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Original article

Age of onset group characteristics in forensic patients with schizophrenia

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ABSTRACT

This study aims to empirically identify age of onset groups and their clinical and background characteristics in forensic patients with schizophrenia. Hospital charts were reviewed of all 138 forensic patients with schizophrenia admitted to Geha Psychiatric Hospital that serves a catchment area of approximately 500,000 people, from 2000 to 2009 inclusive. Admixture analysis empirically identified early- (M = 19.99, SD = 3.31) and late-onset groups (M = 36.13, SD = 9.25). Early-onset was associated with more suicide attempts, violence before the age of 15, and early conduct problems, whereas late-onset was associated with a greater likelihood of violence after the age of 18 and marriage ($P < 0.01$). The current findings provide clinicians with a unique direction for risk assessment and indicate differences in violence between early- and late-onset schizophrenia, particularly co-occurrence of harmful behavioral phenotypes.

1. Introduction

Age of onset is considered fundamental to understanding schizophrenia [2,5,12]. An earlier onset may reflect a genetic propensity to illness, since those with an earlier onset are more likely to have relatives with schizophrenia [4,29]. An earlier onset is also associated with environmental risk factors, such as head injury before the age of 10 [1], substance abuse [6], and immigration [23]. Together these genetic and environmental antecedents of onset may explain the clinical lure and many studies of age of onset [28].

Studies consistently report that an earlier onset of schizophrenia is associated with a poorer prognosis [5]. Similarly, studies report that demographic and diagnostic characteristics differ by age of onset. Background factors associated with an earlier age of onset include: being male [7], disrupted education and employment [15,17], and a higher family risk of illness [5]. Outcomes that have been reported to be associated with an earlier onset include: more hospitalizations over time [20,25], suicide [20], and symptom severity [9]. Collectively, this highlights that an earlier age of onset is associated with a broad range of background factors and poorer outcomes.

Despite research pointing to the clinical lure of early-onset [2,5,12], the majority of age cut off values used to define early- and late-onset values are arbitrary. Specifically, in the literature, values used to define early- and late-age of onset are not empirically based and varied across studies. Thus empirical evidence is lacking regarding the age that constitutes early- or late-onset [28]. To address this issue studies have used admixture analysis to empirically identify early- and late-onset groups. Two studies have empirically identified two onset groups that split into above or below 28 [28], and 22 [20]. Both these studies report that the earlier onset group had more males, and family psychopathology and were conducted using clinical rather than epidemiological samples. A third study of females in a Scottish catchment area identified three onset groups: early (14–41 years), late (42–64 years) and very late onset (65–94 years) psychosis [11].

Characterization of age of illness onset groups is a key issue among forensic patients. These patients are reported to differ from the general population of people with serious mental illness [18]. Interestingly, research and theory identify two distinct developmental patterns of crime and violence that vary by the age of onset of crime (e.g., eary-starters versus late-starters; 21) and age of onset of schizophrenia [8,27,30]. Late-onset patient violence may result from acute symptom exacerbation (e.g., agitation). Early-onset antisocial behavior and violence occur in childhood prior to the onset of psychosis in late adolescence or adult life. To date, only a few epidemiological studies examined the age of onset of crime and its correlates and report, for instance, that early-starters are at increased risk of chronic crime with time and familial adversity [33]. Research, however, is yet to empirically identify age of onset groups among forensic patients. Accordingly,

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to extend the existing literature the current study objectives are to empirically:

- identify age of onset groups in forensic patients and;
- distinguish these onset groups by demographic, developmental and diagnostic characteristics, based on a well-defined epidemiological catchment area design.

2. Methods

2.1. Participants

Study inclusion criteria were: presence of a last diagnosis of a schizophrenia spectrum disorder (ICD-10 codes F20.0-29.0), age of 18 or over at the time of study, at least one forensic hospitalization (court ordered) and at least one involuntary (forensic) hospitalization as a result of violent behavior from 2000 to 2009 at the Geha Psychiatric Hospital (that served a catchment area of approximately 500,000 inhabitants during the study period) [31]. Use of diagnoses in this manner was based on prior research [13,23,32]. Specifically, the data collection consisted of:

- identification of all referrals for involuntary treatment to the hospital ordered by court from January 1, 2000 through December 31, 2009 ($n = 296$);
- from these referrals, cases that did not meet the selection criteria were removed, leaving 148 eligible cases;
- exclusion of a further 10 patients due to diagnostic change ($n = 4$) or insufficient data ($n = 6$);
- and review of all eligible hospital charts to obtain data ($n = 138$).

