Bridging the science-to-service gap in schizophrenia care in the Netherlands: the Schizophrenia Quality Improvement Collaborative

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Accepted for publication 7 September 2013

Abstract

Objective. Many patients with schizophrenia are not treated in line with evidence-based guidelines. This study examines the large-scale implementation of the National Multidisciplinary Guideline for schizophrenia in the Netherlands.

Design. Observational, prospective study, with repeated measurement.

Setting. Thirty mental healthcare teams in different regions of the Netherlands.

Participants. Three hundred and fifty-nine clinicians with different professional backgrounds and 1489 patients suffering from schizophrenia.

Intervention(s). Six evidence-based interventions for schizophrenia were implemented, in the context of a quality improvement collaborative: assertive community treatment (ACT) or its adapted version functional assertive community treatment (FACT), cognitive behavioural therapy, psycho-education, family interventions, individual placement support and pharmacotherapy.

Main Outcome Measure(s). Professional performance, social functioning and relapse rates.

Results. Improved professional performance, in line with guidelines. Availability of (F)ACT improved from 23 to 60%. Individual Placement Support improved from 20 to 53%. Complete care plans were composed for 38% of the patients and routine outcome monitoring was introduced in most teams. Social functioning improved slightly (HoNOS mean: from 6.2 to 5.6). Relapse rates did not improve during the course of the study.

Conclusions. An intensive implementation programme can result in an improved delivery of evidence-based care, increased continuity of care and slightly improved outcomes for individuals with schizophrenia. More rigorous research designs have to confirm these findings.

Keywords: quality improvement, quality management, mental health disorders, disease categories, quality indicators, measurement of quality

Introduction

The first Dutch evidence-based multidisciplinary guideline for schizophrenia was published in 2005 [1]. This guideline was developed by the organizations of patients, families and clinicians. It incorporated recommendations concerning diagnosis and pharmacological, psychosocial and family interventions (FIs), as well as effective community treatment approaches. An analysis of the gap between actual care and guideline recommendations, performed at the release of the guideline, reported a considerable ‘science-to-service gap’ [2]. Although best practices were available in Dutch mental health care, patients did not generally receive effective interventions, or a sufficient number of sessions within an appropriate timeframe.
Moreover, coordination of care appeared hard to come by [3]. This finding was repeated in the first Quality Assessment of Regional Treatment Systems for schizophrenia (QUARTS), a structured interview with stakeholders, showing that in 2005, an estimated 25–50% of patients were offered care according to the guideline [4].

There is a lack of knowledge about effective guideline implementation strategies in schizophrenia care [5, 6]. Quality improvement collaboratives (QICs) have introduced better quality and outcomes of care in other settings [7]. Over the last decade, this method for improving practice has been nationally promoted and funded by the Dutch government to bridge the gap between evidence-based and routine mental health care. In schizophrenia care, this has led to the launch of two waves of QIC, between February 2006 and April 2008.

The Schizophrenia QIC was designed by a team of experts, including experts by experience. It was aimed at the achievement of two goals: a reduction of relapses and improved social functioning [8]. Both goals strongly reflected the perspective of consumers and carers. Social functioning, in terms of having a job, a partner or friends, having suitable housing and of being able to participate in society, is of key importance in the lives of people with schizophrenia. Although for many of them, symptom reduction is not a goal as such; a reduction of relapses is essential, because relapses make patients feel more isolated, and interfere negatively with functioning [9, 10]. In order to achieve these goals, a number of evidence-based interventions and best practices, derived from the guideline, were recommended by the expert team. In this paper, the methods and results of the schizophrenia QIC are described, and suggestions for a further implementation effort in this field will be given.

Methods

Design

The design of the study was a cohort study, with repeated measures. Comparison with a reference group was not an option, since all schizophrenia teams in the Netherlands were invited to participate in the QIC, and routine monitoring data from non-participating teams were not available.

Study population

The study population consisted of clinicians within the participating teams and the patients they treated. Teams were selected after a general call to all mental healthcare organizations. The criteria for selection were being a multidisciplinary specialized team, having the motivation to improve care, active leadership support, a local team coordinator and payment of a participation fee. Patients were included by the clinicians from their own caseload. The criteria for including patients were having a chart diagnosis of schizophrenia and a need of continuous care.

