

**The Impact of Technology on the Therapeutic Alliance: Examining the Perspectives of
Health Professionals**

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Abstract

The usage of technology in direct patient care is increasing in healthcare. Simultaneously, proceeding worries of health professionals about establishing a working therapeutic alliance with their patients are present if extensively implementing technology in treatment. This study investigates the perceived impact of technology that is used in direct patient care on forming a therapeutic alliance from the perspective of health professionals. Qualitative research, including semi-structured interviews, was conducted. A thematic analysis was applied with the assistance of ATLAS.ti. The sample consisted of 11 participants, including three clinical psychologists, three clinical psychology master students, one psychiatrist, and four other healthcare professionals. Despite the current worries from professionals, the analysis did not reveal a negative impact of technology on the formation of a therapeutic alliance. Further, the increase in patients' comfortability and accessibility to treatment was perceived as beneficial. Still, situational, technical, and interpersonal difficulties appear to be problematic. Additional research ought to analyse means to overcome these difficulties and discusses how further investigations of job-specific samples will add to the understanding of the use of technology in direct patient care and the impact on the therapeutic alliance.

Keywords: health professionals, technology, therapeutic alliance, patient care

The Impact of Technology on the Therapeutic Alliance: Examining the Perspectives of Health Professionals

In our rapidly emerging world, healthcare professionals experience an increasing influence of technology on their daily routines. “eHealthcare refers to services in healthcare using the Internet and includes the use of such technologies as connected devices, computers, mobile phones, websites and applications” (Ben Arfi et al., 2021, p. 2). Nowadays, patients are offered the possibility, amongst others, to recourse to medical aid digitally, or to communicate with health professionals via phone (Konttilla et al., 2018).

During the spread of COVID-19 and the corresponding reduction of personal contacts, the need for innovative technologies became prevalent in psychologists’ work as well (Connolly et al., 2021). A variety of applications can be implemented in this work field, namely apps, expert systems, or electronic devices carried by patients (Zhang et al., 2022). The several opportunities in eHealthcare raise interest in studying its implications for the involved stakeholders. This research aims to gain insight into the perceived impact of technology on health professionals’ work life including a special focus on the patient-carer relationship.

Opportunities and Challenges of Technology in Health Care

The administration of recent technologies in the healthcare sector provides numerous benefits. First, research has shown that it can decrease expenditure, which accounts for the supplier and the recipient (Dhagarra et al., 2020). Furthermore, a study by Jansen-Kosterink et al. (2019), which focused on a telehealth application, revealed that partakers valued the versatility and the shortened travel period provided by the tool. Moreover, the devices aim to improve the professional’s interconnection with the client and decrease the need to consult a professional (Tao et al., 2020). The implementation of digital tools in mental health care supplies the opportunity for patients to be able to receive guidance unaccompanied by the need to travel or feeling ashamed on account of societal dishonour (Schueller et al., 2019).

As the adoption of these technologies is a contemporary evolvment, several doubts, and hindrances are present. First, some suppliers fear the processing of the confidential data involved and the necessity of expenditure to establish e-Health tools (Yagiz & Goderis, 2022). Furthermore, individuals without sufficient experience with the proper use of digital tools may face issues, if

eHealth applications are increasingly used (Fagherazzi, 2020). Additional limitations as argued by psychotherapists in Germany include “data safety issues, technical problems, a severe course of disease and insufficient e-mental health education and infrastructure” (Sander et al., 2021). It becomes visible, that there are concerns on behalf of online therapy present from the viewpoint of professionals.

Conditions for Implementing Technology in Health Care

To successfully implement eHealth tools, certain conditions need to be present. A review by Tao et al. (2020) disclosed that adopting modern technologies in the healthcare domain is linked to a feeling of functionality and a confident viewpoint by the consumer towards it. Therefore, health professionals need to detect benefits of using eHealth tools and simultaneously be open-minded regarding using e-health tools. Similarly, professionals need to own sufficient digital skills compared with the genuine intention to adapt them to achieve benefits through technology (Konttilla et al., 2018). As a result, employees in healthcare are the key actors in the potential accomplishments of eHealth.

Another contributing factor to implementing technology in healthcare is the perceived threat to the individual’s professional identity. This concept refers to the place an individual assigns himself in the workplace with a toolbox and which is further linked to the overall behaviour at work (Rees & Monrouxe, 2018). This means that professional identity influences how professionals work and consequently how they act in their daily lives. The building of professional identity is especially in healthcare of essential importance, as Holden et al. (2012) describe it to be “the transition from lay person to physician”. It is a manifold concept as it not only includes academic education and experiences in the workplace, but the formation of a professional identity includes factors such as the individual’s social or religious background as well (Cruess et al., 2014). Research has shown that caregivers owning an extended feeling of professional identity can be able to show increased efficiency at work because they feel entitled to realise advances (Landis et al., 2020). Correspondingly, too powerful professional identities can result in unproductive authority or failing cooperation among colleagues (Rees & Monrouxe, 2018). Recent technologies can be recognised as a danger to professional identity as health professionals can feel that their professional identity is jeopardised through technologies such as applications that can establish a proper therapy for the patient (Heinzl et al., 2018).

