had the necessary conditions to do so due to their level of education. Table 1 and 2 shows the data of our research subjects.

Table 1 Qualitative sample data – patients

Code	Sex	Age group	Disease
P1	Female	55–64 years	breast cancer
P2	Female	45–54 years	breast cancer
P3	Female	65–74 years	diabetes, hypertension, stroke
P4	Male	65–74 years	bladder cancer
P5	Female	45–54 years	CMT
P6	Female	75–84 years	skin cancer

Source: Own construction

Table 2 Qualitative sample data – doctors

Code	Sex	Age group	Specialization
D1	Male	65–74 years	abdominal surgeon specialist
D2	Female	55–64 years	oncologist specialist
D3	Male	25–34 years	internal medicine specialist
D4	Male	25–34 years	internal medicine specialist

Source: Own construction

5. Qualitative results

The results of the analysis of our in-depth interviews are presented on the basis of the most important categories and interrelations that were gained from the transcripts. Due to the difference of topics, we present the results of doctor- and patient interviews in a separate way.

5.1. Results of doctor interviews

Overall, we found that none of the doctors we interviewed heard about the concept of e-patient, they did not know what it could mean. Some of them created their own version of it but nothing about what it really means. Although they seem to consider doctor–patient communication important, they are satisfied with its paternalistic style. Internet use of patients is rather negatively perceived and they connect it to hypochondria. When we clarified the concept, they were somewhat sceptic about it and state e-patients are not present in their practice.

Regarding the detailed results, we found five important categories related to the research question to emerge.

First, they do not know the concept of the e-patient (*“I haven’t met it, but it may exist”* (D4)) The question thus arises: why hadn’t they met such a thing when many patients surely read about their illness, and possibly about therapies on the Internet? Why doesn’t patient knowledge figure in consultations? We believe that it is due to the paternalist culture in which both patients and doctors are socialized in our culture. Several doctors have tried to highlight the issue of lay patients discussing their therapies with the example of car mechanics. However, we consider the example of car repair is inadequate to use in this situation, as patients know their body better than a car. People may have greater knowledge about health, certain diseases that have occurred in their family, and if there is a problem, many are very motivated to get information – which usually does not happen with cars.

Second, patients who are informed or search for information on the Internet and wish to participate in decisions are evaluated negatively. They consider lifestyle issues an important area in which patients should be informed, but overall, they state therapy decisions should be made by doctors; *“there are cases where there is a standard treatment, but the patient arbitrarily thinks he is not taking it now because he read this and this and all that, so unfortunately, we see this, for example in chemotherapy treatment, that patients read something bad about it and does not start it despite that he should, so from this point of view, reading about it is negative”* (D4)

In her TED talk, Heffernan (2012) states that health care is very conservative, it is changing too slowly, and proven new procedures are not entering therapies promptly enough, costing lives. According to Heffernan, what has changed is that today this information no longer reaches only doctors, but is also available to a large number of patients, often sooner than to doctors. Consequently, information asymmetry has been reduced, but patients can only discuss this new information with friends on- and offline, not with doctors. Their paternalistic style has not changed, and

in part because of this, trust and satisfaction in physician–patient communication has reduced. The negative effects of the Internet were emphasized by all interviewees. However, no-one talked about the possibilities of channelling patient energy spent in information searches to improving the quality of the cure. *“There will be more and more people spending more time searching for information on their own health issues on the Internet, but the issue of how competent they are depends on and how much false information and stupidity can be found there”* (D3).

Third, there are generational differences among doctors. Younger doctors believe that they are in a more symmetrical partnership with patients than older doctors. *“They do not like the “smart patient”, so to speak, but during my professional practice I spent in Kecskemét, there was a younger doctor, a specialist, he was 30 years old, he was a gentleman, and he explicitly encouraged patients to search for information, and to ask anything”* (D3). Generational differences are also perceived in connection with ICT use. *“... in the electronic space that doctors have, there are such pop-ups as in the browser, which reminds the doctor of what information is incomplete (...) I cannot imagine that an older general practitioner deals with it, for a younger, obviously, this might be a motivation.”* (D3).

