Outcome on quality of life in a Canadian national sample of patients with schizophrenia and related psychotic disorders

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Objective: To examine changes in subjective and objective dimensions of quality of life (QoL) in a large Canadian sample of patients with diagnosis of schizophrenia or schizoaffective disorder treated in academic and non-academic settings over a 2-year period.

Method: Patients recruited in the study across the country were assessed for QoL and functioning using the Client and Provider versions of the Wisconsin Quality of Life Questionnaire (WQoL) and the Short Form-36 (SF-36) at baseline (n = 448), 1 year (n = 308–353) and 2 years (188–297). Data were analyzed to examine change across time using multivariate analyses controlling for potential influence of variables such as age, regional variation, gender, duration of illness, type of treatment taken and baseline measures of symptoms and QoL.

Results: The weighted quality of life index (W-QoL-I) showed a significant change on both the client and the provider versions of the WQoL while the physical and mental composites of the SF-36 showed change only at 2 years. These changes were influenced significantly by baseline scores on W-QoL-I and in the case of provider version of the WQoL by baseline Brief Psychiatric Rating Scale (BPRS) scores. Regional variation or type of medication had no impact on improvement in QoL.

Conclusion: Within a naturalistic sample of schizophrenia patients treated and followed in routine care the overall QoL showed an improvement over time but this improvement was not influenced by the type of medication prescribed.

Introduction
It is now generally agreed that reduction of symptoms and syndromal recovery are not sufficient objectives of treatment of schizophrenia and related psychotic disorders (1–4). Quality of life (QoL) and level of functioning have become increasingly important concepts when judging outcome in these disorders (5–7) or as key determinants of consumer satisfaction (8). QoL is a highly complex concept and difficult to define (9–11). There are two competing models of QoL (12, 13). Measures based on the ‘satisfaction model’ focus on an individual’s satisfaction with life domains that are personally important in addition to reflecting an overall sense of wellbeing. Such subjective measures of life satisfaction and wellbeing are likely to be influenced by the person’s psychological state such as depression (6, 14) and positive/psychotic symptoms (15). A different approach argues that a QoL measure should be based on a broader definition of QoL and one that includes satisfaction, functioning and social-material conditions such as employment, income etc. (6).
It is generally agreed that patient’s subjective appraisal as well as caregiver/treating clinician’s ratings based on their knowledge of the patient and his/her circumstances are equally important to incorporate in any assessment of QoL.

Aims of the study

To report one and two year outcomes of subjective and observer-rated QoL, functioning, and self-assessed health status from data obtained in the National Outcomes in Schizophrenia study. We examined the differential impact of a variety of factors on change observed in patient’s QoL over 1 and 2 years following entry in the study.

Material and methods

The overall objectives of the study and method of data collection are described in earlier papers in this supplement. The objective of this paper is to report results on QoL and personal functioning over a 2-year period. During this 2-year period, patients were engaged in treatment in either academic or non-academic clinical settings in different regions of Canada. For some subjects, data were available for only one year, while for others data were available for both years. These two samples are referred to as ‘1-’ and ‘2-year’ cohorts (see the first article of this supplement for descriptions of these cohorts p. 2–9).

In this study, we used both the Client and Provider versions of the Wisconsin Quality of Life (WQoL) Scale (16) for measuring self-reported and observer-rated QoL, respectively. The WQoL is regarded as one of only three QoL instruments designed for use in serious mental disorders that meet standards of having a conceptual model, published psychometric properties and cultural adaptations (13). The client version of WQoL provides a self-assessment of several separate domains, including general satisfaction, which are generally missing in QoL rating scales. Both client and observer ratings include domains of occupational activities, symptoms/attitudes, physical health, social relations/support, and activities of daily living. The self-administered questionnaire addresses eight different domains and an overall index of QoL based on scores on different domains:

i) General satisfaction level refers to level of satisfaction with several aspects of life (leisure, housing, neighborhood, safety, food, clothing, transportation, sexual life and capacity to be alone) and subjective importance of each of these aspects. Weighted scores (DWG) are then calculated by multiplying each satisfaction rating by the score on its corresponding item of importance and summing up all weighted scores. A weighted average general satisfaction score is derived by dividing the sum of all weighted item scores by the sum of the importance scores.