The Therapeutic Alliance

The therapeutic alliance between a patient and their therapist plays a significant role in the success of treatment (Baier et al., 2020). The term therapeutic alliance can be defined “as a collaborative relationship between therapist and patient that is influenced by the extent to which there is agreement on treatment goals, a defined set of therapeutic tasks or processes to achieve the stated goals, and the formation of a positive emotional bond” (Baier et al., 2020, pp. 1-2). Previous research suggests “that an ongoing, consistent therapeutic alliance offers a sense of predictability and coherence, bridging past, current, and future care” (Hamovitch et al., 2018, p. 956) and that patients appear to increase the completion of necessary tasks applying to their needed care if a powerful relationship has been built with the professional (Zorzella et al., 2015). The importance of a working therapeutic alliance is consistent throughout various disorders (Buchholz & Abramowitz, 2020), which adds to the demand to establish it properly.

A principal factor in a working therapeutic alliance is that the practitioner acknowledges that the building of this relational connection is associated with the steady effort to make it last effectively (Negri et al., 2019). Hence, relationship building is an approach that guides the entire treatment process and professionals need to react to circumstances that can have an impact on the alliance.

Notably, the execution of online therapy in mental health care settings leads to the emergence of worries from the viewpoint of professionals. A study from Israel, that examined the evaluation of executed online therapy, revealed that psychologists appraised the trials as satisfactory and successful, but still were worried about the development of a durable interpersonal connection, amongst others (Machluf et al., 2021). Békés et al. (2021) examined the anticipated difficulties of psychologists conducting online therapy at the beginning of the COVID-19 pandemic. They detected that their concerns about the implementation of online therapy and their effect on the therapeutic alliance declined after accustoming to it for three months. However, Békés et al. (2021) noted, that disturbances were experienced prevalently throughout treatment and appeared frequently within the period of investigation. Accordingly, a profound assessment of the entirety of experienced obstacles to the establishment of a therapeutic alliance in online therapy and its possible countermeasures can add to the success of digital treatment.

Due to psychologists' existing worries concerning the perceived threat to the establishment of a therapeutic alliance in online therapy (van Lotringen et al., 2021), there is existing advice to counteract. Lopez et al. (2019) recommend openly communicating about the perceived value of this type of care and possessing a backup plan in case of technical collapse. Still, long-term recommendations to successfully initiate a strong therapeutic alliance via online therapy are lacking.

Research Question

Although digital mental health services are already in use, an extensive amount of valid literature concerning the implementation of online therapy, including its lasting effects on both the practitioner and patient, as well as individual testimonials ensuing the pandemic is missing. Subsequently, the study aims to explore more comprehensively the effects of online therapy on the therapeutic alliance between a patient and their practitioner from the viewpoint of the professional with the following research question: *What is the perceived impact of technology used in direct patient treatment on the formation of a therapeutic alliance according to a health professional's view?*

Methods

Design

A qualitative descriptive study was conducted to gain insight into the perceived impact of technology on the daily operations of health professionals. This study particularly examined the impact of technology used in direct treatment for the development of a therapeutic alliance among the practitioner and their patient. Data was analysed through a thematic analysis as part of a larger study researching the impact of technology on the job of healthcare professionals. Subjective experiences of both health professionals and clinical psychology master students, currently performing clinical internships, were gathered. As extensive literature concerning individual attitudes on the technology implemented in healthcare is limited, it was considered proper to conduct qualitative in-depth interviews to acquire an enhanced understanding of this matter. The interviews were conducted and shared among two researchers. The ethics committee of the Faculty

of Behavioural, Management and Social Science of the University of Twente confirmed ethical approval under request 230347.

Participants

The researchers recruited 11 participants in total. The participant's ages range from 23 to 63 with a mean age of 38.9 years ($SD = 13.47$). The entirety of the participants possessed experience with technology prior to exercising their profession. The sociodemographic characteristics of the sample are displayed in Table 1.

Table 1

Sociodemographic Characteristics of the Participants

| Characteristics | N | % |
|---------------------------|---|-------|
| Gender | | |
| Men | 2 | 18.18 |
| Women | 9 | 81.81 |
| Nationality | | |
| Dutch | 6 | 54.54 |
| German | 5 | 45.45 |
| Profession | | |
| Clinical Psychologist | 3 | 27.27 |
| Psychiatrist | 1 | 9.09 |
| Other Health Professional | 4 | 36.36 |
| Master Student | 3 | 27.27 |

Note. N=11

Procedure

The execution of the study took place between April and May 2023. The interviews were conducted with either health professionals or clinical psychology masters from Germany and the Netherlands. Initially, solely health professionals should be included in the sample. They were reached via convenience and snowball sampling and contacted via e-mail, which were gathered through a search on Google. Due to a lack of obtained responses during the period of data

collection, clinical psychology master students were included as a result of a joint decision between the researcher and the supervisor. With the assistance of the supervisor, a call for participation in the study was published on the learning management system Canvas. Subsequently, the master students contacted the researchers via the issued phone number. Finally, individuals must be healthcare professionals directly assigning treatment in their job or internship to be included in the study.

