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Original article

Age of onset and quality of life among males and females with schizophrenia: A national study

Anat Rotstein*, David Roe, Marc Gelkopf, Stephen Z. Levine

Department of Community Mental Health, Faculty of Social Welfare and Health Sciences, University of Haifa, Haifa 3498838, Israel

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ABSTRACT

Background: Age of onset is considered central to understanding the course of schizophrenia, yet little is known regarding its association with quality of life in general, and specifically among males and females.
Aims: To examine the association between the age of schizophrenia onset and quality of life, in general, and among males and females, using data from a national sample and competing statistical models.
Methods: Participants with a diagnosis of schizophrenia (N = 1624) completed the Manchester Short Assessment of Quality of Life (MSA-QoL) and were rated on a parallel measure by their professional caregivers (N = 578). Multiple regression analysis models were computed for self-appraised quality of life, and mixed models with random intercepts were used for caregivers. Six competing models were tested for parsimony for each rating source. Three models without adjustment and three models adjusted for confounding variables. Sensitivity analyses were conducted for males and females separately.
Results: Age of onset was statistically significantly ($P < .05$) negatively associated with self-appraised and caregiver-appraised quality of life on aggregate and among females. Among males, a significant ($P < .01$) quadratic effect of onset age on self-appraised quality of life demonstrated a negative association up to onset age of 36.67 years, after which the association was positive.
Conclusions: An earlier age of onset is associated with a better quality of life in schizophrenia which is tentatively explained by social decline. Specific trends in psychiatric symptom severity may account for this association among females while social advantages may account for the particular results found among males.

1. Introduction

Age of onset is considered central to understanding the course of schizophrenia [1]. An earlier age of onset is associated with a worse course of the disorder and with poorer outcomes, including a worse course of psychiatric hospitalization in the long and short term [2], poorer educational and vocational adjustment [3], lower levels of social functioning and social cognition [4], and an increased risk of suicide [5].

In contrast with most studies which reported that an earlier age of onset is associated with worse outcomes [2–5], many studies report that age of onset is unrelated to quality of life [6–10], a relevant outcome in schizophrenia [6,11]. Quality of life has developed into a central concept in mental health care [12–15] as treatment goals shifted from symptom change to incorporate recovery outcomes evaluating a personally meaningful life [16,17]. Quality of life and symptom severity only moderately correlated [18–22] and so represent alternative approaches to outcome assessment. One approach views recovery as a subjective process while a contrasting approach defines recovery as an objective outcome [23]. These contrasting approaches may account for the aforementioned particular results of a null association between age of onset and quality of life. Nonetheless, one study reported that early onset mediated associations with quality of life [24], indicating that age of onset played a secondary role in quality of life. Thus a further examination of the role of age of onset on quality of life is needed.

The association between age of onset and quality of life is yet to be explored among males and females. Being female has been previously linked to lower quality of life in schizophrenia [25], while being male has been linked to an earlier onset of schizophrenia [26,27] and poorer outcomes [26,28,29]. These

* Corresponding author.
E-mail addresses: aharshko@campus.haifa.ac.il (A. Rotstein), droe@univ.haifa.ac.il (D. Roe), mgelkopf@univ.haifa.ac.il (M. Gelkopf), slevine@univ.haifa.ac.il (S.Z. Levine).

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aforementioned findings may be accounted for by the distinctive nature of the association between age of onset and quality of life or by specific trends of this association, differentiating males and females.

Research suggests that mental health patients and professional caregivers usually appraise quality of life by relying on different aspects [30–32]. Appraisals by professional caregivers are mostly based on psychiatric symptoms, whereas patients base their appraisals on physical health and social relations [30,31]. Disparities between different rating sources are highly prevalent in studies of quality of life [13,30–,31,32,33,34,35,36]. Hence both self-appraised and caregiver-appraised quality of life scores should be considered for robustness.

The current study aims to examine the association between the age of onset and quality of life, among males and females with schizophrenia, using a national study design with competing statistical models. The current study hypotheses are that age of onset would positively correlate with self-appraised and caregiver-appraised quality of life, and that this correlation would be amplified among males.

2. Methods

2.1. Participants

In this ongoing study, the current cohort was part of the Psychiatric Rehabilitation Routine Outcome Measurement Project [37]. The study was approved by the Helsinki committee at the Ministry of Health and by the Institutional Review Board at the University of Haifa. Assessments were conducted during psychiatric rehabilitation and were supervised by an internal service staff member or externally trained individuals [38].

