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Web-based support for daily functioning of people with mild intellectual disabilities or chronic psychiatric disorders: A feasibility study in routine practice

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ABSTRACT

Background: People with mild intellectual disabilities or chronic psychiatric disorders often experience challenges in important aspects of life and need support in daily functioning. In this study, we examined the feasibility of a web-based program enabling professional support of patients with chronic conditions in their daily functioning.
Method: A triangulated research method was applied involving a combination of the results of semi-structured interviews and standardized questionnaires. We conducted face-to-face interviews with clients ($n = 11$) and telephone interviews with coaches ($n = 10$) on their initial experiences with the program. In addition, clients took an online pre-test ($n = 39$) – post-test questionnaire ($n = 30$) which measured quality of life, empowerment, mastery, social cohesion and satisfaction with care. Clients and coaches both received a questionnaire to report on the perceived usability of the program.
Results: Clients and coaches used the program and were positive about this new way of communicating. Clients were pleased that they could contact the coach at any time and experienced increased control over the support they received. Coaches reported positive effects on the levels of independence among clients, saved time and experienced greater flexibility in their scheduling. The implementation of the program did not lead to changes in quality of life, empowerment, mastery, social cohesion or satisfaction with care. Clients and coaches reported that the usability of the MPC could be improved through the use of an enhanced Internet connection.
Conclusion: The initial results of the use of web-based support for this client population seem promising and justify further research on online support for clients with mild intellectual disabilities or chronic psychiatric disorders.

1. Introduction

People with intellectual disabilities or chronic psychiatric disorders (MID-CPD) face many challenges in important aspects of their life, including daily functioning, physical health constraints, social isolation and limited financial resources (Pratt, 2012; Verdonschot et al., 2009). When people with MID-CPD live independently or semi-independently in the community, they often need support with tasks related to daily functioning in order to meet their personal needs (Perkins and Burns, 2001; Thompson et al., 2009). Such personalized support is often provided by professional coaches who visit clients at their homes. Coaching aims to give clients the skills they need to attain a high level of independent daily functioning and improve their quality of life and social functioning (Slevin et al., 2008). With this in mind, coaches generally aim to empower their clients. Empowerment has been defined by Rappaport (1987, p.122) as 'a process, a mechanism by which people, organizations, and communities gain mastery over their affairs'. Through focusing on empowerment, the coach accentuates personal rights and potential, rather than focusing on impairments. Available studies, although limited in numbers, show that providing personalized support at home may lead to improved personal functioning and quality of life among clients with MID-CPD (Siskind et al., 2012; Young et al., 1998). Recently, this kind of support has also been provided remotely, supported by web-based technologies. These new technologies may offer a new, more efficient type of support for MID-CPD clients, while maintaining quality of care levels.

The overall use of Internet interventions in mental health care is rapidly expanding (Andersson et al., 2014; Lal and Adari, 2013). A number

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of interventions aimed at the prevention and treatment of common mental disorders have been developed, delivered via Internet and have proven to be effective when compared with non-intervention or face-to-face treatments (Andrews et al., 2010; Richards and Richardson, 2012). Directing individuals with psychological problems to Internet interventions may reduce costs, facilitate access to help and boost empowerment and self-management skills (Musiat and Tarrier, 2014; Samoocha et al., 2010; Smit et al., 2011). Most e-Mental-Health research has focused on the development and (cost) effectiveness of therapeutic (guided and unguided) self-help interventions to reduce or overcome symptoms of common mental disorders such as anxiety, depression, substance abuse (Lal and Adari, 2013) and co-morbid disorders such as diabetes and depression (Van Bastelaar et al., 2011). Online support for daily functioning for the broad MID-CPD target group remains the exception in terms of both research and service provision. In contrast, studies on the evaluation of online support in daily functioning for clients with (chronic) physical conditions such as diabetes or cardiac problems are widely available and show positive results in relation to health outcomes and costs (Purcell et al., 2014; Takahashi et al., 2012; Verhoeven et al., 2007).