An informed consent (see Appendix A) was signed prior to conducting the interviews. Personal data, such as name, age, gender, and nationality were gathered. Additionally, they were informed that the recordings of the interviews were stored safely until August 21, 2023, and deleted afterward. Four participants were interviewed via Zoom, one via Teams, and six via phone.

Materials

For the development of the interview guide, the two corresponding researchers established a set of general questions for basic information considering the professional's exact type of work and additional queries to be able to answer the individual research questions. Each researcher individually conducted one pilot test, lasting 19 and 29 minutes, to identify any needed adjustments. Minor modifications ought to be made for the subsequent interviews. The eventual data analysis included solely the given answers from unaffected questions. Because of the given time limit, the pilot tests were only executed with health professionals. The final interview guide for health professionals can be found in Appendix B, while the one for the master students appears in Appendix C.

Finally, the developed two semi-structured interview guides included two to three general questions concerning the individual's work field, eleven questions regarding technology use in direct patient care, followed by two questions to detect opportunities and challenges due to technology, six questions about the impact of technology on the patient-carer relationship and finally, two questions asking for the role of technology on professional identity. Further, probes were inserted where possible to gain further information. The present study targeted the six questions concerning the impact on the patient-carer relationship, for instance: "How would you rate your experiences, if you had any, with online treatment compared to face-to-face treatment?". The final interview guide for health professionals can be found in Appendix B, while the one for the master students appears in Appendix C.

The interview transcripts were completed with the help of otter.ai. Private data was pseudonymised, and mistakes or filled silences were removed from the audio recordings to enhance readability.

Data Analysis

The ultimate data was examined through an inductive, reflexive thematic analysis. Thus, the six steps as proposed by Braun & Clarke (2006), were applied in assisting the analysis process.

In order to facilitate the coding process, the final transcripts were uploaded into ATLAS.ti (version 23.1.1). Prior to initiating the actual coding, the transcripts were continuously read. The transcription process offered a first opportunity to accustom to the interviews, and the repeated reading further extended orientation within the data set. Furthermore, initial notes were made for the emergence of later codes. The second step involved extracting the aspects that were assigned to be relevant to the research question which subsequently led to the creation of codes. Important sentences were marked in ATLAS.ti if they seemed suitable. This step was done individually by the researchers, focusing on the specific research question. Thus, sentences that were perceived as meaningful were highlighted in ATLAS.ti. The third step included the creation of themes. The existing codes were grouped into several themes which were declared to be meaningful and suitable. Consequently, the focus was to identify the codes that genuinely correspond with each other. Thereafter, the themes were analysed anew to ensure appropriateness, and insignificant codes were deleted as a fourth step. A predominant goal was to secure that the content within a theme was equal, as well as that the themes can be differentiated from each other clearly. The final coding scheme can be found in Appendix D. In the fifth step, the themes were once again analysed to arrange the given information properly. The aim was to be able to present the themes to such a degree that the research question can be answered most suitably. Finally, appropriate quotes were selected from the transcripts to process the eventual results.

Results

The entirety of the participants reported a positive attitude toward technology in their work field. Nevertheless, everyone revealed that they needed time to adapt to the deployed technologies. Four out of the eleven respondents are equipped with prior experience with technology before

executing their current work. This means, that these people already worked with electronic or internet-based tools that assisted them in the execution of their daily tasks, remote patient monitoring, Virtual Reality, etc. before they started their current job. In their daily life, every respondent makes use of technology within their work. Still, they differ in the types of technology being used. The master students solely make use of electronic tools that assist in documentation processes, which are furthermore used by six other health professionals. Two clinical psychologists are carrying out online therapy for direct patient treatment and two other health professionals fall back on electronic tools in immediate therapy settings.

The implemented thematic analysis generated a coding scheme (Appendix D), including two overarching themes. The examination revealed ‘Complications in Direct Technological Treatment’ and ‘Implications in Direct Technological Treatment’. A distinction between hypothetical answers, if applicable, and those based on actual experiences is not made. Due to simplification, every participant is denoted as a health professional in the following section.

Complications in Direct Technological Treatment

Situational Obstacles

The participants disclosed issues that were detected in technological treatment in direct patient care. First, the involved health professionals noted situational obstacles due to this kind of treatment. This code was mentioned three times by three different interviewees. One participant mentioned:

“Certain exercises I wouldn't do online, work with the empty chair, or inner child work, you can't do that online because you have to stand in the room. That's just not possible. Sometimes I feel sorry for that, because it would normally fit thematically, but we can't implement it, the feeling just doesn't come across properly”

Another professional explained:

“Because you just have to be able to briefly examine someone every now and then. And that's not possible because someone is sitting remotely. You can't say well, just put your iPhone in the throat, well that doesn't work, so that's just, yes, unfortunately.”

Thus, the professional in charge confesses that certain parts of their treatment are renounced due to online meetings, even though they would consider it as beneficial for the patient. The interviewees commiserate with the lack of certain treatments that they perceive as suitable for the treatment process.