Fourth, doctor–patient communication is considered to be important, but has many barriers. One of the aspects assumes that patients are incompetent, therefore, they only see what is easy to notice. *“They only see or experience the way their dentist talk, how he approaches the situation, how he treats them, so he can be a good professional, but if meanwhile he ‘kicks’ patients, they won’t come back to him, as they don’t have the competence to see whether the work done was any good”* (D3). During their university studies, our subjects didn’t perceive communication as having much importance. moreover, organizational hierarchy and lack of time favors one-way communication: *“in inpatient institutions there is a very strong hierarchy within the medical community... doctors in lower positions are entrusted with the care of the patients, and senior doctors only supervise them. ... They only meet the patient effectively during visits, and there is the expectation that there should be silence, everyone should lie well, answer 3–4 questions they receive... there is little time, we are moving on... we have a department, with let’s say 4 wards, 6 people in every ward, and the visit should take place in 1 hour”* (D3). According to our subjects, this type of hierarchy sometimes creates humiliating situations for younger doctors, as older doctors correct them in front of patients, thus, they receive negative feedback in public. As we go up in the hierarchy, the control distribution becomes more asymmetric and communication is increasingly one-way. Strong hierarchy worsens communication in many respects, the powers of non-doctors are severely limited in terms of communication, the are not confident enough to provide information, and those in high positions are unwilling to do so, while “small fry doctors” are overwhelmed with this. Money is a tool that improves communication; with patients who pay, two-way communication is more frequent. The ever-growing role of technical innovations could theoretically also improve doctor–patient communication, but doctors we interviewed saw this in different ways. Since they introduced the so-called EESZT, there has been a lot of disruption, some of our subjects were grateful

that it was not working, others have seen many benefits. As for the role of communication in adherence, its difference from the concept of compliance was mentioned: *“I think there is compliance as a professional term, maybe I think it is outdated. and now they are trying to introduce adherence instead. It does not mean that the doctor will tell you what to do, and the patient will obey, but that together, there is an adherence between them, which means mutual trust (...) Both parties are trying to find the solution that is acceptable to both of them ... I think the doctor who communicates properly with his patients will get this adherence... roughly, this is typically what is dependent on communication”* (D3). We can also see that although our subject knows the words, but cannot understand fully what adherence means; he is talking about communication tricks to make the patient accept the selected therapy willingly: *“...one learns communication tricks that can make the patient feel a little better, and otherwise these are not great tricks, let's just say a nice comment, smile, saying please, thank you, and so on (...) so if this adherence is created, and that is why they seek it, the majority of doctors will strive for it”* (D3).

Finally, the role of new technological trends and robotization is acknowledged and considered to improve the relationship between doctors and patients.

5.2. Results of patient interviews

According to the results of the interviews we conducted with patients, we could not find a "real" e-patient. The characteristics of the e-patient were best approached by one of our interviewees, looking for doctors with whom she could talk about the therapeutic options and with whom she could participate in decisions. However, she does not share her experiences on the Internet, although anyone can contact her in person, and she likes to share her knowledge. She fears the Internet because of the possibility of negative opinions, envy, because the therapies she chose have cost her a lot.

Based on the information retrieved from the interviews, we derived nine relevant categories.

First, the importance of searching information about the therapy is acknowledged, although our subjects use different methods for that purpose; problems of information provided by different doctors also emerged. Our respondents were informed from different sources about their illness and possible therapies. Although we were deliberately looking for well-educated patients (there were health care workers - assistants - and a biologist - genetic researcher and medical researcher - among them), it is interesting that this did not significantly affect being an e-patient, although everyone had "e-patient" attitudes, but none could be considered an e-patient as described in the literature. However, all the interviewees searched for information themselves according to their means: *“I got the paper, I went home, I turned on the Internet, I checked that it was a two-degree, so-so-centimeter, so I was informed from the Internet, as despite all the pleasant atmosphere and compassion there was no time to explain it to me there how much I am in trouble, but it was understandable”* (P3). Our subject, who is a researcher, read studies of her illness in the original literature and took it to the doctors who were not always willing to take it into account –

therefore, she changed her doctors. Patient-specific initial confidence was replaced by a series of disappointments due to rigid, incomplete information, and quickly enforced decisions. Patients did not have time to think, nor did they dare to ask for it even before serious decisions: "... *The doctor said that I should have chemo and there are two types, the stronger one, either I go through with that, or a milder type that actually doesn't let the hair fall, but actually that the former is safer. And then I said if I could bear it, let's have stronger one, I didn't have more info about it all, it would have been a good idea to have a booklet about it because it was serious there... communication is always distorted, there was a decision to immediately put everything right there and then, no questions come to your mind... you don't think there can be lasting side effects, it turned out that the picture is not so bright...* (P3). The various specialists advised our subjects quite differently, which also had a negative impact on them. Sometimes it was only the solution that was announced. Most of the patients accepted incomplete information because of their gratitude for quick treatment, and they didn't dare ask for more in most cases. Also, in many cases, doctors used one-way communication in giving information that was hard to understand, and different specialists happened to communicate different prospects, depending on patient responses.