The lack of online developments in the field of support for the specific MID-CPD group can be explained by a number of barriers which are linked to characteristics of this target group. One explanation is that MID-CPD clients are often characterized by a low social economic status which constitutes a barrier to Internet use and the acquisition of a personal computer (DiMaggio et al., 2004). Another possible barrier is that MID-CPD clients often experience impairments in information processing, learning new information and concentration, which complicates the acquisition of new skills (Sadock and Sadock, 2005). Furthermore, the use of web-based devices such as webcams and microphones may be problematic for clients with CPD who experience delusions (Bell et al., 2005). For these reasons, it was long understood that personal computer or Internet use was beyond the capacities of MID-CPD clients. However, in the Netherlands and other North Western European countries, Internet penetration is remarkably high and almost complete (Warf, 2013). Internet use rates among people with MID-CPD appear to be increasing as well (Khazaal et al., 2008; Tanis et al., 2012). A recent study in the Netherlands even found that people with lower educational levels and people with physical or mental disabilities which prevent them from working, use the Internet more often than people with high levels of education and those in employment (Van Deursen and Van Dijk, 2014). The researchers investigated Internet use in leisure time. The results show that people with a disability and people with lower education use the Internet for more hours a day than higher educated and employed persons and are more likely to use the Internet for gaming and social interactions. Conversely, people with higher education use the Internet more often for personal development and information seeking. Nowadays, it appears that there are no computer- or Internet use barriers for the MID-CPD group in the Netherlands and professional support can be provided online.

Hulsbosch et al. (2011) investigated the effects of an online support system that enabled videocalling between clients with chronic psychiatric disorders and their coaches in a randomized controlled trial. Online videocalling was combined with care as usual (face-to-face contact) to support clients in their daily functioning. Clients who received online support showed stable clinical outcome measures such as quality of life and social and psychological functioning. They also rated their satisfaction with care over the study period higher compared with clients who received care as usual ($\beta = -2.750$, $p = 0.03$). In a small pilot study, Taber-Doughty et al. (2010) compared face-to-face support with support via online videocalling on the independent performance of adults with intellectual disabilities as they completed household tasks. Results indicated that clients who were supported through videocalling had a higher degree of independent performance than those who were not supported in this way. Although initial results seem thus promising, much more research is needed in this area.

In the present study, we focus on the MPC, an online program that enables online communication between MID-CPD clients and their coaches. Coaches offer support when clients experience problems in daily activities as financial administration, housekeeping tasks, social activities or arranging appointments with health professionals and through the MPC clients can receive this support online. One of the core functionalities of the MPC is secured videocalling. This enables clients and coaches to communicate in a way face-to-face on a distance. Furthermore, it contains a personal logbook for the client, messaging for clients and coaches, the client dossier and information. The main objective of the study is to evaluate the feasibility of using the MPC in a regional institution for supported living in the Netherlands. We describe the characteristics of the program and explore the initial experiences of patients and coaches with the program on the basis of qualitative interviews. We also report data on a pre-test – post-test survey which measured the main goals of support for daily functioning for this client group: quality of life, empowerment, mastery and social network. In addition, we measured the usability of the program and satisfaction with care.

2. Methods

2.1. Study design

We performed an uncontrolled feasibility study, in which we applied a triangulated research method to assess the experiences of clients and coaches with the MPC through semi-structured interviews and online questionnaires. Methodological triangulation refers to the use of more than one study method to answer a research question in order to increase confidence in the results (Denzil, 1970). Clients were invited for face-to-face interviews, and telephone interviews were held with coaches. Clients received a questionnaire on two occasions: first, a baseline assessment and then a follow-up measurement three months later. Coaches and clients each received one questionnaire about the usability of the program. The study protocol was approved by the Scientific Committee of the EMGO+ institute and by the Internal Ethical Committee of the VU Psychology and Education faculty.

2.2. Participants

Participants were clients with mild intellectual disabilities or severe chronic psychiatric disorders such as psychotic disorders, schizophrenia, personality disorders and mood disorders. They received professional support in their daily functioning at home from professional coaches in a regional institution for supported living in the Netherlands. Coaches selected clients who were able and motivated to work with the program.

2.3. Study procedure

Clients who were using or subscribed to the MPC ($n = 162$) received a description of the study and an informed consent form via mail and e-mail. Clients could indicate on the informed consent whether they were willing to participate in a face-to-face interview or/and the questionnaires. After submitting the informed consent form by mail, the participants received a link to the first web-based questionnaire. A link to the second web-based questionnaire was sent three months later. Participants received a gift voucher for their contribution (€10 per interview or questionnaire). Coaches who used the program ($n = 44$) were also invited to the study. They were informed via e-mail about the research, received a link to the questionnaire and were invited to participate in a telephone interview.