ii) Activities and occupation domain assesses the level of functioning in the main occupational and/or educational activity and satisfaction with and the level of engagement in the activity as perceived by the subject.

iii) Psychological wellbeing assesses various aspects of the person’s feelings about life and the status of his/her own mental health.

iv) In the domain of symptoms/outlook the subjects endorse one of three statements regarding their symptoms, the amount of distress and level of interference in daily life from these symptoms, level of suicidal feelings and feelings of harming others.

v) Physical health refers to the subjects’ rating of their physical health ranging from ‘poor’ to ‘excellent’ and their level of satisfaction with their physical health.

vi) In the domain of social relations/support the subject rates his/her level of satisfaction and importance regarding number of and relationship with friends, family, people with whom they may be living and with other people and the level of social support received from family and friends.

vii) The domain of money assesses the subject’s satisfaction with the amount of money they have, the level of control they have over their money and how often lack of money keeps them from doing what they want to do.

viii) Assessment of activities of daily living domain involves a list of six common activities carried out in the preceding 1 month, self-rating of these activities and frequency of any difficulty with personal grooming. Respondents are also asked to provide weighting for ‘importance’ on each of the above specific domains (activities and occupation, psychological wellbeing, etc.).

A Weighted Quality of Life Index (W-QoL-I) is calculated using the respective weight score and average satisfaction score for each domain. A detailed outline of scoring procedures is available elsewhere (17–19). The provider version of the WQoL scale includes, in addition, a domain of ‘finances’ and has a single item for assessment of patient’s psychological wellbeing. The patient and the main service provider (case manager, for example) were asked to respond to each question in the respective version of the instrument in relation to the previous 1 month. Most items include a Likert type scale with anchor points ranging from a minimum of 1 to a
maximum of 7, and some use a dichotomous response of yes or no.

A short form of the Health Survey (20) was used to assess general health status. This measure is composed of mental and physical composite scores. The physical composite includes the following four types of problem: i) limitations in physical activities because of health problems, ii) limitations in usual role activities because of physical health problems, iii) bodily pain, and iv) general health perceptions. The mental composite also includes four subscales: i) limitations in social activities because of physical or emotional problems, ii) general mental health (psychological distress and wellbeing), iii) limitations in usual role activities because of emotional problems, and iv) vitality (energy and fatigue).

Data collection procedures and information concerning demographic and clinical (including symptoms and treatment) measures have been provided in the first article of this supplement (p. 2–9).

Data analysis

The main objectives of this paper were to examine: i) change in the level of principal domains of QoL as assessed by the patients themselves and by providers of their care (client and provider versions of the WQoL scale) as well as their self-assessed general health status (SF-36) over 1- and 2-year periods, and ii) to explore whether changes in these measures of outcome were related to any demographic and clinical variables such as gender, region of Canada, illness duration, previous hospitalizations, level of symptoms and antipsychotic (typical vs. novel antipsychotic) drug treatment. The changes in the overall weighted index of quality of life (W-QoL-I) on the provider and the client version, the level of ‘general satisfaction’ (contained within the client version of the WQoL) and mental and physical composites on the SF-36 at one and two years were treated as outcome variables.

We examined if the change from baseline to one and two years for each outcome variable was statistically significant. For examining change from baseline to one year the data on ‘1-year cohort’ and from baseline to two years change data from the ‘2-year cohort’ were used. Further, analyses to determine the impact of other variables on outcome were carried out in several steps. First, the relationship between all outcome variables at baseline and region were investigated using an analysis of variance (ANOVA) for continuous variables and chi-squared test for categorical measures.

These included baseline values on QoL outcome measures (WQoL-C and P and SF-36), clinical outcome measure (BPRS), and demographic and other clinical characteristics (age, gender, age of onset, duration of illness, level of education, family income, marital status, psychiatric hospitalization within the past 2 years and family history of schizophrenia or other psychotic disorders). As a next step the relationship between level of the dependent variables (QoL outcome) at 1 and 2 years and region of Canada was investigated.

