Implementation of a computer-assisted face-to-face intervention for mapping the social support networks of patients with severe mental illness in routine clinical practice: Analysis of the appropriateness and acceptability of the intervention

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Abstract

Background: Social support is a key dimension of personal recovery for patients with severe mental disorders. Although clinicians and health professionals should monitor the social support resources of patients in order to provide effective treatment, no specific tool or intervention exist for that purpose. Egonet is a computer-assisted intervention for health and social services that enables the mapping, assessment and fostering of patients' social support networks.
Aims: This paper describes the intervention and evaluates the appropriateness and acceptability of its implementation in a clinical setting.
Method: We described the computer-assisted intervention. We used a questionnaire to assess how appropriate and acceptable clinicians found a preliminary version to be. We also collected patients' level of satisfaction with their social support networks before and after the intervention and carried out qualitative interviews.
Results: Egonet is made up of four components: (1) a computer-assisted interview for mapping social networks, (2) a remote data server, (3) a data-mining module and (4) a customisable reporting tool. Egonet was implemented for 232 patients by 91 clinicians from five services. The intervention was perceived by clinicians as appropriate and useful for clinical practice, although it was noted that considerable effort was required to obtain its benefits. Patients were slightly more satisfied with their social support after the intervention than before, and expressed the opinion that more attention should be paid to the social support network.
Conclusions: EGONET is appropriate and acceptable for use in work related to the social support networks of patients with psychiatric disorders.

Keywords

Social support, mental disorders, user-computer-interface, psychosocial support systems, benchmarking

Introduction

Over the past decades, personal recovery and the social inclusion of patients with severe mental illness (SMI) have been promoted as overarching objectives of mental health care delivery (Anthony, 1993; Deegan, 1993; Slade et al., 2015). The major dimensions of social inclusion, which are considered the essential foundations of personal recovery, relate to employment, independent housing, education, engagement and participation in social life and social interaction (Anthony, 1993; Morgan et al., 2007; Priebe et al., 2008). While numerous interventions intended to support the social inclusion dimensions of employment

and housing have been developed and are evidenced in the literature (Bond & Campbell, 2008; Craig, 2019; Slade et al., 2014), such as Individual Placement and Support

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(IPS) (Bond et al., 2001; Burns et al., 2007; Kinoshita et al., 2013; Marshall et al., 2014) and Housing First programmes (Gilmer et al., 2015; Padgett et al., 2006; Poremski et al., 2016), few evidence-based interventions are available that address issues related to social support and interaction (Flores et al., 2018; Villalonga-Olives et al., 2018).

Research has indicated that SMI patients' support networks are smaller than those among the general population (Albert et al., 1998; Anderson et al., 2015; Bengtsson-Tops & Hansson, 2001; Furukawa et al., 1999; Goldberg et al., 2003; Horan et al., 2006; Koenders et al., 2017; MacDonald et al., 2004; Palumbo et al., 2015; Wong et al., 2011). A literature review on the social support networks of patients with psychotic disorders found a mean network size of about 12 alters (individuals who form the network around the ego, i.e. the patient) (Palumbo et al., 2015). Horan et al. (2006) found that the recent onset of a psychotic episode did not seem to affect the size of a patient's support network; in fact, there was a decrease in network size before the time of the patient's first hospitalisation. The social support networks of SMI patients also differ from the networks of individuals in the general population in terms of composition: those of SMI patients tend to include a larger proportion of family members and a smaller proportion of friends. Patients' support networks also include a significant proportion of care professionals (Albert et al., 1998; Bengtsson-Tops & Hansson, 2001; Koenders et al., 2017; Palumbo et al., 2015; Wong et al., 2011). The study by Koenders and colleagues found that the networks of SMI patients who were being cared for in the community were, on average, 31% made up of family members (vs. 22% in the general population) and 55% made up of acquaintances (vs. 62% in the general population). Finally, the structure of the social support networks of people with SMI is fragile: the networks tend to lack links between components (i.e. groups of alters connected around a specific social activity), and therefore offer the ego fewer opportunities to experience social diversity (Wyngaerden et al., 2020).

These research findings have, however, rarely been translated into clinical practice. Care professionals in particular lack tools for collecting, mapping, describing, assessing and fostering the social networks of patients (Sigodo et al., 2020; Tee et al., 2020; Webber et al., 2015). The collection and analysis of social network data are often the exclusive preserve of researchers who are trained in network science, which limits the availability of tools and their use by health and social care professionals (Birkett et al., 2021).