Technical Difficulties

Moreover, five interviewed professionals regarded technical difficulties and the resulting uncertainty from the patient's viewpoint as a disturbance in treatment.

“if you're offline et cetera, it can also happen quite suddenly. A lot of clients can interpret it in a bad way if you are suddenly not there anymore. And they don't know why and they think, you just left them. Cause that's what everybody does.”

Health professionals perceive a malfunctioning internet connection as a disruptive factor in their patient's care and it becomes evident, that they aim to counteract negative feelings from their counterparts due to uncontrollable conditions. Further, it was noted that some patients are struggling with online treatment as they do not know how to properly use it.

Another interviewee expressed:

“That you have the time to work with that technology. If you don't have that, it can sometimes happen that you do not respond directly to what a patient has. And then it can actually lead to more dissatisfaction.”

In sum, the answers show that the usage of technology in treatment can reveal worries concerning the patient's contentment from the viewpoint of health professionals. They fear that difficulties with technology can have a negative impact on the therapy's success because patients might feel left behind.

Interpersonal Difficulties

Interpersonal difficulties were the most frequently mentioned obstacles throughout the examination and were indicated ten times by six professionals. They stated that online treatment prevents them from being able to properly observe their patients. Thus, they are not able to inspect their counterpart's body language or general attitude to the same degree, as compared to face-to-face treatment.

“I think that as a human being you always bring along a mood and your posture, and you just don't see that. Some people hold their hands directly in front of their face. You don't see the person as a whole. I think that can sometimes be a real disadvantage.”

Another participant further expresses this notion:

“And also just their whole body language. How do they sit? Because mostly in video conferences you only see shoulders and up and, sometimes it's also interesting what patients do with their hands”

Additionally, one interviewee communicated that *“not everybody can open up through video chat, but I think the majority of patients will open up quicker than in face to face setting”* and highlighted that not every patient might feel equally comfortable working with technology in a therapeutic setting.

Professionals perceive the missing capturing of their patient's body language and mood as a drawback in technological treatment. These non-verbal clues appear to have a significant meaning in their treatment.

Implications in Direct Technological Treatment

This theme includes the opportunities as well as overall practical acknowledgements of direct technological treatment including a perception of forthcoming online treatment.

Comfortability

Participants affirmed that technological treatment can secure patients' comfortability. The code was mentioned five times in total, by three different participants. One participant remarked it three times, e.g., by stating:

“The patient is in his home surroundings, you know, most of the time. Does not have to come to an unknown place where he might not be that secure. He can always shut off the computer and be safe, you know, there's no one else in the room. So, patients tend to open up a lot quicker over video call.”

This is further substantiated by another interviewee by declaring:

“People are often more relaxed in their own environment.”

Thus, this type of treatment supplies the practitioner to use the given comfort of the patient to set up mutual trust and openness. Professionals working in mental health care argued that this can be especially valuable for patients with, for instance, anxiety disorders.

“Because of some online therapy because they can't leave the house, or maybe because they sit in their safe space, which is usually their room. And then, maybe they are more relaxed, because if they go to a therapy place, wherever that is, then they are already kind of agitated and nervous because they're in some place. Whereas when they're at home, maybe they're more, more relaxed.”

The treatment appears to offer benefits for patients due to the residence in their personal space which makes them feel more relaxed and open towards it.

Accessibility

Furthermore, technological treatment offers simpler access to healthcare. This was noted by three health professionals working in mental health care.

“Well, that it can be done 24/7 — basically. So, it is also possible, some people also just have a full-time job. And if they have to take time off every time for an appointment, that's quite complicated.”

Patients are able to reach out to their healthcare professionals more conveniently. They do not have to rearrange their working hours due to travel time. Another professional declared that this leads to an occasion in which an increased amount of people can get in touch with proper medical supplies:

“So, I think that really lowers the threshold and allows us to reach more people because of that. I think that's a good thing. And you don't have to go straight to the psychiatrist for every problem, do you?”

The interviewed professionals were sure that this kind of treatment is particularly interesting and advantageous for people that constantly relocate.

“For people that move a lot to different cities, it's hard because of the long waiting lists you have for therapy. Some people only live in a city for a year, and then it's not worth waiting for a therapy spot. So, I guess for people that move a lot, it's convenient to have online therapy, because then they can have the same therapist for years.”

Thus, patients do not have to familiarise themselves with several professionals, but they can form a therapeutic alliance with one person over a certain period.

Therapeutic Relationship

In terms of the effect of online treatment on the therapeutic alliance, none of the participants reported difficulties in the process of relationship-building with their patients due to technological treatment. In total, four professionals communicated the absence of a negative impact on the therapeutic alliance. A healthcare professional proclaimed:

“I wouldn't say that the relationship or the relationship building was worse.”

Another person stated:

“But in the end, I'm just as satisfied with online as I am with face-to-face.”

Consequently, professionals were content with the outcome of online therapy on the therapeutic alliance as they did not detect any challenges. Remarks concerning the factors influencing the positive effects were not made.