2.4. The web-based support program

The MPC is a web-based program that enables online communication between clients and their coaches. The program follows the European standard for secured communication between clients and professionals (see Fig. 1). The program offers six main functionalities:

1. Videocalling: Clients and coaches can see and hear one another. Therefore, they can have an online appointment instead of a face-to-face appointment. The conversations can be recorded and the client can consult the conversation at any time.
2. Logbook: Every client has a personal logbook (see Fig. 2), which is a self-management tool. The client can set goals and plan steps to achieve these goals. Using the logbook, clients can ask the coach questions via recorded video, a document or a text message, to which the coach can respond. The logbook is designed to be user-friendly for clients. With this in mind, it is represented in the form of two refrigerators on which clients can stick notes. Coaches can also place messages in the logbook, for example to remind a client of an appointment.
3. Messages: Clients and coaches can send messages to one another. Consequently, clients can receive answers on questions between set appointments. Clients can even send messages (SMS) to the coach's mobile phone.
4. Client dossier: The program is connected with the client dossier. Clients and coaches have access to this information.
5. Information: The program offers a search engine allowing clients to search for information on the Internet. The coach can browse simultaneously with the client in order to support them during Internet navigation. Through the program, clients can find information about the organization, daytime activities and leisure activities.
6. Social contact: Clients can make contact with other clients through the communication functionalities of the program.

2.5. Implementation of the MPC in the institute

Clients who did not have access to a computer received one on loan, along with an Internet connection at their place of residence. Clients and coaches learned the skills required to use the program during workshops and received information about the program including their privacy protection. Coaches and clients were able to arrange how and when the program was used, in line with their own preferences, in addition to face-to-face contact. The organization encouraged coaches to replace 20% of their face-to-face contact with online contact.

2.6. Interviews

2.6.1. Face-to-face interviews with clients

The interviews were conducted by two members of the research team (JdW and ED). Interviews with clients took place at the clients' place of residence and were audio recorded. Participants were interviewed to obtain information about their daily functioning, experiences with the MPC, and the received support via the MPC. These interviews lasted about 40 min. We invited individual clients to take part in an interview until saturation was reached. Saturation indicates that acquiring new data does not lead to new information on the topic (Glaser and Strauss, 1967). When selecting the participants for interview, we aimed to achieve good representation of the total sample by choosing participants who differed in age, place of residence and gender.

2.6.2. Telephone interviews with coaches

Interviews with coaches were held via telephone. Coaches worked at different locations and visited their clients at different venues which made it difficult to interview them face-to-face in the period of the study. Participants were interviewed to obtain information about their work activities, their experiences with the MPC and the support via the MPC. The interviews lasted about 30 min. The concept of saturation was also applied when interviewing coaches.

2.6.3. Analysis interviews

Client and coach interviews were transcribed and the information was sorted and labeled under the themes 'use of the MPC', 'experience with the MPC', 'computer skills', 'quality of contact via MPC' and 'future of the MPC'. Qualitative data analyses were executed independently by two researchers through content analysis (JdW and ED).

2.7. Measures survey

The measures contained in the online survey are listed below. We chose these measurement scales as they reflect the core values of the institution when she provides support for daily functioning to her clients. These values focus on the quality of life, empowerment, mastery and social cohesion of the clients.

The *WHO-QOL-Bref*, developed by the World Health Organization Quality of Life Group is a 26-item questionnaire covering physical health, psychological health, social relations and the environment of the participants (The WHOQOL GROUP, 1998). This questionnaire does not produce an overall quality of life score. Items are scored on a 5-point Likert scale (1 = not at all and 5 = extremely), and summed