This paper is the first step of an implementation assessment of an intervention for that purpose. Egonet is a computer-assisted intervention that makes it possible to describe the social support networks of SMI patients. It aims to provide clinicians and patients with a computer-assisted face-to-face intervention designed for use in routine practice. The intervention takes place within a wider framework that includes a remote data server and tools for analysing and reporting results on the social networks collected during the intervention. In this paper, we describe the components of the intervention. We also report the results of the exploratory phase of its implementation, in relation to (1) the appropriateness of the intervention for implementation in routine practice and (2) the acceptability of the intervention to its users, that is, clinicians and patients (Aarons et al., 2011; Proctor et al., 2013).

Methods

The Egonet intervention and framework was inspired by previous research including the Morpheus study, which examined the social support networks of people with severe mental illness (Wyngaerden et al., 2019, 2020). That study included the development of a survey for research purposes. In order to translate the survey into an intervention for use in routine clinical practice, we expanded several components of the framework and created a computer-assisted environment. Then, the implementation evaluation of the Egonet intervention and framework was carried out using the EPIS conceptual model developed by Proctor and Aarons (Aarons et al., 2011; Proctor et al., 2011), which is based on four stages of implementation: Exploration, Preparation, Implementation and Sustainment. According to this model, for an experimental intervention to be scaled up for use in routine clinical practice, the four abovementioned implementation stages must be developed and assessed. Each stage has its own indicators and measurements. The first stage is exploration, in which an issue is considered of interest for innovative interventions and such an intervention is available for an experiment, but an assessment of several factors is required to address the appropriateness of the intervention and its acceptability to potential users. Appropriateness refers to how relevant users perceive the intervention to be to the practice setting. Acceptability refers to the perception of how well adapted the intervention is to the settings in which it is intended to be implemented. The exploration stage is followed by the preparation stage, in which the feasibility of the intervention is assessed and its actual adoption by users occurs. In the following stages, the fidelity of the intervention implementation to its guidelines, the costs associated with implementation and sustainment over time are considered. The results presented in this paper are those of the exploration stage of the implementation of Egonet, that is, the assessment of the appropriateness and acceptability of the intervention.

First, we describe the several components of the Egonet framework as expanded for use in routine practice. In order to assess the appropriateness and acceptability of the

intervention, we asked professionals in care settings to implement a preliminary version of the intervention. We collected these clinicians' views on the intervention using a questionnaire that addressed their exposure to the intervention, the relevance of the intervention to the context and practice of the care setting, its acceptability, its benefits and the effort required to implement it. The questionnaire included five items rating the relevance and appropriateness of Egonet on a 5-point Likert scale, and two items rating the benefits of Egonet ('rate the benefits of Egonet for your practice') and the effort it required ('rate the effort involved in implementing Egonet') with scores ranging from 0 to 10. Professionals also had the opportunity to comment on their ratings in open-ended textual spaces. Then, we assessed the acceptability of the intervention to the patients, with three questions that measured the patients' levels of satisfaction with the overall support they received from others, with the number of people who could potentially offer support, and with the level of information exchange among the people offering support. The three questions were rated twice by the patients on a 7-point Likert scale, once before and once after the data collection interview in order to assess the effect of the intervention on their satisfaction with their overall social support. Qualitative interviews were also conducted with nine patients.

Participants

In the exploration stage of the implementation study, we included three inpatient units of one psychiatric hospital and two outpatient mental health services in Brussels. All the care professionals of the participating services and all the care professionals in the hospital were included in the sample of professionals ($N = 145$). The sample was composed of 91 professionals in participating units and 54 in non-participating units. It was mostly made up of psychiatric nurses (35%), psychologists (18%), psychiatrists (12%) and social workers (7%). Patients were recruited by these professionals, who administered the preliminary data collection interview to 232 patients recruited in their services. Of these, 105 (45%) had a primary diagnosis of substance-use disorder (mainly alcohol misuse), 46 (20%) had a primary diagnosis of mood disorder, 23 (10%) had a main diagnosis of anxiety, neurotic and somatoform disorder, 19 (8%) had a psychotic disorder and 12 (5%) had another type of disorder. The diagnosis was not documented for 27 (11%) patients.