This was followed by an examination of the relationship between change in QoL outcome variables (from baseline to year 1 and year 2) and region using ANCOVA, with the baseline value of the corresponding QoL outcome as a covariate. To region, we sequentially added illness duration, region by duration of illness, and age to determine influence of duration of illness and age on regional differences, if any. This allowed us to determine if there are any factor interactions using region as a covariate that may account for regional differences. As a next step, beginning with demographic and baseline clinical and QoL outcome variables as covariates, treatment (typical vs. novel antipsychotic drug) and region were added to the model to test if region is associated with the one and two years outcomes. Finally, we examined the residuals from the model and found no extreme outliers or anomalous patterns.

Results

Data on baseline variables were available on 448 patients distributed across the six regions of Canada from east to west as follows: 92, 49, 97, 76, 70 and 64 in Atlantic region, Quebec, Ontario, Saskatchewan/Manitoba (prairies), Alberta and British Columbia, respectively. The details of sample characteristics have been provided in the first article of this supplement (p. 2–9). Patients were predominantly male (68%), with a mean age of 37.9 years and a mean age of onset of illness of 23.7 years (sd 7.3) Most patients (66.3%) had some high school education or higher and 18% received some college education. More than one-third (38.6%) had been hospitalized in the previous 2 years. One-fifth (21%) had been ill for <3 years, one-third (32%) for 3–10 years and nearly half (47%) for more than 10 years. A positive family history of schizophrenia was reported in 30%. Patients were relatively stable clinically with moderate to extremely severe psychopathology present in <10% according to the BPRS and a similar proportion showing a Clinical Global Impression (CGI) of marked to extreme severity.
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Table 1. Change in Indices of Quality of life at 1 and 2 years

<table>
<thead>
<tr>
<th></th>
<th>Baseline</th>
<th>One year</th>
<th>N</th>
<th>Statistics; P</th>
<th>Baseline</th>
<th>Two years</th>
<th>N</th>
<th>Statistics; P</th>
</tr>
</thead>
<tbody>
<tr>
<td>WQOL-I (P)</td>
<td>0.8 (0.8)</td>
<td>0.9 (0.9)</td>
<td>353</td>
<td></td>
<td>0.8 (0.8)</td>
<td>1.0 (0.9)</td>
<td>297</td>
<td></td>
</tr>
<tr>
<td>WQOL-I (C)</td>
<td>1.1 (0.7)</td>
<td>1.3 (0.8)</td>
<td>238</td>
<td></td>
<td>1.2 (0.7)</td>
<td>1.3 (0.7)</td>
<td>188</td>
<td></td>
</tr>
<tr>
<td>WQOL-GS</td>
<td>1.2 (1.1)</td>
<td>1.4 (1.1)</td>
<td>238</td>
<td></td>
<td>1.3 (1.1)</td>
<td>1.3 (1.2)</td>
<td>272</td>
<td></td>
</tr>
<tr>
<td>SF-36 (Phy.Comp.)</td>
<td>69.8 (20.0)</td>
<td>70.1 (21.7)</td>
<td>308</td>
<td></td>
<td>69.6 (20.2)</td>
<td>72.0 (20.7)</td>
<td>254</td>
<td></td>
</tr>
<tr>
<td>SF-36 (Ment.Comp.)</td>
<td>61.0 (21.2)</td>
<td>63.0 (22.6)</td>
<td>320</td>
<td></td>
<td>61.5 (21.4)</td>
<td>64.9 (22.5)</td>
<td>265</td>
<td></td>
</tr>
</tbody>
</table>

Values are mean (SD).
WQOL-I (P), Weighted Quality of Life – Index (Provider); WQOL-I (C), Weighted Quality of Life – Index (Client); WQOL-GS, Weighted Quality of Life – General Satisfaction (Client); SF-36 (Phy. Comp.), SF-36 (Physical Composite); SF-36 (Ment. Comp.), SF-36 (Mental Composite).

Novel antipsychotics (risperidone, quetiapine and olanzapine) were prescribed to nearly half (48%), clozapine to 13.6%, and 21% were receiving a typical antipsychotic either alone or in combination with novel antipsychotic(s) or other typical antipsychotics.