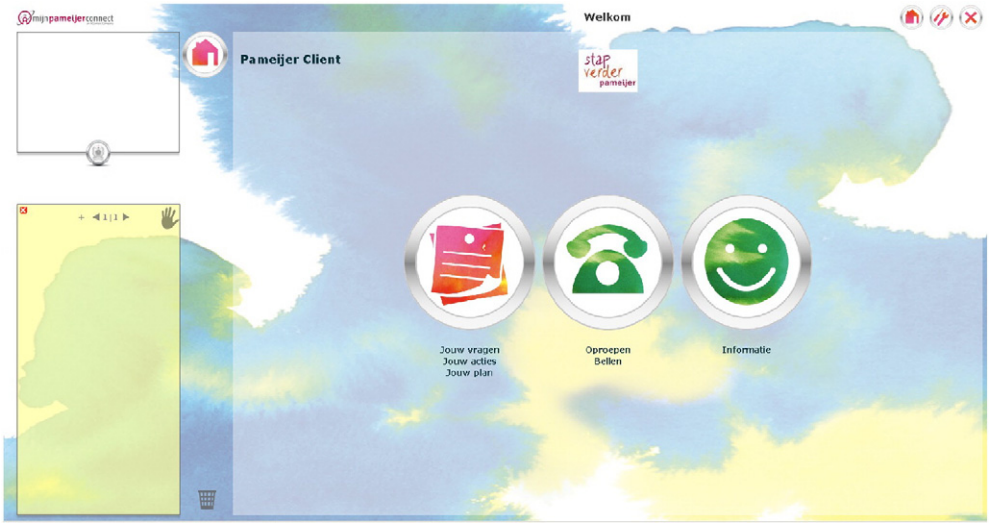

Fig. 1. Screenshot of the MPC homepage.

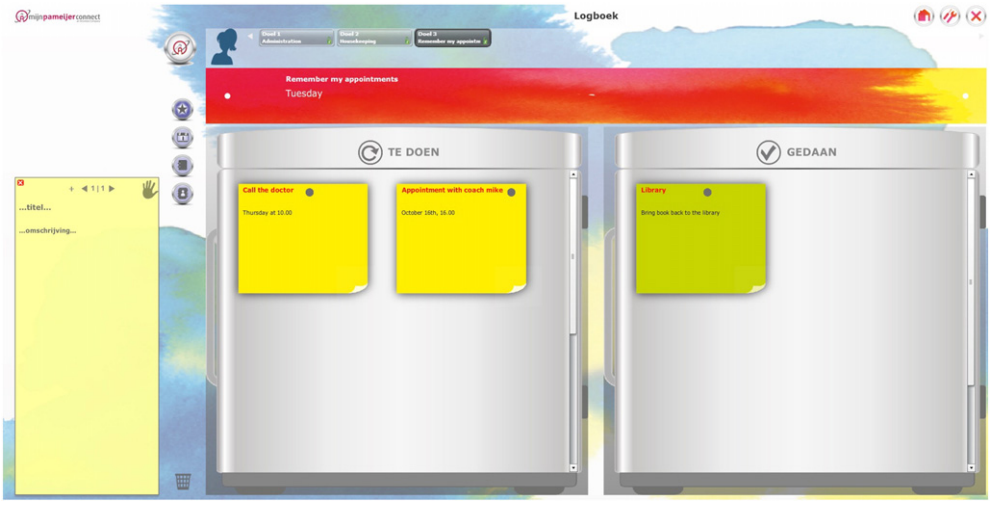

Fig. 2. Screenshot of the MPC logbook.

to obtain a scale score. For each domain, scores range from 0 to 100, with higher scores suggesting better quality of life. The scale reliability ranges from alpha = .66 to .84 (The WHOQOL GROUP, 1998).

The *Dutch Empowerment Questionnaire* is a 40-item self-report questionnaire (Boevink et al., 2008) which measures empowerment. The items are divided in six subscales: professional help, social support, self-knowledge, perception of the self, fitting in, self-management and committed community (perception of commitment of the society to people with impairments). The items are scored on a 5-point Likert scale (1 = strongly disagree and 5 = strongly agree). Subscale scores are calculated as the average of the item scores. Internal consistency is high (.93) (Boevink et al., 2009).

The *Pearlin Mastery Scale* measures the locus of control: the feeling of being in control of situations. This questionnaire has good psychometric properties (Pearlin and Schooler, 1978). We used an abbreviated and translated version of the original 7 item Pearlin Mastery Scale. This questionnaire contains five items, scored on a 5-point Likert scale (1 = strongly agree and 5 = strongly disagree). Higher scores denote higher levels of subjectively experienced mastery. The abbreviated version shows good internal consistency (.77) (Cooper et al., 2011).