Implementation strategy

The two consecutive waves of the quality improvement project abided by the rules and regulations of the ‘Breakthrough’ QIC, method [11, 12]. This method has been applied in many countries for various clinical problems and generally has five essential features: (i) there is a focus on a specific aim, with gaps between best and current practice; (ii) clinical experts provide recommendations and support for improvement; (iii) multidisciplinary teams from multiple sites participate; (iv) there is a model for improvement (setting targets, collecting data and testing changes) and (v) a quality improvement process is organized with a series of structured activities in a given time frame [7, 11, 13]. The structured activities offered to the participants during the Schizophrenia QIC are listed in Table 1.

Table 1 Implementation strategies used during the Schizophrenia QICs

| Professionals | • National expert team on schizophrenia care and quality improvement  
| • National network of multidisciplinary teams for exchange and learning  
| • SMART goal setting and indicators to monitor results in Excel (PDSA cycles)  
| • Training on the Breakthrough method and data collection  
| • Four conference days for exchange and learning (including workshops on evidence-based interventions)  
| • Eight meetings between local team coordinators and the expert team (including support in applying evidence-based interventions)  
| • Team visits and telephone contact by experts  
| • Written feedback on three improvement reports and data charts  
| • A virtual network environment for exchange of best practices and online discussion  
| • A Toolkit of protocols on evidence-based interventions leading to fidelity  
| • Involvement of patient representatives in improvement teams/care teams  
| • Quality of life measurement and feedback (optional)  
| • A patient participation training  
| • Two meetings with local patient representatives for exchange and learning  
| • Active management involvement  
| • Include the care plan into the electronic patient record where possible  
| • Conference day for local management  
| • Workshops reducing waiting lists and spreading and sustaining QI results  
| • Uptake of new interventions in organizational policy and planning  
| • Local newsletters and folders

| Patients | • Involvement of patient representatives in improvement teams/care teams  
| • Quality of life measurement and feedback (optional)  
| • A patient participation training  
| • Two meetings with local patient representatives for exchange and learning  
| • Active management involvement  

| Organization | • Include the care plan into the electronic patient record where possible  
| • Conference day for local management  
| • Workshops reducing waiting lists and spreading and sustaining QI results  
| • Uptake of new interventions in organizational policy and planning  
| • Local newsletters and folders
The aims of the Schizophrenia QIC were the implementation of one or more of the evidence-based interventions recommended in the guideline [1] and optimal continuity of care. The evidence-based interventions included: assertive community treatment (ACT) or its adapted version functional assertive community treatment (FACT) [14], cognitive behavioural therapy (CBT), psycho-education (PE), FIs, individual placement support (IPS) and pharma-therapy (PHth).

Optimal continuity of care was to be achieved by the introduction of comprehensive and up-to-date patient care plans, covering treatment, early warning signs and rehabilitation. This was based on the assumption that having a recent comprehensive care plan implies regular patient contact and a proper assessment of the patients’ needs and goals.

Measures

To assess the impact of the QIC, outcome and process indicators were developed. Outcome indicators concerned relapse rates and the level of social functioning. Process indicators concerned the degree of implementation of the evidence-based interventions and the existence of a recent comprehensive care plan.

Data collection to calculate the degree of implementation of the evidence-based interventions consisted of a repeated self-assessment survey among the team coordinators (n = 30). In the survey, that was designed for this QIC, three levels of implementation were distinguished: level 1, interventions are available; level 2, local protocols describing the proper procedures for the intervention have been developed; level 3, 70% or more of the patients received the intervention according to the protocol. The survey also contained questions to gather qualitative information on influencing factors and further results of the QIC.

To measure improvements in continuity of care, dates of completion of a recent comprehensive care plan were registered for each patient. A recent complete care plan should not be older than 1 year, and consist of a treatment plan, a crisis plan and a rehabilitation plan.