Conceptions for Future Treatment

Every participant revealed ideas on how the implementation of technology could proceed in their work fields. Still, varying recognitions for further technological treatments in direct patient care are existent. There are two professionals that aim to see online therapy as one possibility in treating their patients, but not necessarily the standard procedure, as one participant stated:

“It should remain an option, I still think that live on site is the better alternative, definitely. It's sometimes more convenient for the therapist that you don't have to go there, or that you can do something online, and also for the patient, but in the end, on-site is more valuable in terms of quality.”

This served as an overall evaluation of the participant on the general implementation of technology. It was still the case, that there was no negative effect on the therapeutic relationship noted. The same person added to *“find it practical if there were a basic system that you could use from any laptop without being connected to a device”*. This referred to the online treatment in a mental health care setting.

Other remarks were made about conducting the first meeting with a client via video calls to conserve resources.

“I personally think that it would be great to do like, first meetings, like whether they come into treatment or not, or also like they just want to, to get a first impression of the clinic or whatever, that these things are done per video chat. I think that would save a lot of time.”

Additionally, one interviewee confessed to already working on a questionnaire for participants that could be filled out before a first meeting with a patient, which did not have necessarily a link to technological treatment, but rather overall examinations. One participant wished for greater flexibility from health insurance, to provide for easier decision-making when a meeting can be scheduled online. Another professional highlighted the opportunities that technology can yield in healthcare and uttered:

“I hope that humans learn to see what technology has to offer rather than what it takes away”

Further, four interviewees aim to increase eHealth applications to assist the treatment of their patients, in forms of apps that they could use when not receiving direct therapy.

Discussion

Examining the perceived impact of technology used in direct patient treatment on the formation of a therapeutic alliance was the purpose of this study. Presently, the focus was on investigating this matter from the perspective of health professionals with the aim to answer the research question *‘What is the perceived impact of technology used in direct patient treatment on the formation of a therapeutic alliance according to a health professional’s view?’*. The investigation revealed that the usage of technology in direct treatment might not have a negative impact on the formation of a therapeutic alliance. Further benefits were detected through this kind of therapy, but still implied that there are proceeding concerns for the implementation of it.

Health professionals detected three different types of hindrances in the direct technological treatment that can influence the therapeutic alliance with their patients. First, situational obstacles were mentioned as worries from the viewpoint of health professionals. This implied the absence of opportunities to carry out usual tasks such as the work with the inner child in mental health care or physical examinations in online therapy settings. Prior literature mainly focused on the

perceived threat through technology on professional identity (Heinzl et al., 2018) or the possible dangers through the involvement of confidential data (Yagiz & Goderis, 2022), but misses information considering the realisable implementation of familiar assignments in online therapy settings, especially in mental health care.

Further, interviewees reported concerns due to technical difficulties, as it was already disclosed by Sander et al. (2021). The fear of disrupting the patient's treatment through uncontrollable technical issues and a subsequent influence on the therapeutic bond is visible. At the present time, substantial literature on factors that lead to the proper establishment of a therapeutic alliance although being confronted with technical difficulties is lacking.

Lastly, the major issue in direct technological treatment turned out to be interpersonal difficulties. Healthcare professionals miss the personal specifics of an individual when carrying out, e.g., video consultations. This includes capturing one's mood, gestures, and general body language. It can be classified as a recent finding that potentially hinders the formation of a therapeutic alliance.

Nonetheless, the examination released advantages as well as opportunities for the direct technological treatment of patients. Professionals from mental health care remarked on the value of comfortability from the patient's side. It is seen as a benefit that patients are offered the opportunity to receive treatment in their familiar environment, which adds to the contributions of Schueller et al. (2019), claiming that patients do not need to feel ashamed when receiving treatment at home. Thus, they are perceived as increasingly relaxed which can add to the treatment's success, especially for individuals with anxiety disorders. The conduction of qualitative research contributed to the understanding of the value of comfortability.

Additionally, the increase in accessibility is a positively connoted aspect of the direct technological treatment of patients. Through the current opportunities, patients can connect with their caregivers wherever they want. Thus, they do not necessarily have to come to a certain place in order to receive advice on their issues, which is further in line with the findings of Schueller et al. (2019), who disclosed that the elimination of travel time to a health professional is an immense benefit for the patient. The qualitative nature of this study facilitated highlighting the profit of accessibility in technological treatment and the resulting potential to build a long-term relational

connection which adds to the working of a therapeutic alliance as communicated by (Hamovitch et al., 2018).

Moreover, the health professionals involved in the execution of technological treatment did not report any difficulties in the formation of a therapeutic alliance with their patients. Thus, it weakens the psychologist's concerns indicated by Machluf et al. (2021), that feared not being able to establish a durable interpersonal connection when executing online therapy. This could be explained by the continuous amount of experience that professionals were able to make after the start of the COVID-19 pandemic and support the findings of Békés et al. (2021) that revealed that concerns about establishing a therapeutic alliance in online therapy decreased along with steady encounters. Due to the great importance of a working therapeutic alliance, it can be seen as a success for future treatments and possibly anticipates present doubts of professionals considering the implementation of it.