The *Social Network Questionnaire is* a 49-item self-report inventory (Van Wijngaarden, 1988) which measures the extent of contact with the social environment. The questionnaire is organized into the following subscales: neighbors, hobbies, organizations, church, work, courses, co occupants, friends, partner, children, parents, brothers and sisters, in-laws and remaining family. To reduce the total amount of questions for the clients, we only used 22 items. We comprised the scales 'parents', 'brothers and sisters' and 'in-laws' in the scale 'remaining family' and did not use all the questions from the other subscales. Items are scored on a scale from 0 to 7 (number of days a week in contact). Higher scores indicate greater social contact with the environment.

The *Client Satisfaction Questionnaire* is an 8-item self-report inventory (De Brey, 1983), which measures client satisfaction with the coaching service. Items are scored on a 4-point Likert scale (with various answer options); a higher score indicating greater satisfaction. Internal consistency is high (.91) (De Brey, 1983).

To assess system usability, we administered an adapted version of the *System Usability Scale (SUS)*, which is a 10-item self-report inventory (Brooke, 1996). We replaced the word 'system' for 'MPC' in the questions. In addition, complex terms were replaced by simplified synonyms. Items relate to scores on a 5-point Likert scale (0 = strongly disagree and 4 = strongly agree). The sum of the item scores is multiplied by 2.5 to obtain the overall value. The scale is scored from 0 to 100, with higher scores indicating greater usability, a score of 70 or higher indicating acceptable system usability. Internal consistency is high (.91) (Bangor et al., 2008).

Sociodemographics where measured through a short demographic questionnaire developed by the researchers, see Table 1.

2.7.1. Analysis pre-test – post-test survey

All statistical analyses were conducted using SPSS for Windows (Version 21.0, SPSS Inc.; Chicago, IL, USA). Paired *T*-tests were used to compare pre-test and post-test scores and only completers were used in the analysis. A significance level of $\alpha = .05$ was set.

3. Results

3.1. Participants and response rates

A total of 60 clients indicated their willingness to participate in the online survey by returning the informed consent form and 30 of them offered to participate in the interviews. A total of 26 coaches agreed to participate in an interview. Eleven clients and 10 coaches were interviewed. After conducting the last interviews no new information

Table 1
Baseline characteristics clients in survey ($n = 39$).

	Clients with CPD ($n = 29$)		Clients with ID ($n = 10$)	
Variable	*n*	%	*n*	%
Gender				
Female	17	59	4	40
Age (*M*, *SD*)	42.4	11.0	47.6	8.4
Ethnicity (country of birth)				
Netherlands	26	90	9	
Partner	6	21	2	20
Education				
Low	11	38	9	90
Medium	16	55	1	10
High		2	7	
Paid job	4	14	3	30
Living conditions				
Independent/alone	18	62	8	80
With family	9	31	1	10
In an assisted living facility	2	7	1	10
Frequency support at home by a coach?				
1 ≥ a day	2	7	1	10
A few times a week	9	31	1	10
1 a week	13	45	7	70
1 ≤ a week	5	17	1	10

was received on the prior labeled themes or on new themes and saturation was reached. A total of 39 clients (65%) responded to the pre-test questionnaire and 30 clients (50%) responded to the post-test questionnaire.

3.1.1. Interviewed clients

The average age of the clients interviewed ($n = 11$) was 43 years ($sd = 8.0$) and most were female ($n = 7$) and Dutch ($n = 9$). All but one of the clients interviewed had chronic psychiatric problems.

3.1.2. Interviewed coaches

The coaches interviewed ($n = 10$) had an average age of 37 years ($sd = 7.1$) and the mean years they were working as a caregiver was 9 years ($sd = 9.5$). Most of the coaches were female ($n = 7$).

3.1.3. Survey clients

The characteristics of the clients with MID-CPD who participated in the pre-test are presented in Table 1. Twenty-nine clients received support for psychiatric problems and 10 for intellectual disabilities. The age of the clients ranged from 26 to 65 years and the mean age was 44 years ($sd = 10.5$). The majority of the participants was female and identified themselves as Dutch. Most participants lived independently in the community and received once a week support from their coach at home. Overall, the group corresponded to the baseline characteristics of the clients who took the interview.