Ethical review

The Egonet study was reviewed by the Ethical board of the Epsylon Psychiatric Care Network and approved on 27 June 2018 (no. CEL-Epsylon 2018-06-27). All participating patients signed an informed consent form. All the data were anonymised and stored in Egonet's secured, encrypted server.

Results

Description of the components of the Egonet intervention

The Egonet setting is a computer-assisted intervention designed to collect data on the social support networks of service users, map their social networks and provide clinicians and users with relevant information for fostering such networks. It is based on a tool that includes four main components (Figure 1): (i) a computer-assisted data collection interview, (ii) a remote data warehouse (server and database), (iii) a data-mining module and (iv) a customisable web-based feedback report that includes a visualisation of the social support network map and a benchmark against the other networks included in the database. The detailed architecture of the whole Egonet framework can be found on our website (Lorant et al., 2021).

In order to translate the research setting into an intervention that would be feasible in routine practice, the *data collection interview* was redesigned to be carried out with the use of a computer application, Network Canvas (Birkett et al., 2021; Hogan et al., 2020). In this context, the clinician, usually a psychiatric nurse, psychologist, psychiatrist or social worker with expertise in mental health care, invites the patient to map his/her social support network. A tablet is placed on a table between the clinician and the patient so that they can interact with one another and with the tablet. The interview has three sections. The first is a name generator, which is used to identify significant people (alters) who are supportive contacts of the respondent (ego). The name generation phase includes one question that allows the respondent to draw up a list of people spontaneously identified as offering generic social support. Respondents are free to mention as many alters as they want. Next, two specific social contexts are explored: informal relationships (family, friends and acquaintances), and relationships with care professionals. Then, the respondent is asked about support in four specific domains of social support: finances and administration, everyday life, activities and health. These four domains of support had been used in previously validated scales (Broadhead et al., 1988; Zimet et al., 1988).

The name generation phase is followed by the name interpretation phase, which is used to collect information about the alters. Each alter's gender and role are collected. The role of an alter depends on the social context of their relationship with ego, that is, whether it is an informal relationship (e.g. father, daughter, friend) or one within the context of professional care (e.g. psychiatrist, nurse, social worker). For each alter, the respondents are also asked to specify a series of contact characteristics, such as the
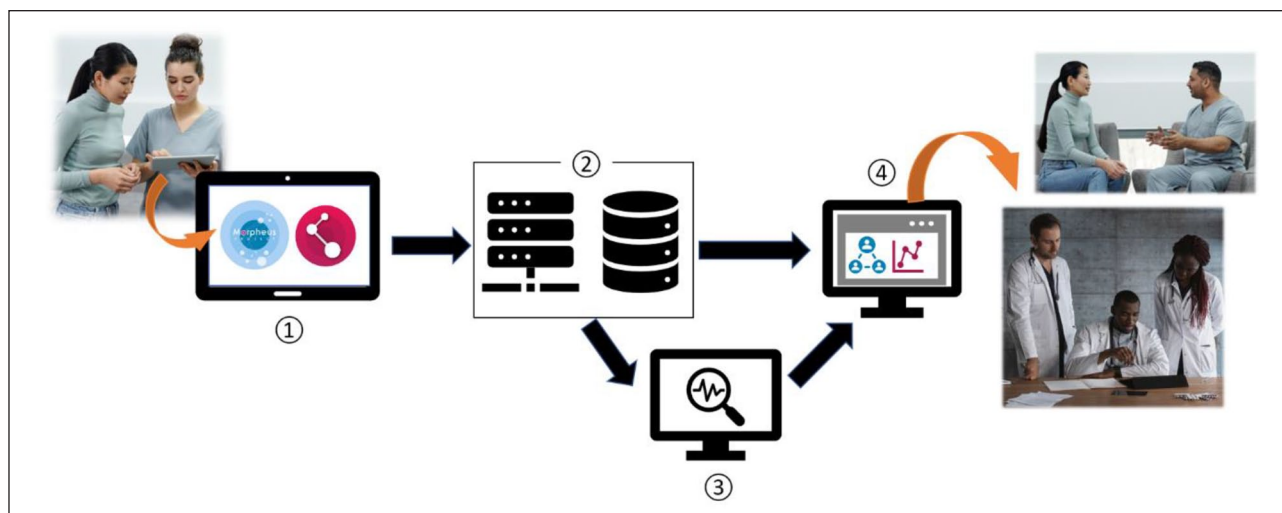
Figure 1. The components of the Egonet framework: ① computer-assisted data collection interview, ② distant data warehouse (server and database), ③ datamining analytical module and ④ feedback report on a webapp.

possibility of the alter providing support during a crisis event and the extent to which they have been in contact recently.