Second, patients misunderstand doctors in several cases, which frequently comes up later, because they do not dare to question them, or had no chance to do so. This is a typical drawback of one-way communication, which is often used in healthcare.

"... *And then they sent me off telling me it is ok, and I became very happy about that, but they sent me to oncology too. And I went there, why not, and there came the bad news, the doctor told me there that the picture is not so clear, I should have chemotherapy*" (P3).

Third, most respondents perceived the lack of time in communication, it was not clear for them how much time they have for the consultation, and this contributed to the one-way communication: "... *The doctor was in a hurry, but told me what was needed. And it was a very big slap when he said it was going to be an operation and then I hoped for a moment that they were mistaken or there was only an inflammation (...) then he said it is going to be mastectomy* (P3).

Fourth, at many specialist departments, patients wait for hours in crowded, airless places, in extreme cases leading to people collapsing. It so happens that little individual sensitivity is accepted, although the patient remarked: "I only see the present of the doctor-patient communication, but the future is the big question mark. I see the present as being very overcrowded (...) This affects me even more, because my blood pressure is very high and I take the prescribed medication in vain. During my last four visits I got sick... I usually go for an appointment, but for some reason they are always disrupted" (P6).

Fifth, paternalism, due to its relevance in our culture, is actually instilled in the behavior of patients: "I don't have doubts, why should I? I'm not the doctor, if he thinks this is okay for me, then he must be right" (P2).

Sixth, most patients feel empathy with doctors because they see that there are many patients, and all our subjects used their relationships within the system, hoping to get better treatment, so they thought they had to tolerate incomplete communication. They didn't need to wait for long, so they're very grateful and feel they have no right to self-advocate.

Seventh, every interviewee turned to their doctor with confidence and trust when their illness was confirmed. *"I trust him in that he will do everything that is meaningful and what is reasonable and (...) and will do so with the necessary attention"* (P6).

Eighth, the importance of kindness and attention is acknowledged. Our respondents, according to their stories, met with lots of kindness and attentiveness from health professionals.

Ninth, disappointment also appeared: all of our subjects reported abusive treatment, abuse of the patient's vulnerable position, and denial of basic, legitimate requests, as well as brutal honesty and lack of empathy: *"The nurse said this was an emergency department, not a luxury hotel and I didn't get my nose drops out of my bag, though I couldn't breathe"* (P1)

6. Summary and conclusions

As a result of technical changes, the risk perception of patients and healthcare professionals is also changing. Patients who are informed about their disease and its therapy from the Internet go to the doctors with some knowledge, while doctors offer them the protocol, even in cases in which they are already aware that it is being challenged professionally. Patients assume a special status with their knowledge of their symptoms, which has led to the notion of "lay expert" in the literature. If they are able to share this knowledge with their physician, actively engage in the development of their health, and share their knowledge and experience in online patient communities, they become e-patients.

According to our research, the concept of e-patient seems rather idealistic and impracticable in a Hungarian setting, and patients are convinced that only paternalistic communication is possible in the field of health services, so they seem to accept the doctor's decision on therapy. Our respondents first usually turned to their doctors with confidence and were partly satisfied with the information, but as they began to get in touch with newer health professionals, more and more deficiencies were discovered. It seems that the initial trust in the doctor is disrupted by other information. As the patient's knowledge is not included in the communication, but information asymmetry between the two sides increases, it causes loss of trust and dissatisfaction in the patients.