Relapse in schizophrenia is usually defined as a significant increase of symptom severity, a decrement in social functioning or a change in the pattern of care such as hospitalization [15]. In this project, the expert team chose the definition of an increment of symptom severity to a clinical level, because of its compatibility to definitions in the remission tool of Andreason et al. [16]. For reasons of comparison and practical use in daily care, relapse data were collected with a generic instrument: the Dutch version [17] of the Clinical Global Impression (CGI) scale [18]. Since there is no general rule of cut-off points of the CGI to define relapse, these cut-off points were selected at face value by the expert team to match a clinical level of symptom severity and to confirm the remission tool [16]. Relapse was defined as a score of ≥5 (markedly ill) on the 7-point severity subscale of the CGI (CGI-I), combined with a score of ≥2 (much worse) on the 7-point improvement subscale of the CGI (CGI-I).

Data for social functioning were collected with the corresponding subscale of the Dutch version of the Health of the

Statistical analysis

All data were aggregated on a quarterly basis in an SPSS database for statistical analysis. Because these data involved repeated measures over time within patients, and as a consequence were likely to be correlated, the Generalized Estimation Equation (GEE) method [21–23] was used to test for significance in the rate of change. The GEE method is a type of regression analysis of longitudinal data, specifically useful in multi-site cohort studies, as it can handle many types of unmeasured dependence between outcomes, and can account for missing data appropriately.

Results

Eighty organizations were invited to participate in the QIC, and 30 healthcare teams from 24 mental health organizations agreed to participate. Three organizations participated in both QIC waves. Participating teams came from all regions of the Netherlands. Most teams already functioned as a regular care team prior to the QIC; a few teams were composed for the occasion of the project. All teams appointed one formal team coordinator (n = 30). In total, 359 clinicians participated in the QIC: 40 psychiatrists/doctors, 21 psychologists, 167 case managers, 19 vocational therapists, 41 supported housing professionals, 48 managers, 9 experts by experience and 14 other clinicians.

A total of 1489 patients were included by the clinicians, with a range of 26–102 patients in each participating team. Of these patients, 367 were classified by the clinicians as chronic, unstable patients and 1122 as chronic patients with stable symptomatology. The mean age of the patient population was 41.3 years (with a range of 18–83 years). Outcome data from one improvement team were excluded from the analysis, due to a short (crisis) treatment period of 3 months maximum.

Evidence-based interventions

The teams selected one to three evidence-based interventions to be implemented, according to their own priorities. (F)ACT was selected as a priority to be implemented by 15 teams, PE by 14 teams, IPS and FI both by 8 teams, CBT and PHth both by 5 teams.

Table 2 shows the degree of implementation of the interventions, in the beginning and at the end of the QIC. Only half of the evidence-based interventions (CBT, PE and PHth) were available in most of the teams at the start of the QIC, and less than half of the teams could offer their patients (F)ACT, Nation Outcome Scales (HoNOS) [19, 20]. Both the CGI and the HoNOS are validated instruments and feasible to be implemented in daily practice [17–20]. Data were collected on a monthly basis by the clinicians and registered in a database, during 12–14 months. This difference in duration was caused by the context of the second QIC wave, which took part within a large improvement programme, the National Action Plan Quality Mental Health and Addiction Care.
FI or IPS. At the end of the QIC, in most teams, all evidence-based interventions were available (implementation level 1), and a majority of the teams had developed protocols for the interventions (implementation level 2), except for FI and IPS. More than 70% of the patients receiving the intervention according to protocol (implementation level 3) was reported by a minority of teams, except for PHth (53% of the teams), although for all interventions, the number of teams who routinely provided the interventions according to protocol improved over time.

The degree of level 1 implementation of (F)ACT and IPS improved most (respectively from 23 to 60% and from 20 to 53%), although both being marginally implemented at the start of the QIC and remaining at a relatively low implementation rate at the end. The largest level 2 improvement, having a protocol for a specific intervention, was seen in PE (from 23 to 70%), although for all interventions, the number of teams who routinely provided the interventions according to protocol improved over time.