A test of proportions for categorical variables at baseline showed that there was a significant difference across the regions of Canada in the proportion of patients who had been ill for <3 years, 3–10 years or longer than 10 years ($\chi^2 = 30.29$, d.f. = 10, $P < 0.001$), whether patients had been hospitalized in the preceding 2 years ($\chi^2 = 16.2$, d.f. = 5, $P < 0.007$) and in the proportion who were married/common-law ($\chi^2 = 14.4$, d.f. = 5, $P < 0.02$). Samples from Quebec and Alberta had the lowest proportion of patients with <3 years of illness (5.7% and 12.2%, respectively) and Atlantic and Ontario regions the highest. Atlantic region had the highest (52.2%) and the prairies the lowest proportion of patients hospitalized in the previous 2 years and Quebec and Atlantic regions showed the lowest proportion of married or in common-law relationships. Age at the time of the baseline assessment also varied significantly across the regions ($F = 5.1$, d.f. = 5, d.f., error = 442, $P < 0.001$). No differences were observed across regions on gender, age of onset, educational level, household income and family history of schizophrenia. On the clinical outcome measure (BPRS score) there were significant differences between regions ($F = 7.07$, d.f. = 5, 441, $P < 0.001$) at baseline.

Level of QoL at baseline was compared across the regions on four measures: physical composite score on SF-36 ($n = 338$), mental composite score on SF-36 ($n = 394$), and scores on the W-QoL-I-Client ($n = 331$) and W-QoL-I-Provider ($n = 447$). Marginally significant regional variation was seen on the physical composite score of SF-36 ($F = 2.4$, d.f. = 5, 382, $P < 0.04$) but not on the mental composite score. On the W-QoL-I (provider) the regional differences were marginal ($F = 2.2$, d.f. = 5,441, $P < 0.06$). No regional differences were observed in relation to the weighted W-QoL (client version) index ($F = 1.34$, d.f. = 5,325, $P = 0.25$).

Outcome at one and two years following initial assessment on measures of QoL

Table 1 shows change in each dimension of QoL, i.e. W-QOL-I (client and provider versions) and measures of health status (physical and mental composites of SF-36). As indicated above the number of subjects on whom 1- or 2-year data were available varied with a relatively smaller number of subjects having completed 2-year assessments. Also, data on the provider version of the WQoL were available for a larger number of patients than the data on the client version. The W-QoL-I on the provider as well as client version showed significant change at one and two years (see Table 1 for details). There is no significant change in the patients’ general satisfaction with various domains of life at one or two years. Neither the physical nor the mental composite index (SF-36) showed a significant change at one year. However, at two years the physical composite showed modest ($t = 1.93$, d.f. = 253, $P = 0.05$) and the mental composite moderate positive change ($t = 2.53$, d.f. = 264, $P = 0.01$).

Determinants of outcome on QoL measures at one and two years

Outcome on WQoL-provider version. Using change in the W-QoL-I (provider) from baseline to one year as the dependent variable an analysis of covariance was conducted first with region, baseline scores on W-QoL-I (provider), length of illness, region by length of illness interaction and age as covariates. This model showed that only the baseline scores on W-QoL-I (provider) ($F = 77.65$, d.f. = 1,332, $P < 0.0001$) and length of illness ($F = 5.84$, d.f. = 2,332, $P < 0.004$) significantly influenced change in scores on W-QoL-I (provider). The effect of regional differences, age or interaction between region × illness group (length
of illness) were not significant. In the final model, the following variables were added sequentially as covariates: age, race, gender, education level, income, marital status, baseline scores on the weighted W-QoL-I (provider), W-QoL-I (client), SF-36 physical and mental composite scores, BPRS positive and negative symptoms, region of Canada, and medication treatment group (typical vs. atypical). The results (n = 237) showed that change in W-QoL-I (provider) score was influenced by baseline values of W-QoL-I (provider) ($F = 48.25$, d.f. = 1.236, $P < 0.0001$) and baseline total scores on BPRS ($F = 7.31$, d.f. = 1.236, $P < 0.008$). None of the other independent variables had any impact on the change scores. The results of analyses of co-variance with two years outcome (change scores) on W-QoL-I (provider) as the dependent variable produced very similar results with baseline scores on W-QoL-I (provider) being the only significant predictor ($F = 27.59$, d.f. = 1,163, $P < 0.0001$).