3.2. System usage at pre-test

Five out of 39 clients (13%) who participated in the pre-test noted that they had not started working with the MPC yet. Three of the clients who took part in interviews were registered for the MPC but had not used it so far. Reasons for delay were as follows: no installed computer, hesitancy of the coach to use the program and procrastination. All interviewed coaches already worked with the MPC, except for one who struggled with the integration of the program into work activities.

3.3. Interviews with clients and coaches

3.3.1. Use of the MPC

The majority of clients received support via videocalling with the MPC alternately with face-to-face support. In between appointments, they were able to use the other functionalities of the MPC. Videocalling, logbook and free SMS were the most widely used and appreciated functions among clients. Coaches were particularly satisfied with videocalling since this functionality offered an appropriate alternative for face-to-face contact. Client dossiers were not used frequently because not all parts of the file were available. Clients and coaches occasionally experienced problems with the technical functioning of the program during the study, mainly due to a low quality of the Internet connection.

3.3.2. Experience with the MPC

Some participants initially experienced the MPC as a considerable change from face-to-face support. However, by becoming more familiar with the program, both clients and coaches noticed how the program facilitated their communication. Clients were able to contact their coach twenty-four hours a day, seven days a week by sending him/her a message via the MPC. This increase in accessibility to the coach led to a feeling of security among clients (even though coaches did not always respond immediately) and alleviated the stand-alone nature of set appointments. The personal logbook enabled clients to express their feelings and organize their thoughts in writing. The MPC enabled clients to receive support at various locations, for instance, at the family home or at a holiday destination via online videocalling. The integration of the MPC in the daily work routine of coaches was sometimes challenging and required time and effort. Some coaches noted that travel time was reduced as they replaced some of the face-to-face appointments by videocalling. With the MPC, they were able to work from home and were more flexible in the planning of client contacts, which they experienced as an advantage.

3.3.3. Computer skills

The majority of the clients and coaches had access to a private computer, which they used on a daily basis. However, a small proportion of clients and coaches had never or hardly ever worked with a computer before. Frequent practice with the computer and the MPC was key to learning to work with the MPC. The support needed varied from one client to another. Developing new skills was demanding for some clients who experienced severe difficulties with concentration, for example. Overall, coaches and clients believed that the majority of clients attending the institute had the capacity to learn the skills required to work with the program.

3.3.4. Quality of communication via the MPC

Some clients found it difficult to assess the reactions of the coach during the conversation via videocalling, experienced the communication as cold or were worried about their privacy. Nevertheless, coaches and the majority of clients did not experience a deterioration in the quality of communication or the working relationship. Remote coaching encouraged clients to draw on their own strengths to execute daily tasks, which resulted in improved self-confidence. Having more frequent, shorter sessions via videocalling, instead of one face-to-face session, was indicated as one of the main advantages of using the MPC.

3.3.5. Future of the MPC

Clients and coaches emphasized the need to retain face-to-face contact in the future, which is in their view, necessary for certain forms of support and certain clients' statuses (e.g. housekeeping, administration or a crisis). Coaches highlighted the importance of tailored usage of the services, in which the support meets the needs of a client. Coaches and clients preferred a combination of face-to-face contact and use of the MPC.

3.4. Pre-test – post-test

Table 2 provides an overview of the changes in quality of life, empowerment, mastery, social network and client satisfaction over the period clients used the program. No significant changes were found for the outcomes at the 3-month follow-up compared with baseline assessments except for scores on the empowerment questionnaire. Scores on the total empowerment scale were significantly reduced from baseline to the post-test ($p = .035$). This reduction was caused by a significant difference on the 'Professional help' empowerment subscale ($p = .031$). After applying the Bonferonni correction for multiple testing to the statistical results of the present study, no significant differences on empowerment were found. No significant differences were found between clients who responded to the post-test and those who did not. There were no significant differences between the pre-test and post-test outcomes when the two client groups (clients with MID and clients with CPD) were analyzed separately.

3.4.1. System usability

The System Usability Questionnaire mean score as rated by clients ($n = 27$) was 56.4 ($sd = 14.22$). Coaches ($n = 27$) rated the usability of MPC at 51.5 ($sd = 13.12$). A score of 70 or higher indicates acceptable system usability (Bangor et al., 2008).

