Establishing Therapeutic Alliance in Mental Health Care via Cooperative Documentation

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Abstract

In talk-based mental health interventions, treatment outcomes can be decisively improved by enhancing the relationship between patient and therapist. We developed the interactive documentation system Tele-Board MED (TBM) with the goal of supporting patients and doctors in their cooperative task of patient care. The system offers a whiteboard-inspired graphical user interface which allows them to take notes jointly during the treatment session. Two proxy studies were conducted whereby TBM was introduced in a role play that showcased the dialogue in a therapy session. The patient role was played by a volunteer. The audience of human-centered design as well as eHealth experts rated the therapist-patient relationship in a session with and without TBM. The data collected via questionnaires shows that TBM consistently receives a positive rating from study participants (N=36) in the areas of collaboration, communication, patient-doctor relationship, as well as patient empowerment.

Keywords:

Physician-Patient Relations; Patient Participation; Psychotherapy

Introduction

Mental health disorders account for over 40% of all chronic illnesses and are the biggest cause of years lived with disability in the developed countries [1]. One major reason why treatments fail is a lack of engagement by the patients. Recent studies show that technology has the potential of supporting a productive patient-doctor relationship and of promoting patient engagement [2]. However, the use of information and communication technology in talk-based mental health interventions is fairly limited, to a large degree because research in this domain is restricted by sensitivity and social stigma. Symptoms of mental disorders may include anxiety, depressed mood, and obsessive-compulsive or delusional behaviour. Talk-based interventions for diagnostics and treatments are common approaches.

In the domain of mental health care, the therapist-patient relationship is a primary curative component and can be considered a necessary prerequisite for the effectiveness of all therapeutic interventions [3]. The term 'therapeutic alliance' is used to describe the ideal patient-provider relationship. This alliance is defined as "a dynamic interactional process in which the patient and provider collaborate to carry out negotiated mutual goals in a shared partnership" [4].

In this paper we elaborate on the support of patient-doctor relationships in psychotherapeutic treatments through the use of cooperative technology. We introduce the documentation system Tele-Board MED (TBM), which aims at supporting

doctor-patient interactions in face-to-face clinical encounters. Traditionally, the therapist takes handwritten notes (figure 1a) in order to serve personal purposes, e.g. to fulfil legal duties and to overview the treatment. Inviting patients to access their record is very unlikely, as its legibility and understandability can hardly be guaranteed [5]. In contrast, TBM allows the patient and the care provider to jointly take notes and freely structure them on a whiteboard-inspired graphical user interface (figure 1b). The documentation panels can be filled with digital sticky notes, uploaded images, and visual elements such as scribbles. This way, progress notes, therapy material, and case stories are collected in a digital, visually enhanced patient file. Blank documentation panels can be used, as well as templates for specific tasks or treatment approaches (see figure 2).

Figure 1a – Traditional treatment session: Therapy notes are visible to the therapist only.

Figure 1b – Treatment session with Tele-Board MED: Therapist and patient work together on therapy notes by using a digital whiteboard, a wireless keyboard and a tablet computer.

Figure 2a – Example of a documentation panel used in anamnesis sessions containing headlines and patient information visible as sticky notes.
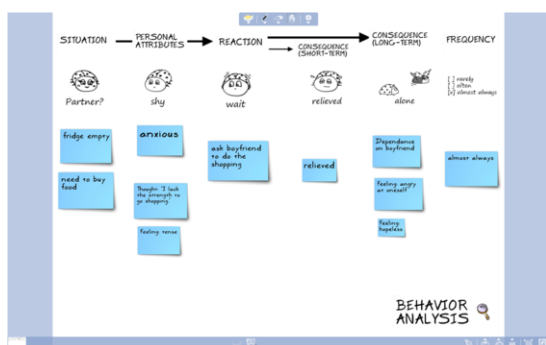

Figure 2b – Example of a documentation panel used for behavior analysis based on the SORKC model [6].

Related Work

Tele-Board MED is based on Tele-Board – a digital whiteboard system to support creative teamwork over distances [7]. It is a web application based on HTML5 technology [8], which runs in a web browser and thus on diverse hardware devices, such as a desktop computer, laptop, tablet computer, or interactive whiteboard.