In the third phase, a dyad interpreter is used to identify the existing links between alters based on ego's knowledge. The dyad interpreter is based on Hogan's Bullseye target technique of network visualisation (Hogan et al., 2007, 2020). Ego, that is, the respondent, is pictured in the centre of a four-circle target. The respondent places all the alters on target circles according to the level of support they provide in his/her view. Then, the respondent is asked to draw links between the alters who exchange information about him/her. The whole interview is synthesised with the generation of a sociogram, that is, a network map representing the actors who are members of the respondent's social support network and the ties that exist between them according to the respondent's perception. The feedback application allows the sociogram visualisation to be customised: the patient and the clinician are provided with different visualisation options for the layout of the graph and for the colours, shapes and sizes used to represent alter's and tie's characteristics. The clinician and patient may engage in a dialogue about the patient's needs and resources in terms of social support (D'Angelo & Ryan, 2021; Tubaro et al., 2016).

All the information collected is stored within a secured *remote data warehouse* (server and database) and automatically examined by the *data-mining module*. This module calculates basic statistics about each registered social support network (e.g. number of alters, proportion of relatives and professionals among the alters in the network), calculates several network indicators on the sociogram (e.g. density of ties, number of components, degree and betweenness centralisation) and provides the clinician and the patient with a benchmark for comparing his/her network characteristics with the average situation of other networks stored in the database. A feedback report that includes a summary of the primary information collected and the secondary information produced by the data-mining module is available, along with the sociogram visualisation, via *the feedback web app*.

Assessment of clinicians' perception of the appropriateness and acceptability of the intervention

The level of involvement of care professionals within the participating services was moderate. Out of the 91 care professionals who worked in the participating units, only 39 had actually completed at least one sociogram interview with a patient and very few ($n=7$) had completed at least 10 interviews. Nurses ($\chi^2=26.4$; $p=.002$) were more likely to use the sociogram than those with other professional backgrounds, and professionals with a bachelor's degree ($\chi^2=21.0$, $p<.001$) were more likely to use it than professionals with a master's degree.

The vast majority of respondents had a positive view of the appropriateness of the sociogram and were willing to invite patients to map their social support networks (Table 1). Those working in the participating units were convinced that the exercise helped them to be more effective in their work with patients, while those who did not participate disagreed with this statement. Most respondents, however, said that carrying out a sociogram interview with patients would add to their workload: the benefit of using the intervention was rated 6.4/10, while the related

Table 1. Appropriateness of the Egonet intervention in the views of participating and non-participating services and of participants who completed at least one sociogram, % of agreement or mean score and number of respondents.

| Do you agree with the following statements?	Participating service		Completed at least one sociogram		Total
	No	Yes	No	Yes	
	Agree (%)	Agree (%)	Agree (%)	Agree (%)	N
It is relevant to look at the social support networks of patients	97.6	98.1	96.9	100.0	136
I am willing to invite the patient to map their social support network	81.5	90.7	80.4	97.4	135
The sociogram helps me to be more effective in my work with patients	10.3	86.0	21.8	83.3	137
Creating a sociogram is a worthwhile investment	15.9	92.2	24.8	94.7	139
Once the Egonet project is completed, I intend to continue to run sociograms	4.7	82.0	21.2	66.7	135
		Mean (std)			
Rate the benefits of using the sociogram in your practice with a score from 0 to 10		6.4 (2.5)			38
Rate the workload of using the sociogram in your practice with a score from 0 to 10		6.2 (2.8)			37

workload was rated 6.2/10 in the participating services. In their comments on their ratings, clinicians said that: 'it's the most interesting tool available to us', 'it allows us to identify who is contactable for an appointment . . . and to find out about people around the user other than relatives'. Others, however, reported that: 'some patients find it long and exhausting', 'It requires time, preparation, administration, discussion, transmission. . .', 'If there were only the sociogram, it is useful and I'd continue doing it'.

Assessment of the acceptability of the intervention to patients

On average, patients mentioned 12.4 alters (std=6.8), 36.3% of whom were professionals and 63.4% of whom were relatives or friends. The degree distribution (see Figure 2) indicates that 38% of the patients had fewer than nine alters in their networks.