Strengths and Limitations

During the interpretation of the current findings, various strengths and limitations become apparent. The conduction of qualitative interviews offered valuable insights into the experiences and attitudes of health professionals on the implementation of technology in direct patient care. The importance of the research is underlined by the fact that a growing interest in eHealth applications is visible and recommendations on establishing a working therapeutic alliance in this context are missing. The research disclosed that health professionals are open to the implementation of technology and simultaneously are especially worried about technical and interpersonal difficulties. Further, the analysis included the notions of clinical psychology master students who find themselves at the beginning of their careers in health care. Their contributions offer a perspective on the implementation of technology in the future.

Nonetheless, the thesis reveals boundaries. First, substantial experience in the direct technological treatment of patients was lacking for most of the participants. Thus, they could solely reflect on the impact of it on the therapeutic alliance theoretically and missed falling back on actual experiences. This could influence the provided answers and lead to bias.

Moreover, there was a great variety of work fields within the current sample. Initially, the focus was laid on clinical psychologists, which was eventually not feasible due to a low response

rate. Daily tasks and specific treatments differ among health professionals, the work of a clinical psychologist and a neurologist cannot be easily compared. Further, master students were consulted due to a lack of responses from health professionals. One must acknowledge the limited work experience itself, which could influence their attitude toward the perceived impact of technology on the therapeutic alliance.

Finally, the interviews were conducted by two researchers and subsequently differed in depth regarding certain questions. Probes could be implemented where perceived as necessary by the interviewer in charge, naturally leading to differences in the outcome. This drawback is difficult to resolve, as researchers ought to share the conduction of interviews due to restricted time frames for the data collection.

Additionally, an increased number of questions could be implemented for the investigation of the therapeutic alliance in technological treatment. Further questions could have led to an extended insight into why individuals did not detect any differences and which specific circumstances may have contributed to this notion.

Implications for Future Research and Practice

In future studies, it might be wise to conduct work-specific analyses. Samples could consist of clinical psychologists only. Analyses with groups from different work areas seem to be difficult to compare due to varying tasks. Hence, individual recommendations for jobs in the implementation of direct technological treatment can be formulated.

Moreover, ensuing research could focus specifically on the existing difficulties in the daily operations of health professionals. Investigations could develop advice on how to handle situational, technical, and interpersonal difficulties. Thus, possible interferences within the formation of a therapeutic alliance could be prevented.

In addition to this, another interesting approach would be to investigate the impact of online treatment from the perspective of professionals that do not possess substantial experience in the usage of technology at the workplace. Fagherazzi et al. (2020) already mentioned that insufficient involvement in technology can lead to issues when implementing it. Research could focus on detecting and finally tackling the arising problems for this group of professionals.

In sum, health professionals did not detect a negative impact of technology used in direct patient treatment on forming a therapeutic alliance. Particularly the increase in comfortability and accessibility was recognised as beneficial for the patient and consequently, the relationship building and the treatment. Yet, situational, technical, and interpersonal difficulties were detected that could potentially interfere with the positive notion of technological treatment for the therapeutic alliance in the future. Additional research will set up recommendations to handle the existing complications.

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Appendix A

Informed Consent Form

You are being invited to participate in a research study titled **Interviewing healthcare professionals on the impact of technology on their job**. This study is being done by Luca Hoeijmans and Sophia Kordelas from the Faculty of Behavioural, Management and Social Sciences at the University of Twente.

We are investigating thoughts about, and experiences with technology in healthcare. We wish to discover challenges, opportunities and general acknowledgements towards technology use. As experiences can differ, we will conduct interviews with multiple health professionals. By analysing this, we hope to gain sufficient knowledge about this matter.

We are interested in your own personal experiences. This means that there are no right or wrong answers: you are the expert on this subject.

The interview will last approximately 30-45 minutes. I would also like to record the interview. This will enable me to transcribe it word for word so that we can analyse and compare the different interviews. We are going to keep the recordings until August 21st 2023 and delete them afterwards.

I will write a bachelor's thesis, including the assistance of a fellow student relating to the research. This will be assessed by the teaching staff. The other student and the supervising staff will therefore be able to read the transcription of your interview. However, I will first ensure that all your answers are anonymous: names, dates, and places will be removed. We may want to use quotes from your interview in our report. These will also be anonymous. Anybody reading the report will not be able to work out which answers you gave. The interview will not be used for any other purpose than for our report.

You can stop the interview at any time and you may decide to withdraw from the study at any time.

If there are remaining questions concerning the interview you are welcome to contact us: s.kordelas@student.utwente.nl or l.n.hoeijmans@student.utwente.nl.

Informed Consent Form

Title research: Interviewing healthcare professionals on the impact of technology on their job

Responsible researcher: Sophia Kordelas

To be completed by the participant: I declare in a manner obvious to me, to be informed about the nature, method, target and of the investigation. I know that the data and results of the study

will only be published anonymously and confidentially to third parties. My questions have been answered satisfactorily.

I understand that audio recordings thereof will be used only for analysis and / or scientific presentations. I voluntarily agree to take part in this study. While I reserve the right to terminate my participation in this study without giving a reason at any time.