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### Table 2

<table>
<thead>
<tr>
<th>Evidence-based (EB) intervention</th>
<th>Start QIC</th>
<th>End QIC</th>
<th>Start QIC</th>
<th>End QIC</th>
<th>Start QIC</th>
<th>End QIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>(F)ACT</td>
<td>23%</td>
<td>60%</td>
<td>17%</td>
<td>53%</td>
<td>7%</td>
<td>40%</td>
</tr>
<tr>
<td>CBT</td>
<td>70%</td>
<td>83%</td>
<td>33%</td>
<td>60%</td>
<td>3%</td>
<td>10%</td>
</tr>
<tr>
<td>PE</td>
<td>70%</td>
<td>90%</td>
<td>23%</td>
<td>70%</td>
<td>7%</td>
<td>33%</td>
</tr>
<tr>
<td>FI</td>
<td>43%</td>
<td>60%</td>
<td>10%</td>
<td>27%</td>
<td>0%</td>
<td>10%</td>
</tr>
<tr>
<td>IPS</td>
<td>20%</td>
<td>53%</td>
<td>13%</td>
<td>40%</td>
<td>3%</td>
<td>10%</td>
</tr>
<tr>
<td>PHth</td>
<td>90%</td>
<td>93%</td>
<td>60%</td>
<td>70%</td>
<td>43%</td>
<td>53%</td>
</tr>
</tbody>
</table>

Bold: >50% of the teams reported a positive score on this item.

**Continuity of care**

Complete and up-to-date care plans, including a treatment plan, a crisis plan and a rehabilitation plan, were hardly present at the start of the QIC. All teams worked on this aim. At the end of the QIC, the overall percentage of patients having a complete and up-to-date care plan had increased to more than 30% (see Fig. 1).

**Social functioning and relapse**

During the QIC, the teams learned to measure patient outcomes routinely, which was new for most of them. At the start of the QIC, CGI- and HoNOS scores were obtained from a quarter of the included patients (respectively, 27.2 and 23.7% in the first month). During the last month, when some teams were not able to update their Excel file before the final deadline, CGI- and HoNOS scores were obtained from half of the patients (45.3 and 51.5%). Over the course of the QIC, the teams managed to obtain a monthly score.
on both the CGI and the HoNOS from 64.5 to 85.1% of the included patients. Time Series Analysis (using the GEE method) pointed out that the HoNOS mean scores showed a decrement on the 7-point subscale ‘Social Functioning’ from a mean of 6.2 in the first quarter of the QIC to a mean of 5.6 in the last quarter ($\beta = -0.20; P = 0.000$), reflecting an improvement in social functioning. The percentage of patients, with at least two points of improvement on social functioning, increased from 8.5 to 54% of the patients ($\beta = 0.65; P = 0.000$). Concerning relapse, mean scores of the Severity-Subscale (CGI-S) showed a decrement from 4.1 to 3.9 ($\beta = -0.09; P = 0.000$). Also, the proportion of patients with scores of 5 or higher on the Severity-Subscale reduced from 45.3 to 38.2% ($\beta = -0.12; P = 0.000$), reflecting a small reduction in symptom severity. On the other hand, the Improvement-Subscale (CGI-I) showed an increment in the percentage of patients with scores of 6 or higher, from 4.8 to 7.6% ($\beta = 0.18; P = 0.014$), reflecting a deterioration of clinical status during that period. In addition, relapse rates, defined as the proportion of patients with a score of 5 or higher on the CGI Severity-Subscale, combined with a score of 6 or higher on the CGI Improvement-Subscale, showed an increment in the percentage of patients with a relapse from 4.3 to 6.9% ($\beta = 0.18; P = 0.018$) (see Table 3).

### Influencing factors and qualitative results

Factors facilitating the QIC, reported frequently by the team coordinators ($n = 30$) in the self-assessment survey, were support and interest of the institutional management, a capable local team coordinator and a motivated and skilled multidisciplinary team of clinicians. Qualitative impacts of the QIC were an increased capacity to work systematically according to protocols while monitoring outcomes, an improved knowledge of evidence-based practices and a sense of urgency to bring schizophrenia care to a higher quality standard. The QIC also improved team cohesion and collaboration within the organizations, due to better communication, and to using the guideline as a common language for implementing evidence-based care.

Reported factors hindering the project were a lack of dedicated time for participating clinicians and team coordinators to restructure care- and monitoring processes, ongoing organizational changes at institutional level and resistance to innovations among clinicians and patients. In relation to this, team coordinators reported that the timeframe of the QIC, 12–14 months, was too short for real changes to occur.