Patient's satisfaction with their social support networks tended to be low, with a mean score of 3.90/7 (std=0.72). After they saw the sociogram of their support network, satisfaction increased slightly to 4.34/7 (std=0.84). The difference between satisfaction before and after the sociogram was positive and statistically different from 0 (Paired t-test=4.4, $p < .01$).

In qualitative interviews, most patients described the intervention as a means of self-discovery. On the one hand, some of them discovered that their social support network was different from expected, some for the worse: 'I realise that there is no one, I'm feeling so sad' (P1), but some for the better: 'I discovered that there were unexpected people, the cleaning woman, the GP. . .' (P2), 'When I'm not well, I take the sociogram, and I remember that I'm not
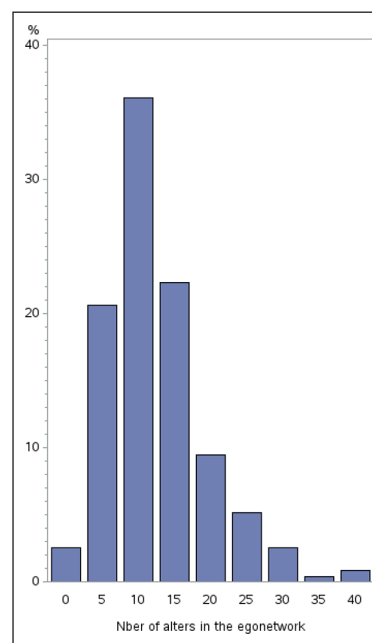
Figure 2. Number of alters in the personal network of the patients who completed the sociogram.

alone' (P10). Several patients made observations such as 'currently, there are many people, such as Narcotics Anonymous, the hospital, the psychologist, psychiatrist. . . If there were fewer care professionals, it would mean I was getting better' (P8), 'I'd like to have more social contacts . . . I took my sociogram to the psychologist's, I want to work on this with her' (P8), and 'I realised that it's up to me to contact people; when I'm not well I tend to isolate myself' (P10).

Some patients, however, felt that the intervention involved a cognitive and emotional effort: 'It's difficult to place people in the circles. Establishing a hierarchy between people is weird and difficult . . . It's an emotional burden because while doing the exercise, one puts one's head in order' (P3).

Discussion

Main findings

This paper describes the components and the implementation of a computer-assisted intervention that maps the social support networks of patients with severe mental illness in routine clinical practice. The intervention was successfully implemented in five services with more than 200 patients. Both clinicians and patients expressed interest and were satisfied with the intervention. Clinicians, however, pointed out the effort required to implement the preliminary version, while patients reported that it involved a cognitive and emotional burden. These results indicate that the intervention is appropriate and acceptable although it requires some adaptation. The information collected can improve the knowledge of patients' social support networks: on the whole, the patient's social support networks were quite small and contained a high percentage of professionals, which is consistent with previous research.

Consistency with previous studies

Following the Exploration, Preparation, Implementation and Sustainment (EPIS) framework (Aarons et al., 2011; Proctor et al., 2011), the Egonet intervention is still at the exploratory stage, in which the appropriateness and acceptability of an intervention is assessed. Instead of testing the effectiveness of the intervention, we developed a comprehensive computer-assisted framework for the intervention, and created a preliminary version of the intervention in order to assess the appropriateness and acceptability of the intervention's concept. This development strategy is consistent with the recommendations of previous studies in implementation science and makes it possible to accelerate intervention development (Mohr et al., 2017) and improve uptake (Lyon & Koerner, 2016). Many evidence-based interventions are only used in an experimental context without being scaled up in routine practice. We chose to develop an intervention that addressed a key dimension of personal recovery, social support, within the context of a real fieldwork. Its effectiveness, however, still needs to be evidenced.

Our findings suggest that the concept of the Egonet intervention was acceptable and appropriate in the view of both professionals and patients. Among the professionals, the vast majority of respondents considered the intervention highly relevant to the patient's care. Those who used the intervention also reported that the intervention helped them to be more effective in their clinical practice. Among the patients, satisfaction with social support was moderate, but significantly higher after the intervention than before. The qualitative material collected from patients revealed great curiosity and interest in the novel approach, especially in relation to the visualisation of the social support network. Many patients saw it as a tool for discussing their social support with clinicians in a different way.