Technology used in mental health care to date strongly focuses on improving the access to services and mostly represents a replication of existing, analogue methods. There are means of electronic communication, such as email or chat to support doctor and patient collaboration. Furthermore, there are technologies aimed at increasing patient engagement. Classic therapy techniques, such as emotion regulation and exposure, can be enhanced by virtual or augmented reality [9, 10]. In addition to technology interventions introduced by the therapist, there are computerized therapy applications that autonomously deliver care, e.g. internet-based interventions for post-traumatic stress disorders [11]. However, in order to not leave patients alone with their problems, Knowles et al. [12] call for more research about computer-mediated therapy looking at the integration of health professional input with computer-delivered content.

Tele-Board MED, as well as the software applications described in the following, fall in the category of computer-mediated therapy. Coyle and Doherty [2] designed the role-playing computer game 'Personal Investigator' to be played in therapy sessions by an adolescent patient together with a therapist, who takes the role of a partner in the exploration of a game world. A digital notebook supports the player's personal reflection. In contrast, TBM strives for a collaborative documentation by both patient and therapist. The mobile phone and web application 'My Mobile Story' incorporates the therapeutic agent of telling and re-telling the patient's story to trigger self-reflection. This is carried out by capturing case information in visual and multimedia-based ways [13]. In contrast to TBM, it seems that collaboration between therapist and patient via the application takes place asynchronously and remotely.

Research Questions

Our research objective with TBM is to increase patient engagement in treatments and to improve the doctor-patient relationship. In this way, the effectiveness of the overall treatment increases. The described study addresses the following questions:

- Can Tele-Board MED help to strengthen the therapeutic alliance between patient and therapist?
- Can Tele-Board MED help to increase the shared knowledge of patient and therapist?

In the following, we describe the study setup, the collection of quantitative data through questionnaires, and the data analysis in comparing a traditional therapy session scenario with a TBM-supported scenario. We discuss our study design and results in depth – and finally conclude with a summary.

Methods

In order to test the effects of Tele-Board MED on therapeutic alliance and patient empowerment, two proxy studies [14] were conducted.

Study Setup

In both studies, TBM was presented in the form of an impromptu role play that showcased a therapeutic dialogue. The first study was conducted in Germany with 8 participants whose professional background was eHealth. We used a digital whiteboard as hardware device. The second study was conducted in the United States with 28 participants from the field of human-centered design. Here, a laptop and projector were used. The role of the psychotherapist was acted by a mental health care professional. In both studies, a person from the audience spontaneously volunteered to act the patient role and shared a personal problem. A short, true-to-life therapy session was carried out on stage.

In both settings, the role play contained two parts, each of which was followed by data collection (see figure 3). First, the therapist used traditional documentation means: handwriting on paper sheets. After about five minutes, a break was taken. Both the audience and the proxy patient were asked to fill out short questionnaires. Afterwards, during the next five minutes of therapeutic conversation, TBM was used as a means of documentation. Then again, audience and "patient" filled out questionnaires.
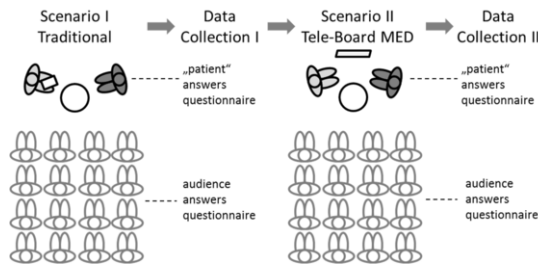
Figure 3 – Procedure in both proxy studies: the role play contained two parts, each of which was followed by data collection.

Questionnaires for Data Collection

The questionnaire items represent several aspects of relevance for patient-doctor collaboration (see table 1). The constructs of collaboration, integration, empowerment and communication represent the four subscales of the Kim Alliance Scale [4]. In each subscale one or two of the corresponding items were adopted. The items in table 1 are phrased from the patient perspective. For the audience questionnaire, the syntax of the sentences was adapted (e.g. item 2 reads "I feel my therapist listens to me." for the patient questionnaire and "The therapist listens to the patient." for the audience questionnaire). The items were rated on a five-point scale, ranging from 2 to -2 ('clearly so'{2}, 'seems so'{1}, 'I don't know'{0}, 'doesn't seem so'{-1} and 'clearly not'{-2}). Feedback from the first study led to minor modifications in the questionnaire (one item was omitted, two new items were added). Thus, most items were rated by all study participants (N=36), however, item 5 was rated by 8 people and items 8 and 9 were rated by 28 people.