### Discussion

During the Schizophrenia QIC, the standard of care provided by the 30 participating teams improved in terms of professional performance and patient outcomes. Most teams made all of the evidence-based interventions available for patients and developed protocols, except for FI and IPS. Self-reported reach of the interventions according to protocol increased, with some of the more frequently indicated interventions (FACT, PE, and PHIn) being offered routinely and according to protocol, after the QIC. The degree of availability of

### Table 3 Social functioning and relapse in schizophrenia patients with outcome measuring at different stages of the Schizophrenia QIC

<table>
<thead>
<tr>
<th></th>
<th>Social functioning</th>
<th>Relapse (Ptnt = Patient)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean score</td>
<td>% Ptn with ≥2 point decrease (%)</td>
</tr>
<tr>
<td>Quarter 1</td>
<td>Mean score</td>
<td>% Ptn with ≥2 point decrease (%)</td>
</tr>
<tr>
<td></td>
<td>Mean score HoNOS</td>
<td>CGI-S/% ≥5</td>
</tr>
<tr>
<td></td>
<td>Mean score</td>
<td>CGI-S/% ≥5</td>
</tr>
<tr>
<td>Ptn included</td>
<td>Mean score HoNOS</td>
<td>CGI-S/% ≥5</td>
</tr>
<tr>
<td></td>
<td>Mean score</td>
<td>CGI-S/% ≥5</td>
</tr>
<tr>
<td>Quarter 2</td>
<td>Mean score HoNOS</td>
<td>CGI-S/% ≥5</td>
</tr>
<tr>
<td></td>
<td>Mean score</td>
<td>CGI-S/% ≥5</td>
</tr>
<tr>
<td>Ptn included</td>
<td>Mean score HoNOS</td>
<td>CGI-S/% ≥5</td>
</tr>
<tr>
<td>Quarter 3</td>
<td>Mean score HoNOS</td>
<td>CGI-S/% ≥5</td>
</tr>
<tr>
<td></td>
<td>Mean score</td>
<td>CGI-S/% ≥5</td>
</tr>
<tr>
<td>Ptn included</td>
<td>Mean score HoNOS</td>
<td>CGI-S/% ≥5</td>
</tr>
<tr>
<td>Quarter 4</td>
<td>Mean score HoNOS</td>
<td>CGI-S/% ≥5</td>
</tr>
<tr>
<td></td>
<td>Mean score</td>
<td>CGI-S/% ≥5</td>
</tr>
<tr>
<td>Ptn included</td>
<td>Mean score HoNOS</td>
<td>CGI-S/% ≥5</td>
</tr>
</tbody>
</table>

- **CGI-S, Severity-Subscale of the CGI; CGI-I, Improvement-Subscale of the CGI; $\beta$, Regression Coefficient: Size and Direction of Change (using the GEE method).**
- *Sign. $P < 0.05$.**
interventions with a protocol improved most for (F)ACT and IPS. The percentage of patients actually receiving the intervention according to protocol was highest for PHth and lowest for CBT, FI and IPS. These data might represent the fact that PHth is indicated for this population more frequently than CBT, FI and IPS. The overall percentage of patients having a complete and up-to-date care plan changed from almost 0% to more than 30%. Small clinical improvements were made in terms of social functioning and symptom severity. However, teams did not succeed in reducing relapse rates.

The improvements in the quality of care, introduced by the QIC teams, are relevant for patients with schizophrenia, since effectiveness research into the implemented evidence-based interventions has shown positive results in terms of hospitalization, employment participation, relapse, adherence to therapy, social functioning, quality of life, coping with positive symptoms and somatic problems [1]. In addition, progress in the availability of up-to-date comprehensive care plans is essential within this setting of long-term care, and systematic monitoring of outcomes is believed to improve the quality of care. Finally, the authors estimate the modest improvements on social functioning (as measured with the HoNOS) as clinically relevant, considering the robustness of this variable. The small alterations on the CGI scores (a reduction in symptom severity as measured with the CGI-S and a deterioration of clinical status as measured with the CGI-I) are, although statistically significant, estimated as clinically not relevant. The contradiictory scores on the CGI are not easy to understand, but might be due to (i) the generic nature of the instrument as opposed to instruments specifically measuring positive, negative and cognitive symptoms of schizophrenia, such as the CGI-SCH (CGI-Schizophrenia) [24] or the PANSS (Positive and Negative Syndrome Scale) [16]; (ii) no checking whether remission was reached before a patient reached scores for relapse; (iii) a lack of training in the proper use of the CGI; (iv) the choice of cut-off points or (v) an alteration in relapses.