Name participant:

Age:

Gender:

Nationality:

Date:

Signature participant:

To be completed by the executive researcher: I have given a verbal and written explanation of the study. I will answer the remaining questions about the investigation into power. The participant will not suffer any adverse consequences in case of any early termination of participation in this study.

Name researcher:

Date:

Signature researcher:

Appendix B

Interview Guide Healthcare Professionals

Thank you for taking the time in order to participate in our study. I would like to start with some general questions regarding your work.

What is your specialisation?

How long have you been a healthcare professional?

The following questions will refer to technology use regarding direct patient care, but sometimes other work-related topics. A definition of technology and some examples can be provided if that might help you, you can always ask for this definition to be repeated.

What has been your technology experience prior to your current job? (Years + Type of use)

How long have you been using technology within your current sector? (Years)

What kind of work requires technology within your sector?

What type of technology do you use within your sector? (Provide examples e.g. AI, VR (see probes))

(Ask additional questions based on the type of technology they mention)

To what extent do you feel competent in using that type of technology within your sector? (scale 1-10 + reasoning as to why you feel that way)

How would you rate the usability of the technology you are using? (Scale 1-10 + reasoning)

Would you say you are adequately prepared to use technology in your job? (Yes/No + reasoning)

Could you give me an overall standpoint of how you feel about using technology within your work field? (Personal opinion, probes: useful/useless, beneficial/threatening, potential/

The next sector will relate to potential opportunities and challenges technology might have for your job. This is a completely personal opinion, if you do not see any opportunities or do not see challenges you can mention this as well.

What are some opportunities that could occur if technology were to be part of your job?

Practical opportunities? (does it work your job more efficiently)

Treatment opportunities? (autonomy level, decision-making)

Can you think of any challenges that technology might bring to your job?

Practical challenges? (does it work your job more efficiently)

Treatment challenges? (autonomy level, decision making)

The next Questions are specifically related to the relationship you have with your patient (Therapeutic relationship) and the effect technology might have on this relationship.

What are your experiences with technology considering the direct treatment with your patients?

From your perspective, what are the strengths of the technology you are using for the relationship with your patients?

And what are its weaknesses?

How would you rate your experiences, if you had any, with online treatment compared to face-to-face treatment?

What are the most significant differences that you detect in the communication with your clients?

Did technology have an effect on the relationship with your patient?

How do you want to have technological treatment proceeding in the future?

This last question refers to professional identity and how technology plays a role in this identity. If you need an explanation of what professional identity entails, one can be provided

Are you aware of your professional identity?

How much do you feel technology is a part of this identity?

As I do not have any questions left, we are coming to the end of the interview. Thank you very much for your participation.

Probes:

Technology we mean:

Technology refers to electronics or internet-based tools used to make your job easier, in the aspect of patient care. It starts as simple forms of communication such as ZOOM as part of video communication or online care possibilities, but we do not count email or WhatsApp. But gets progressively more complicated as we also refer to innovative ways to provide care, such as VR (virtual reality) or augmented reality or other types of “online” treatment methods. We also refer to actual devices such as robots that help with integrating data and predictive analysis, wearable devices (pedometers or various sensors, smart hearing aids, biopatch technology), remote patient monitoring or other medical devices that allow e.g. insights into monitoring the human body such as bioprinting or organ care technology. Lastly, we consider AI to be an example of technology, that sometimes is used in for example decision-making (Reading CT-scans, Improving diagnosis) or improving certain qualities within devices.

Professional Identity:

Professional Identity is constructed based on the combination of both social- and role identity. Reflecting their depiction of a specific role and their self-definition as part of a profession. Social identities refer to the acceptance of the norms and values of a group as well as the identification with that group. Role identity refers to a particular role an individual plays entailing both performing tasks concerning this role as well as managing and controlling resources associated with this role.

Summarising, it refers to how healthcare professionals define themselves regarding work roles, this is the foundation of who they are as a professional.

Example: Care Provider. Doctor, but also, Colleague or Assistant

Appendix C

Interview Guide Master Students

Thank you for taking the time in order to participate in our study. I would like to start with some general questions regarding your work.

In what department are you currently doing your internship?

What type of work do you carry out during your internship?

How long does your internship last in total?

The following questions will refer to technology use regarding direct patient care, but sometimes other work-related topics. A definition of technology or Technological acceptance and some examples can be provided if that might help you, you can always ask for this definition to be repeated.

What has been your technology experience prior to your internship? (Years + Type of use)

What kind of work requires technology within your internship?

What type of technology do you use within your internship? (Provide examples e.g. AI, VR (see probes))

(Ask additional questions based on the type of technology they mention)

To what extent do you feel competent in using that type of technology within your internship? (scale 1-10 + reasoning as to why you feel that way)

To what extent do you feel it's useful to use this type of technology within this job?

Would you say you are adequately prepared to use technology in your internship? Or would you say you will be adequately prepared to use this technology in the job later on? (Yes/No + reasoning) (Links to e.g., lack of learned perceived usefulness)

How would you rate the ease of use on a scale of 1-10 + reasoning? (Ask for specific tech used as well)

Could you describe your attitude towards the use of technology within the job you are doing the internship for? (Personal opinion, probes: useful/useless, beneficial/threatening, potential/useless)

How positive do you feel about the use of technology (Scale 1-10)?