4. Discussion

In this study, we examined the feasibility of a web-based program (MPC) to support clients with MID-CPD in their daily functioning. We investigated the experiences of clients and their coaches with the use

Table 2
Client outcomes completers only ($n = 30$).

Measure	Score, *M* (*SD*)				Mean difference, [95% CI for difference]		*t*	*p*
	Pre		Post					
Quality of life[a]								
Physical health	53.50	(21.20)	51.00	(21.20)	2.5	[−1.64,6.64]	1.24	.227
Psychological health	51.47	(14.12)	53.17	(14.82)	−1.7	[−4.88,1.48]	−1.09	.283
Social relationships	48.13	(24.62)	50.67	(21.01)	−2.53	[−7.87,2.80]	-.97	.339
Environment	58.63	(16.35)	58.33	(16.88)	.30	[−2.83,3.43]	.20	.846
Empowerment[b]	3.47	(.52)	3.36	(.59)	.11	[.01,.21]	2.21	.035
Professional help	3.92	(.73)	3.67	(.88)	.25	[.02,.48]	2.62	.031
Social support	3.55	(.78)	3.46	(.78)	.10	[−.08,.27]	1.12	.271
Self-knowledge	3.50	(.67)	3.40	(.78)	.10	[−.05,.26]	1.35	.187
Fitting in/social inclusion	3.48	(.68)	3.36	(.72)	.13	[−.02,.28]	1.71	.097
Self-management	3.65	(.45)	3.51	(.76)	.15	[−.09,.38]	1.29	.206
Committed community	2.82	(.65)	2.86	(.75)	-.03	[−0.20,.12]	−0.49	.626
Mastery[c]	25.83	(4.09)	26.00	(4.12)	-.17	[−1.10,.76]	−0.37	.717
Social network[d]	20.33	(9.32)	21.11	(11.93)	-.78	[−3.33,1.77]	−0.63	.536
Client satisfaction[e]	14.30	(4.39)	13.77	(4.37)	.53	[−.53,1.60]	1.03	.314

Note. Outcomes were measured with:
[a] WHO-QOL –Bref.
[b] Dutch Empowerment Questionnaire.
[c] Pearlin Mastery Scale.
[d] Social Cohesion Questionnaire.
[e] Client Satisfaction Questionnaire.

of the program in routine practice. We used a triangulated research method consisting of qualitative interviews with clients and coaches and quantitative online questionnaires. Results showed that use of the MPC is feasible in routine practice and accepted by both coaches and clients. While working with the MPC, clients maintained their quality of life, empowerment, mastery, social cohesion, and satisfaction with care. The results are in line with earlier research conducted by Hulsbosch et al. (2011), who found that online support in addition to face to face support did not lead to a reduced quality of life or psychological and social functioning.

Clients experienced the use of the MPC as way to facilitate communication with their coach. The ability to videocall from different locations and send messages through MPC increased the accessibility of the coach for clients. This increase in access is in the e-Mental-Health literature often cited as one of the main benefits of offering mental health care services online (Yuen et al., 2012). Another well received functionality was the logbook. The logbook seems to relate to the function of a journal for a part of the clients, containing entries relating the client's thoughts and feelings. Sharing information through messaging and the logbook in addition to face-to-face contact may enrich the communication between clients and coaches and thereby enhance the understanding of each other. This is another advantage of an online program as some clients may experience difficulties in explaining themselves verbally in face-to-face contact with their coach. The opposite may be true for some other clients as well.

Clients experienced no change in the quality of their working relationship with coaches. This implies that although some face-to-face contact was replaced with online contact, clients did not experience a deterioration in the quality of support received. Coaches perceived greater flexibility in scheduling appointments with their clients and saved time due to a reduction in travel time as a consequence of the use of videocalling with the MPC. Use of web-based care may thus eventually lead to a reduction in professional costs. These findings are in line with previous research that demonstrated that the use of videocalling in the mental health sector may lead to greater efficiency and a reduction in costs (Hilty et al., 2013; Richardson et al., 2009). Richardson et al. (2009) reviewed the literature on videocalling for the delivery of patient interventions in mental health care and concluded that this type of service seems cost-effective compared with care as usual. The reductions in costs reported in the reviewed studies were mainly due to reduced travel time. In a more recent review on the use of videocalling in mental health care, researchers found that the quality of assessments and therapeutic interventions offered via videoconferencing seems comparable to face-to-face care (Hilty et al., 2013). They argued that videocalling is effective for various client groups in diverse settings and may be useful across different client populations.