A meaningful use of measurement instruments for internal quality improvement purposes is in its early stages in schizophrenia care. This paper is one of the first naturalistic studies to report on the use of measures linked to the implementation of evidence-based interventions. In our QIC, designed in 2006, we opted for the use of generic outcome measures. The rationale for this choice was the unfamiliarity of the teams with the daily use of any measurement instrument at all, and the need to monitor the overall improvement within and across teams for mutual learning and exchange. Therefore, our measures mainly served as system level monitoring instruments. We estimate that clinical effects might have been larger and more sensitive to change, when each of the implemented interventions would have been monitored with specific measures for each domain of proven effectiveness, such as the PANSS (positive and negative symptoms of schizophrenia); the HoNOS; the amount of months with a regular job; the MANSA Manchester Short Assessment of Quality of Life (quality of life) or the severity of somatic problems. If we were to design a follow-up study, this would incorporate both system levels together with more specific measures.

Apart from these measurement-related issues, there are several strengths and limitations to our study. A strength is that this study is one of the first documented, structured, large-scale implementation projects, with a participation rate of more than 20% of Dutch mental health organizations. Furthermore, we were able to analyse process as well as outcome data from a large number of patients in a naturalistic context. A first limitation is that data collection was performed by participating clinicians and partly based on self-reports. Secondly, the inclusion of motivated teams and the absence of a comparison with a reference group might have increased the risk of potential bias. Thirdly, no formal and extensive educational programme was arranged for training clinicians in applying each of the evidence-based interventions. This might have caused practice variation and a delay in the improvement of professional performance. Finally, the duration of the QIC was about 1 year; teams might need more time to adapt to the new methods and this duration might have been too short in order to measure a consistent change on robust indicators such as relapse rates.

The results of our study are in line with the literature on QIC, showing modest effects on clinical outcomes [7, 25, 26]. Results are also partly consistent with the results of the National Implementing Evidence-Based Practice Project, in which 53 American community health centres implemented one out of five evidence-based practices for severe mental illnesses. Preliminary results after 2 years showed a high degree of fidelity in implementing the selected practice in 55% of participating sites [27]. The American project had a longer duration and offered slightly more extensive support to the sites [28]. Results on clinical improvements were not measured within this project.

The present study shows that, despite the positive changes in process and outcome measures, improving care for a substantial part of patients with schizophrenia is a long and complex process. Even though teams focused on the implementation process for 12–14 months, and received a lot of support, they were not able to offer evidence-based care according to protocol to the majority of their patients within this timeframe. On the other hand, this study shows that a quality improvement programme, like the Schizophrenia QIC, is feasible in the chronic mental healthcare setting and can lead to changes in the quality of care. An improvement model, based on the schizophrenia guideline, offering clinicians specific goals, instruments and support, can help clinicians and healthcare organizations to foster evidence-based routines in schizophrenia care.

The results presented in this study can be helpful to inform others in improving care for patients with schizophrenia. Still, a lot of questions about implementing evidence-based care in this setting remain unanswered. More rigorous research is needed to confirm our findings and to understand factors hindering the uptake of the interventions, effective elements of the QIC method and the cost-effectiveness of these large and intensive implementation programmes in order to inform policy and practice.

Conclusions

Implementing evidence-based care with positive outcomes is possible in the care for patients with schizophrenia, although it needs intensive and continuous support over an extensive time. Although the Schizophrenia QIC has changed healthcare...
practices, controlled follow-up research is necessary, in order to evaluate which method generates long-term improved healthcare practice, when compared with control conditions and at what costs and benefits.

Acknowledgements

We thank all clinicians and patients who contributed to this study.

Funding

This work was supported by the Health Care Insurance Board (CVZ) and the Netherlands organization for Health Research and Development (ZonMw). Co-payment was made by the participating mental healthcare organizations.

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