During therapy, the majority of those interviewed do not dare to discuss their knowledge, doubts, and questions with their physician. They are under stress, they are embarrassed, they don't know how much time they can spend with the doctor. Using the functional model of communication, the patient detects a very asymmetric control

distribution favoring doctors, with both positive and negative manifestations of affection. Affiliations would be important, but medicine has changed in a mechanical direction, which has brought some disadvantages for both sides. It is important for patients to know how much time they have at the consultation and what to ask and communicate in a few minutes. Our conclusion is that although the respondents are actively addressing the issue of their recovery, doctor-patient communication takes place in the traditional paternalistic style, one of the reasons being the patient's attitudes, and hence patient education would be needed to increase the effectiveness of clinical service.

Acknowledgements

This research was supported by the EU-funded Hungarian grant EFOP-3.6.1-16-2016-00008.

References

- Atkinson, R. L. – Atkinson, R. C. – Smith, E. E. – Bem, D. J. – Nolen-Hoeksema, S. (2002): *Pszichológia*. Osiris Kiadó, Budapest.
- Berenbaum, F. (2018): E-Health, social media, and rheumatology: Can they get along? *Joint Bone Spine*, 85, 3, 265–266.
- Charmaz, K. (2013): Lehorgonyzott elmélet. In: *Kvalitatív kutatási olvasókönyv - Szavak, képek jelentés*. Bodor P. (szerk.) Budapest: L'Harmattan Kiadó.
- Chiauzzi, E. – Rodarte, C. – DasMahapatra, P. (2015): Patient-centered activity monitoring in the self-management of chronic health conditions. *BMC Medicine* 13:77 DOI 10.1186/s12916-015-0319-2
- Ferguson, T. – Frydman, G. (2004): The first generation of e-patients: These new medical colleagues could provide sustainable healthcare solutions. *British Medical Journal*, 328, 7449, 1148–1149.
- Davenport, TH, – Prusak, L. (1998): *Working knowledge: How organizations manage what they know*. Harvard Business Press.
- Fox, S. (2008): The Engaged E-Patient Population. <https://www.pewinternet.org/2008/08/26/the-engaged-e-patient-population/> Accessed at 30 April 2019.
- Godfrey, A. – Hetherington, V. – Shum, H. – Bonato, P. – Lovell, N. H. – Stuart, S. (2018): From A to Z: Wearable technology explained. *Maturitas*, 113, 40–47.
- Heffernan, M (2012): Dare to disagree. TED talk, https://www.ted.com/talks/margaret_heffernan_dare_to_disagree?language=en
- Ilhan, A. – Henkel, M. (2018): 10.000 Steps a Day for Health? User-based Evaluation of Wearable Activity Trackers. *Proceedings of the 51st Hawaii International Conference on System Sciences*, 3376–3385.
- Horváth, D. – Mitev, A. (2015): *Alternatív kvalitatív kutatási kézikönyv*. Alinea Kiadó, Budapest.

- Le Fanu, J. (2008): *Az orvostudomány önkritikája*. Typotex, Budapest.
- Kincsesné, V. B. (2014): Az egészségügyi ellátás minőségének SERVQUAL szempon্তু mérése. *Marketing és Menedzsment*, 48, 1, 47–58.
- McCabe, C. – Timmins, F. (2016): Embracing healthcare technology – What is the way forward for nurse education? *Nurse Education in Practice*, 21, 104–106.
- Meskó, B. (2016): *Az orvoslás jövője*. HVG Kiadó Zrt, Budapest.
- Nisar, S. – Shafiq, M. (2018): Framework for utilisation of social media in Pakistan’s healthcare sector. *Technology in Society*,
<https://doi.org/10.1016/j.techsoc.2018.09.003>
- PWC (2018): Top health industry issues of 2018: A year for resilience and uncertainty. <https://www.pwc.com/us/en/health-industries/assets/pwc-health-research-institute-top-health-industry-issues-of-2018-report.pdf> Accessed at 5 May 2019.
- Stahl, B. C. – Coeckelbergh, M. (2016): Ethics of healthcare robotics: Towards responsible research and innovation. *Robotics and Autonomous Systems*, 86: 152–161.
- Wu, M. – Lou, J. (2019): Wearable Technology Applications in Healthcare: A Literature Review. *ONline Journal of Nursing Informatics Contributors*, 23, 3, available at <http://www.himss.org/ojni>
- Yarbrough, A. K. – Smith, T. B. (2007): Technology Acceptance among Physicians: A New Take on TAM. *Medical Care Research and Review*, 64, 6, 650–672.