Table 1 – Items used to assess patient-therapist cooperation with and without Tele-Board MED. The constructs marked with an (*) are the dimensions of the Kim Alliance Scale [4].

Construct	#	Item
Collaboration*	1	Me and my therapist have the same therapeutic goals.
Integration*	2	I feel my therapist listens to me.
Empowerment*	3	I am allowed in the decision-making process.
Communication*	4	It is easy to understand my therapist's instructions.
	5	My therapist and I work well together.
Relationship	6	Me and my therapist collaborate at eye-level.
Documentation	7	It is possible for me to recognize documentation errors.
Shared Knowledge	8	Me and my therapist develop joint knowledge that we can build on in the next session.
	9	Me and my therapist have a common understanding of the treatment procedure.

Statistical Measures

For the statistical analysis of the quantitative questionnaire data, the software package SPSS Version 22 was used. We calculated the arithmetic means of both scenarios (traditional vs. TBM), as well as measures to assess the statistical significance (two-sided p-values) and the effect size (Cohen's d). In order to determine the degree of agreement among the audience raters, we calculated intra-class correlation coefficients for single measures and Cronbach's alpha for average measures. Coefficients of Pearson, Spearman's rho and Kendall's tau-b were used to measure pairwise correlation among the two proxy patient raters.

Results

The data of both proxy studies was analyzed together. The following sections describe the comparison of both scenarios and provide assessments of statistical significance and reliability.

Evaluation: Traditional vs. Tele-Board MED

Table 2 shows the arithmetic means (in a range from 2 to -2) of the ratings for the traditional and the TBM scenario pertaining to the audience and the volunteering "patients". For the audience ratings, dependent t-tests for paired samples with two-tailed tests of significance (p-values) show the level of statistical significance. These tests were chosen because each person provided ratings for the traditional and the TBM setting, and because there was no a priori knowledge about which scenario would receive better ratings. Furthermore, Cohen's d estimates the effect size of the intervention. Here, the traditional setting is interpreted as the control condition and the TBM setting is considered the experimental condition, so that positive d-values indicate a positive effect of TBM. N specifies the number of valid answers per item. Due to some missing replies, and three items not being part of both studies, N varies across the comparisons.

For the answers of the audience members who volunteered to be patients, no statistical tests are computed since there are only two respondents.

Table 2 – Average ratings of questionnaire items (#) for a traditional therapy setting (Trad.) versus a session with Tele-Board MED (TBM) listed separately for audience members and volunteering patients. N specifies the number of comparisons. A two-sided p-value (p) indicates the level of statistical significance. Cohen's d (d) indicates the effect size.

#	AUDIENCE					VOLUNTEER		
	Trad.	TBM	N	p	d	Trad.	TBM	N
1	0.06	0.97	32	<.001	1.25	0.5	0.5	2
2	1.24	1.15	33	.572	-0.12	1.5	2	2
3	-0.58	1.42	31	<.001	2.62	-.5	1.5	2
4	0.42	1.23	31	<.001	1.03	2	2	2
5	0.86	1.57	7	.008	1.15	1	2	1
6	0.03	0.81	32	.010	0.77	-0.5	2	2
7	-1.64	1.64	33	<.001	5.44	-1.5	1.5	2
8	-0.44	1.28	25	<.001	2.13	0	1	1
9	-0.52	0.60	25	<.001	1.46	-1	0	1

Inter-Rater Reliability

For the ratings by the audience members, intra-class correlation coefficients for single measures and Cronbach's alpha for average measures were calculated.

In the first study with audience ratings of eHealth experts in Germany (N=7), the intra-class correlation coefficient, calculated with a two-way random model and consistency

analysis, amounts to 0.69 for single measures (i.e. regarding single items). On a level of $p<0.001$, this is statistically significant. In terms of average measures (i.e. regarding the total amount of items), Cronbach's alpha is 0.94, where 1 would be the maximum possible. When this analysis is carried out in the second study with audience ratings of human-centered design experts in the United States (N=27), the intra-class correlation yields a coefficient of 0.870 for single measures, which is also significant on a level of $p<0.001$. Here, Cronbach's alpha for average measures is 0.995. Considering the audience raters of study one and two together (N=34) and only those 12 items (2x6) that were handed out in both studies, the intra-class correlation coefficient amounts to 0.873 for single measures, which is again significant on a level of $p<0.001$. In terms of average measures, a Cronbach's alpha of 0.996 is obtained.