Although the reviews discussed above mainly covered assessment and treatment for people with less severe mental health problems, the results of the present study imply that the use of online videoconferencing and related web-based technologies is also useful for clients with MID-CPD, in spite of their impairments. According to the majority of clients, the MPC program was easy to use. It seems that technological illiteracy and the challenges clients with MID-CPD may experience during the learning of new skills can be overcome with educational workshops, intensive support from coaches, exposure to the program and practice. However, both clients and coaches rated the system usability as quite low (56.4 and 51.5) compared with the indications that acceptable usability scores are at 70 or higher (Bangor et al., 2008). These low rates may have been a consequence of technical difficulties experienced when working with the program due to poor Internet connections which impaired the functioning of the MPC. It seems that the system itself is experienced as user-friendly by coaches and clients, but the poor Internet connection obstructs a good connection to the MPC. Another point that may have influenced the low rates for system usability is client's privacy concerns in relation to the program. In another study investigating the use of videocalling in mental health care, clients expressed concerns regarding their privacy, specifically that their conversations would be overheard by others (Myers et al., 2006). These are important points that need to be addressed by the institute to ensure improved use of the system by clients and professionals in the future.

The results of the qualitative interviews also showed that clients were more able to control the support they received from their coaches by working with the MPC, which may lead to improvements in overall empowerment levels. Earlier research suggested that the use of web-based interventions aimed at increasing self-management, education and improving the communication with care providers for people with physical or mental problems may boost empowerment among users (Samoocha et al., 2010). This conclusion seems to apply to clients with MID-CPD. Greater empowerment is an important issue for this client group, as it may increase their level of independence and make them less dependent on coaches in their daily functioning. This

underscores the potential of web-based technologies directed at this client group.

4.1. Strengths and limitations

This study is one of the first to address web-based support for daily functioning of clients with MID-CPD. MID-CPD covers a diverse and severely impaired group of individuals who are often dependent of care systems, but have received only minimal attention in research on innovation in care. Further studies are needed to fill this gap and the present study contributes to this line of research.

There are some limitations to this study. First, although the results in our study seem promising, the results need to be interpreted in the context of a pilot study with a relatively small group of clients. Despite the positive results on the interviews there were no improvements on the outcomes of the questionnaires. We did not anticipate in this first phase of the implementation trajectory an improvement however on these measures. Indeed, the results show that clients receive the same quality of support despite the fact that this is partly provided online. In this phase clients and coaches learned to use the program effectively. It is expected that the new support strategy may lead to improvement on the main outcomes when it is fully implemented. Future studies are needed to evaluate this assumption. Second, coaches selected clients who were able to work with the program. Although coaches tried to involve critical clients, this may have led to a selection of clients who are open to technology and experience less severe problems in their daily functioning. Conversely, this could also have led to an above-average number of critical clients. Third, some clients were already using the program prior to the pre-test, which may have resulted in neutral outcome measurements. Nevertheless, after controlling for the number of weeks clients were working with the MPC, we found no relationship between time working with the MPC and outcome measures. Fourth, the fact that we used a modified version of the SUS to measure the system usability may have influenced the scores. For this reason results must be interpreted with caution. Fifth and finally, not all the clients interviewed completed the questionnaires. This may have led to different samples of clients who participated in the interviews, the questionnaires or both. In addition, due to practical reasons we were only able to interview one client with MID, which may have contributed to differences in the results of the two research methods.

4.2. Future research

Further investigation on the evaluation and implementation of web-based tools aimed at supporting the daily functioning of clients with MID-CPD in practice is advised. Research should also be conducted on the long-term impact of online support.

5. Conclusion

The present study provided an initial proof of concept that the implementation of web-based technologies to support clients with MID-CPT in their daily functioning in practice is feasible and accepted and leads to maintenance of the quality of life, empowerment, mastery, satisfaction with care and social cohesion. Online support may have the potential to reduce the dependence of clients with MID-CPD on their coaches and improve their independent daily functioning. These results are promising and support further development and research in the area of online support for clients with MID-CPD.

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