Outcome on W-QoL-Client version at 1 and 2 years

Analyses of covariance were also conducted with change scores on W-WQoL-I (client) at 1 year as the dependent measure. In the initial analysis of covariance results showed that change in scores on the client version of W-QoL-I (client) was significantly influenced by baseline scores on W-QoL-I (client) ($F = 31.99$, d.f. = 1, 180, $P < 0.0001$) and marginally by baseline physical composite scores on SF-36 ($F = 6.55$, d.f. = 1, 180, $P < 0.02$). None of the other variables entered made any significant contribution to the final model. In the final model when the remaining variables (same as for provider version above) were added serially as covariates, baseline level of WQOL-I (client) and physical composite score on SF-36 remained the only significant contributors to the outcome variable (change scores on W-QoL-I-Client) ($F = 29.20$, d.f. = 1,174, $P < 0.0001$ and $F = 6.55$, d.f. = 1,174, $P < 0.01$, respectively). The results for 2 year outcome confirmed the significant effect of baseline scores on W-QoL-I (client) ($F = 13.8$, d.f. = 1,132, $P < 0.001$) but also revealed significant effect of baseline scores on W-QoL-I (provider) ($F = 6.61$, d.f. = 1,132, $P < 0.01$) and baseline CGI ($F = 2.3$, d.f. = 1,132, $P < 0.04$). One of the major advantages of using the client version of the WQOL scale is the inclusion of a domain of general satisfaction, as perceived by the patient which incorporates ratings on several domains of life as well as their relative importance to the individual. As reported above, there was no statistically significant change in this domain at one and two years.

**Determinants of outcome on measures of health status (SF-36).** Change over 1 and 2 years in physical and mental composite scores on the SF-36 were subjected to similar analyses. The results showed that for physical composite on the health status measure baseline level of the physical composite had a significant impact on change over 1 ($F = 53.41$, d.f. = 1,203, $P < 0.0001$) and 2 years ($F = 29.54$, d.f. = 1,155, $P < 0.0001$) outcome while patient’s age had an impact on 1 year outcome ($F = 5.10$, d.f. = 1,203, $P < 0.01$). Change in the mental composite score at one year was influenced by baseline values of the mental composite index ($F = 57.51$, d.f. = 1,205, $P < 0.0001$), provider version of QoL-Index ($F = 4.60$, d.f. = 1,205, $P < 0.006$) and physical composite score ($F = 6.92$, d.f. = 1,205, $P < 0.01$). At 2 years significant predictors included baseline levels of mental composite index ($F = 75.10$, d.f. = 1,160, $P < 0.0001$); WQoL-I (client) ($F = 9.7$, d.f. = 1,160, $P < 0.003$) and physical composite index ($F = 4.88$, d.f. = 1,160, $P < 0.03$). An analysis of the residuals for each of the above analyses revealed that there were no problems with goodness of the model fit and all residuals were within ±2.5 SD. There were no significant differences in demographic and clinical characteristics of patients who did or did not complete all the QoL measures.

**Discussion**

The results of this study provide information on QoL for a relatively large sample of patients who were being treated for schizophrenia or schizoaffective disorder in different regions of Canada in academic or non-academic facilities. In general, patients experienced a satisfactory QoL as assessed by either themselves or by those who provide them treatment. In addition, a statistically significant improvement in several measures of QoL occurred over the 2-year follow-up period and this change seems to be influenced largely by level of functioning at the initial assessment. That is to say, higher level of QoL predicted more improvement in QoL. The initial assessment was usually carried out at the time of recruitment in the study and most had been in treatment for several years.