What are necessary conditions to implement new technology successfully in your internship or the job you're doing the internship for? (e.g., sufficient resources, time, knowledge, usefulness, etc.)

The next sector will relate to potential opportunities and challenges technology might have for your internship. This is a completely personal opinion, if you do not see any opportunities or do not see challenges you can mention this as well.

What are some opportunities that could occur if technology were to be part of your future job?

Practical opportunities? (does it work your job more efficiently)

Treatment opportunities? (autonomy level, decision-making)

Can you think of any challenges that technology might bring to your future job?

Practical challenges? (does it work your job more efficiently)

Treatment challenges? (autonomy level, decision making)

The next Questions are specifically related to the relationship you have with your patient (Therapeutic relationship) and the effect technology might have on this relationship.

What are your experiences with technology considering the direct treatment with your patients? (only if they have any)

From your perspective, what are the strengths of the technology you are using for the relationship with your patients?

And what are its weaknesses?

If they have not any: What do you think could be strengths of the technology you are using for the relationship with your patients?

And what are its weaknesses?

How would you rate your experiences, if you had any, with online treatment compared to face-to-face treatment?

What are the most significant differences that you detect in the communication with your clients?

If they have not any: What do you think could be the most significant differences that you detect in the communication with your clients?

Did technology have an effect on the relationship with your patient?

If they have not any: Do you think technology can have an effect on the relationship with your patient?

How do you want to have technological treatment proceeding in the future?

This last question refers to professional identity and how technology plays a role in this identity. If you need an explanation of what professional identity entails, one can be provided

Are you aware of your professional identity?

How much do you feel technology is a part of this identity?

As I do not have any questions left, we are coming to the end of the interview. Thank you very much for your participation.

Probes:

Technology we mean:

Technology refers to electronics or internet-based tools used to make your job easier, in the aspect of patient care. It starts as simple forms of communication such as ZOOM as part of video communication or online care possibilities, but we do not count email or WhatsApp. But gets progressively more complicated as we also refer to innovative ways to provide care, such as VR (virtual reality) or augmented reality or other types of “online” treatment methods. We also refer to actual devices such as robots that help with integrating data and predictive analysis, wearable devices (pedometers or various sensors, smart hearing aids, biopatch technology), remote patient monitoring or other medical devices that allow e.g. insights into monitoring the human body such as bioprinting or organ care technology. Lastly, we consider AI to be an example of technology, that sometimes is used in for example decision-making (Reading CT-scans, Improving diagnosis) or improving certain qualities within devices.

Professional Identity:

Professional Identity is constructed based on the combination of both social- and role identity. Reflecting their depiction of a specific role and their self-definition as part of a profession. Social identities refer to the acceptance of the norms and values of a group as well as the identification with that group. Role identity refers to a particular role an individual plays entailing both performing tasks concerning this role as well as managing and controlling resources associated with this role.

Summarising, it refers to how healthcare professionals define themselves regarding work roles, this is the foundation of who they are as a professional.

Example: Care Provider. Doctor, but also, Colleague or Assistant

Technological acceptance:

Technology acceptance can be defined as a user's willingness to employ technology for the tasks it is designed to support.

Appendix D

Coding Scheme

| Theme | Code | Definition | Example Quote |
|---|----------------------------|--|---|
| Complications in Direct Technological Treatment | Situational Obstacles | Hindrances of the treatment due to the environmental circumstances | <i>“Because you just have to be able to briefly examine someone every now and then. And that's not possible because someone is sitting remotely You can't say well, just put your Iphone in the throat, well that doesn't work, so that's just, yes unfortunately.”</i> |
| | Technical Difficulties | Hindrances due to technical troubles | <i>“Actually, like maybe just the WiFi itself, because honestly, if my WiFi would fuck up and I'm the therapist. I don't know what the fuck to do”</i> |
| | Interpersonal Difficulties | Hindrances in personal communication due to online treatment | <i>“Some things still get lost during video calls, you know? Also, depending on the quality of the microphone, you don't hear the intonation of the other person very well, cannot talk, or really hold eye contact because you're looking at the screen.”</i> |
| Implications in Direct Technological Treatment | Comfortability | Pleasant outcomes for the patient due to online treatment | <i>“Because they are at home in a comfortable setting. It's very anonymous.”</i> |

| | | |
|----------------------------------|--|---|
| Accessibility | Increase in convenience due to online treatment | <p><i>There's no one in the room directly and, you know, it feels a little bit more distant. So, it's mostly easier for them to open up and form a bond faster with the therapist.”</i></p> <p><i>“But even for, especially for people in really rural areas, I think it will be a great option and way better than waiting for a therapy place where you have to go in person, then you need to travel maybe two hours.”</i></p> |
| Therapeutic Relationship | Detected effects on the therapeutic alliance due to online treatment | <p><i>“I don't make a difference to ordinary conversations honestly.”</i></p> |
| Conceptions for Future Treatment | Notions for proceeding online treatment | <p><i>“And I would like to offer patients the possibility to come online to outpatient check-ups.”</i></p> |