2.2. Hospital chart information

Psychiatric hospitalization registry records were obtained from the database of the Geha Psychiatric Hospital. Information was collected on the age at first psychiatric hospitalization, voluntary and involuntary hospitalizations, early behavioral conduct problems (e.g., truancy, bullying; coded affirmatively if at least two problems were present based on a behavioral checklist), violent and antisocial behavior before the age of 15 and after the age of 18, lifetime suicide attempts, family history of psychiatric disorders, sex, marital status, and occupational status. To assess symptom severity Positive and Negative Syndrome Scale (PANSS) were collected at the beginning of the first admission by senior trained psychiatrists [10]. For consistency with past research, violence was identified as "offences causing physical harm, threat of violence, all types of sexual offences, forcible confinement, and destruction of property, arson and robbery" [8]. In addition to the psychiatric hospitalization registry database records obtained from the computerized database of the Geha Psychiatric Hospital, detailed expert opinions of the cases were reviewed. Since all cases were court ordered, they included a detailed expert opinion following an observation period of the patient on the ward. This information included data from the expert opinion. By reviewing these data by computer and manually, we were able to ascertain information regarding the first age of violence that would have otherwise have been unavailable. Ethical clearance to conduct the current study was granted by Helsinki committee at Geha Psychiatric Hospital.

2.3. Statistical analysis

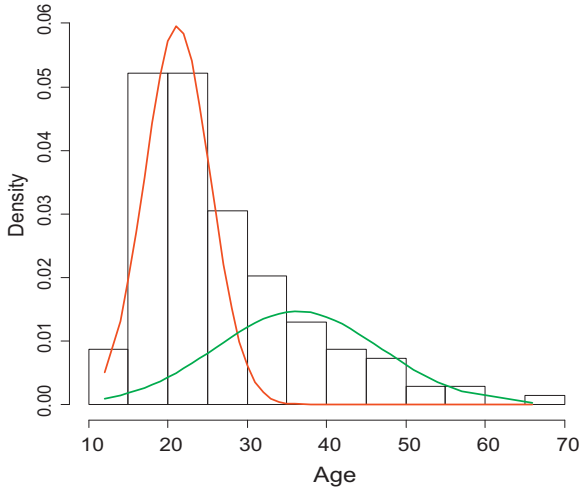
Admixture analysis was conducted to empirically derive age of onset groups, following past research [11,20,28]. This method examines whether the observed continuous age of onset distribution could be better modeled as a mixture of two or more Gaussian distributions. Sequential Bayesian Information Criterion (BIC) model fit indices were examined to identify the best fitting model (i.e., the number of distributions with the lowest BIC value). Participants were then classified into age of onset groups identified by the admixture analysis and differentiated on the study variables (i.e., background and clinical factors) with a series of t-tests, odds ratios, and χ^2 values.

3. Results

The group mean age of onset was 27.01 (SD = 10.37) and ranged from 12 to 55. To delineate empirically identifiable age of onset groups, admixture modeling was computed. The model that best fit the age of onset distribution was a mixture of two distributions (BIC = −325.56) and was plotted in Fig. 1. The mean age of the early- (M = 19.99 SD = 3.31) and late- (M = 36.13, SD = 9.25), onset groups significantly differed, splitting at 25 ($t = 12.9$, df = 70.66, $P < 0.01$, 95% CI = 18.6, 13.7). Next differences between the empirically identified early- and late-onset groups were examined (Table 1). Compared with the late-onset group, the early-onset group was characterized by significantly ($P < 0.01$) more suicide attempts, violence before the age of 15, and early conduct problems. Compared with the early-onset group, the later-onset-group was characterized by a significantly ($P < 0.01$) greater likelihood of more violence after the age of 18 and being married. The empirically identified groups did not significantly differ on involuntary or involuntary hospitalizations and PANSS scores.

4. Discussion

The current study uniquely contributes to the literature by empirically identifying early- and late-age of onset groups of forensic patients with schizophrenia in a catchment area. The results identify two onset groups that split at the age of 25 and average ages of approximately 20 for the early onset-group, and 36 for the late-onset group. The split-value resembles past empirical estimates based on non-forensic samples [28]. Unlike the early-onset group, late-onset patients were more likely to have married.



Note. Based on 138 forensic patients, peaking to the left,in red is the earlier-onset group (M = 19.99, SD = 3.309), and in green peaking to the right is the later-onset group (M = 36.13, SD = 9.251).

Fig. 1. Empirically derived age of onset groups with admixture modeling. Based on 138 forensic patients, peaking to the left, in red is the earlier-onset group (M = 19.99, SD = 3.309), and in green peaking to the right is the later-onset group (M = 36.13, SD = 9.251).