To assess the inter-rater agreement of the proxy patients, common correlation coefficients were calculated. On metrics ranging from 1 (a perfect positive relationship) to 0 (neutral relationship) and down to -1 (a perfect negative relationship), all measures yield values above 0.8, which is statistically highly significant (Spearman's rho: 0.89 with $p<0.001$, Pearson: 0.86 with $p<0.001$, Kendall's tau-b: 0.81 with $p <=0.002$).

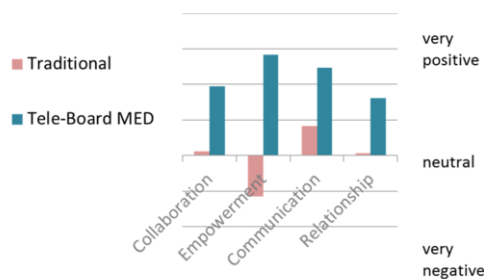*Figure 4 – Expert ratings (N=36) on patient-doctor cooperation indicate great benefits of Tele-Board MED compared to traditional documentation approaches.*

Discussion

The use of Tele-Board MED seems to have highly significant positive effects on therapist-patient interactions. Figure 4 displays a chart with the expert ratings regarding the comparison of the traditional versus TBM scenario based on the numbers of table 2 relating to the four items and respective constructs #1 (collaboration), #3 (empowerment), #4 (communication), and #6 (relationship).

The two studies on TBM effects had a differing session content (i.e. each proxy patient introduced an individual problem) and different display devices were in use. The studies were conducted on two different continents and the professional background of the expert audiences varied. These differences are likely to add some variance ("noise") to the data. Still, the ratings show high intra-class correlations both within and across studies. Therefore, the findings seem all the more reliable. A high concordance indicates that the questionnaire answers seem noncontroversial or obvious. Subjective or culture-specific viewpoints bear little influence on the ratings. Consequently, the participants (despite of belonging to different rater populations) show a striking agreement in their responses along all questionnaire items.

There is a strongly significant effect in favor of TBM in eight out of nine items. Statistically, a p-value below 0.05 is generally considered significant and hence it would be sufficient to support the hypothesis that TBM makes a difference. Here, even p-values below 0.001 are observed, which is remarkable given the relatively small sample sizes. This is indicative of a significant effect (see table 2). It is likewise reflected by Cohen's d, where values of 0.2 to 0.5 are considered a small effect, values of 0.5 to 0.8 indicate a medium effect and values above 0.8 indicate a large effect [15]. The questionnaire data does not only indicate a large positive effect on almost all scales. There are even shifts from a negative average rating without TBM to a positive rating with TBM. The only variable where the audience does not see a clear positive effect of TBM is item #2 ("The therapist listens to the patient."). However, the members of the audience who volunteered to take on the patient role do indicate that they experience a positive effect of TBM on this item as well (see table 2, part on the right).

Given that therapeutic alliance is seen as one of the most important factors in predicting patient outcome [3], the concordant results of two proxy studies, carried out on two different continents with two different expert audiences, can be considered very promising. Hence, we conclude that TBM has the potential of delivering more than documentation support, namely strengthening the therapeutic alliance between patient and therapist and increasing their shared knowledge. These findings are in line with qualitative insights from real patient consultation with TBM that showed an increased acceptance of diagnoses and patient-therapist bonding [16].

In future work, experimental assessments in on-site clinical studies should add further data to evaluate TMB.

Conclusion

We introduced the cooperative documentation system Tele-Board MED as a supportive tool for face-to-face encounters in mental health care. In this domain, characterized by sensitivity and stigma, research studies conducted with substitute persons instead of real patients are an increasingly valued methodological approach. In the proxy studies discussed here, we found evidence that therapy documentation can be turned from a necessity taken care of by the doctor into an intervention that affects treatments positively. TBM creates more benefits than providing patients access to their treatment notes. With great concordance, participants observed positive effects of TBM on the creation of shared knowledge and therapeutic alliance between patient and care provider. The latter aspect indicates that TBM strengthens therapeutic communication, integration, collaboration, and patient empowerment.

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