Changes in some aspects of QoL were also influenced by both client and provider ratings of severity of symptoms, self-perceptions about physical health, and mental composite index and age. While changes in QoL measures are statistically
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The differences in results from the present study may be related to the cross-sectional nature of the data in the Vorunganti et al. study (21) which is unlikely to provide any meaningful information on QoL directly attributable to the class of medication. The study of Cook et al. (22) included results based on a comparison of ratings on the QoL measure before and after patients were switched from a typical to a novel antipsychotic medication. The influence of other variables on the change in the QoL was not controlled and, as observed in the present study, baseline scores on the same measure of QoL can influence ratings taken at a later date. Several factors limit a more general interpretation of our results. The sample recruited for this study, although representative of both academic and non-academic settings, was a sample of convenience. It is possible that patients who agreed to be involved in this study were more cooperative and relatively more stable thereby representing a higher level of QoL compared with patients who either do not stay in treatment or refused to be included. However, the effects of refusal to participate may have been limited by the fact that this naturalistic study did not involve any change in regular treatment or make any excessive demands on a patient’s time. A comparison of the patients who following the initial assessment at the time of recruitment in the study refused to participate in the follow-up assessments during the course of the study failed to reveal any significant differences in patient characteristics (23). This suggests that the results are at least relevant to a large sample of patients who were in treatment at various treatment centres across diverse regions of Canada. It is also unlikely that variations in type or access to health care would have influenced these results because of the relative homogeneity in the delivery of mental health care across Canada and access to mental health care is available to all patients free of charge. A relatively stable measure such as QoL is more likely to be influenced by trait characteristics which were not measured in this study or by the previous level of the same stable characteristic as shown by our results. The latter would imply that whatever improvement in QoL can be achieved relatively early on in the course of treatment of schizophrenia and schizoaffective disorders will likely determine both future levels of different aspects of QoL and magnitude of change (improvement). This is in keeping with results on social functioning and clinical outcome reported previously in long-term follow-up studies (24).

A lack of comparative data on measures of QoL from the general population and/or from individuals with other psychiatric or chronic physical

significant their clinical or social significance remains unknown. The relative level of QoL is difficult to determine in the absence of a control of either non-psychiatrically ill or individuals suffering from chronic physical conditions such as chronic arthritis.

The level of ‘general satisfaction’ as assessed by the patient did not show any significant change over time. This lack of change could be explained by the fact that this domain measures aspects of a person’s life that are unlikely to change substantially over two years. These include leisure, housing, neighborhood, safety, food, clothing, transportation, sexual life and capacity to be alone and are less likely to change as a result of improvement in a patient’s clinical condition. It is interesting, however, that self-rated QoL measures (such as W-QoL-Client or mental composite of SF-36) are likely to be influenced more by the patients perception about their physical health and not by observer-based ratings of their psychiatric symptoms. While there may be some overlap between observer-based and self-ratings of QoL, it appears that there is considerable independence in these two dimensions. Therefore, in the evaluation of aspects of patient functioning, as it relates to the concept of QoL, both observer and self-ratings are important in order to gauge progress over time.

Our results also showed that while there is significant regional variation in patient characteristics (length of illness, age, etc.) in this study sample there are at best marginal differences in the level of QoL measures. These marginal differences did not have any impact on change in QoL measures over the 2-year period. We also failed to show any impact of variation in antipsychotic medications taken by patients on any measure of QoL. It is likely that the dimensions of QoL measured by Wisconsin QoL scale reflect a person’s QoL in general and are subject to multiple influences. It is noteworthy that even self-rated physical health and mental health was not differentially influenced by antipsychotic medications. The relatively stable clinical status of patients included in this sample may also explain lack of an association between medication and aspects of QoL. Some investigators have reported differences in patients taking typical vs. novel antipsychotic medications on self-ratings of the Sickness Impact Profile (21) and the Lehman Quality of Life Scale (22). The former study reported results based on cross-sectional QoL assessment of patients who were taking typical or novel antipsychotic medications. Patients were not randomly allocated to a medication and no supportive longitudinal data were provided.
disorders also limits our potential for interpreting and generalizing these results. However, this is one of the few studies of a national sample of schizophrenia patients treated within a publicly funded healthcare system. Detailed measures of observer-based and self-rated QoL were applied to obtain longitudinal data along with a plethora of data on several patient and treatment characteristics that could potentially influence patients’ QoL. These data should provide useful information for the public, patients and clinicians.

References