The current study included a subset of persons with a last diagnosis of schizophrenia who had information on birth year, dates of psychiatric hospital admissions and self and caregiver-appraised quality of life assessments (N = 1624). All participants received national psychiatric rehabilitation services in Israel. The exclusion criteria for psychiatric rehabilitation services are illicit drug addiction, violence and lack of psychiatric monitoring. Participants completed the research questionnaires from January 1st, 2013 to August 19th, 2015. Professional caregivers (N = 578) were given instruments that mirrored the one designed for self-appraisals.

2.2. Data sources

Demographic data (e.g. birth year), hospitalization information (e.g. date and duration of first and subsequent psychiatric hospital admissions) and psychiatric diagnosis were obtained from the Israeli National Psychiatric Case Registry. The registry, established in 1950, contains a lifelong listing of psychiatric hospitalizations in Israel, and includes ICD-10 diagnoses made by an Israeli medical board certified psychiatrist. Registry diagnoses include almost all persons with schizophrenia [39], were found to be reliable over time [40], and have acceptable sensitivity compared to research diagnostic criteria [41]. The registry has been used in numerous studies [2,42,43].

2.3. Quality of life appraisal

Mental health related quality of life was measured and validated [37] based on the Manchester Short Assessment of Quality of Life (MSA-QoL), an abbreviated version of the Lancaster Questionnaire Life Quality Profile [44]. Scale items were rated on a 5-point Likert scale and coded so higher scores on the assessment indicated better quality of life. Eight items measured satisfaction with one's work or volunteering activities, financial status, social status and activities, family relations, leisure activities, residential status, physical health condition and mental health condition (one item per life area). Quality of life appraisals for persons with schizophrenia were made by two rating sources: self-appraised and by their professional caregivers. Caregivers were given an instrument that mirrored the one designed for self-appraisals. The internal reliabilities of the measure were acceptable for self and caregiver-appraisals ($\alpha = 0.76$; $\alpha = 0.77$, respectively).

2.4. Analytic approach

First, descriptive analyses were computed of the sample characteristics. A modest yet statistically significant correlation was observed between self-appraised and caregiver-appraised quality of life ($r = 0.29$, $p < 0.01$), like prior research [30–36]. Mean scores were significantly ($t(1623) = 24.01$, $p < .05$) higher for self-appraisals ($M = 28.86$, $SD = 5.59$) compared to caregiver appraisals ($M = 25.12$, $SD = 4.89$), like prior research [36]. Hence, self-appraised and caregiver-appraised quality of life scores were analyzed for robustness.

Second, the primary statistical analysis examined the association between self-appraised and then caregiver-appraised quality of life as a function of age of onset using regression models. The assumptions of the regression models were tested. Visual inspection of residual figures was performed in order to reveal deviations from homoscedasticity or normality. An inspection for normality of error terms followed using a histogram and probability plots of the residuals. Independence of the error term was examined through a scatter plot of residuals by the predicted values to show that no discernible association existed. Then, statistically significant outliers were removed as their inclusion offsets estimation [45]. Next, multiple regression analysis models were computed for self-appraised quality of life. Mixed models with random intercepts for caregivers were then used to account for the repeated caregiver ratings in the data. Significance for mixed regression models was calculated by comparing models via the likelihood ratio test.

Competing models for each rating source were computed in ascending complexity and tested without adjustment and adjusted for confounding of birth year, age at the time of data collection, duration of disorder and whether male or female. The age of onset was derived from the difference between the date of birth and date of first psychiatric hospital admission. Duration of disorder was derived from the difference between the time of data collection and the date of first psychiatric hospital admission and was categorized into four categories cased on quartile scores. Age at the time of data collection was derived from the difference between the time of data collection and the date of birth and was categorized into two categories based on the median score. Birth year was categorized into two categories based on the median score. Models for each rating source were numbered as follows. The first model accounted for a linear effect of age of onset on self-appraised quality of life (model 1 hereafter). The second model accounted for a linear effect of age of onset, whether male or female, birth year, age at the time of data collection and duration of disorder (model 2 hereafter). The third model accounted for a quadratic effect of age of onset on self-appraised quality of life (model 3 hereafter). The fourth model accounted for a quadratic effect of age of onset, whether male or female, birth year, age at the time of data collection and duration of disorder (model 4 hereafter). The fifth model accounted for a cubic effect of age of onset on self-appraised quality of life (model 5 hereafter). The sixth model accounted for a cubic effect of age of onset, whether male or female, birth year, age at the time of data collection and duration of disorder (model 6 hereafter).