Both professionals and patients, however, also noted barriers to implementation. The professional respondents found the effort required by the intervention burdensome. The difference between the intervention's benefit rate and effort rate was not significant. Qualitatively, the professional respondents stated that the intervention required time and they also felt that it was burdensome for the patients. Patients did not mention time as a major barrier but highlighted the cognitive and emotional effort involved. The barriers identified by professionals are commonly found in implementation studies on new health interventions (Geerligs et al., 2018). Research has shown that innovations require support from champions and leaders in order to be adopted (Aarons et al., 2016; Tansella & Thornicroft, 2009), support that may have been lacking at this stage of the implementation. The unequal take-up rate across disciplines confirm the importance of service culture, for example, the recognition importance of social support network and the concept brought by the novel intervention for clinical practice (Aarons & Sawitzky, 2006; Glisson et al., 2008). The design and implementation of Egonet did not specifically address issues related to leaders' support and service culture. The cost-benefit balance is, however, expected to be positively affected by the implementation of the full computer-assisted intervention, which will dramatically decrease the burden of the intervention in terms of preparation and data recording and facilitate access to output such as customisable visualisation and feedback reporting.

The qualitative material obtained from patients also yielded some unexpected results. Visualisation is one of the key outcomes of Egonet. We expected visualisation to provide care professionals and patients with useful information about the organisation of care around the patient, support with crisis events and the exchange of information between the patient and people around him/her. Patients, however, also highlighted its use in offering insight and raising awareness of social support. They particularly emphasised the emotional effect of the social support visualisation, their hope that it would help them to discuss their situation with clinicians differently, and their desire to be active within their social support networks. These indications are particularly promising in the context of a personal recovery model that aims to involve and empower patients as well as fostering hope in the care process (Leamy et al., 2011; Wallace et al., 2016). This kind of visualisation can, however, be a double-edged sword, as has been explained by others (Tubaro, 2021). In some cases, the feedback can

generate concerns, particularly when the patient becomes aware of how lonely he/she can be or how much the network is dominated by professionals. Other ethnographical studies have highlighted the unease researchers may experience in such situations (D'Angelo & Ryan, 2021). In order to avoid these, the relational aspect of the administration of the intervention needs to be improved. The implementation of this feedback in a care setting gives the health professionals the opportunity to prepare beforehand and work on the patient's network with him/her in order to promote personal recovery.

Finally, the characteristics of the social support networks of patients collected with Egonet were consistent with those found in previous studies in terms of size and composition (Palumbo et al., 2015). Most of these studies were carried out with people having severe mental illness, in particular psychotic and mood disorders. Only a limited number of studies were conducted with other types of mental disorders, although few differences between groups were found (Dickinson et al., 2002).

Limitations

This paper presents several findings from an ongoing research and development programme. These are, therefore, preliminary results from the exploration stage of the implementation of the Egonet intervention. If the adoption of the intervention is effective, its effectiveness will be examined in further research. The present study, therefore, is only the first step in a longer implementation and evaluation process. The appropriateness and acceptability of the intervention as examined in the present study were limited by the lack of diversity of the services involved so far. Other services and professionals were invited but declined to take part in the study. Although this limitation is not a major issue at the exploration stage, a larger spectrum of service types will be required before scaling up the Egonet intervention at later implementation stages. For instance, patients with severe mental illness and other vulnerable groups with complex needs are also cared for in primary care services, so it is of utmost importance that the intervention is made short and easy to use. A second major limitation of the present study is the likelihood that the results of the survey on appropriateness were impacted by social desirability: the positive assessment of the intervention by participating professionals may have been overestimated. The quantitative results must, therefore, be interpreted with some caution.

Conclusion

The Egonet intervention provides patients, clinicians and services managers with valuable information for use in recovery-oriented mental health care and may strengthen continuity of care between in- and outpatient services and between professionals and informal carers around the patient, while empowering the patient to be actively involved in his/her own care and support (Corrigan & Phelan, 2004). The intervention appears to be acceptable to end-users and is potentially appropriate if the effort required to use it is taken into account. The development of a comprehensive computer-assisted framework should decrease the effort required by the intervention and optimise its benefits in terms of customisable feedback and visualisation. Egonet might be particularly suitable for use in preparing discharges from hospital stays and monitoring patients who are cared for by assertive community treatment teams.

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