

Marital and Labor Market Status in the Long Run in Schizophrenia

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Background: Singleness and unemployment increase the risk of schizophrenia. Schizophrenia subsequently increases the risk of singleness and unemployment.

Objective: To describe long-term changes in marital status and labor market affiliation before and after the first admission with schizophrenia.

Design: A case-control study.

Setting and Participants: The sample included 5341 patients with a diagnosis of schizophrenia at the first admission to a psychiatric facility between 1970 and 1999, and 53410 matched control subjects. A person admitted in 1999 was followed up in the registers from 1980 to 1997 (ie, from 19 to 2 years before admission). Individuals admitted in 1970 could be followed up from 10 years until 27 years after admission.

Main Outcome Measures: Annual socioeconomic indicators.

Results: Individuals who were later hospitalized were more frequently living alone, unemployed, receiving social benefits, or otherwise outside the labor market when compared with controls, as early as 19 years before their first admission. For individuals with schizophrenia, the odds ratios of being unmarried or not being fully employed were significantly increased even 25 years after admission. This pattern was especially pronounced for men and for individuals who had more admissions. The ratios increased until admission, with a steeper increase in the years before admission. After admission, the odds declined to the level shown before admission and then stabilized.

Conclusions: Schizophrenia hinders social achievement long before the first admission. The first hospital episode is followed by a period during which social status does not deteriorate further except for the transition into disability pension.

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SINGLENES, UNEMPLOYMENT, and labor market marginalization may independently increase the risk of schizophrenia,¹⁻³ or insidious or untreated psychotic symptoms^{4,5} may lead to singleness or unemployment or may hinder development of personal relationships or gaining a foothold on the labor market.^{2,6-8} Individuals who have been admitted to a psychiatric hospital with schizophrenia are subsequently more likely to become single, unemployed, or recipients of social benefits.^{9,10} These findings could be explained by the influence of cognitive deficits or permanent behavioral traits that have been connected with schizophrenia^{11,12} or by the effects of labeling and stigma leading to singleness and labor market marginalization.^{13,14}

The long-term effect of singleness and labor market affiliation on the risk of developing schizophrenia, as well as the long-

term effects of schizophrenia on marital and labor market status, have rarely been examined¹⁵⁻¹⁹ and never, to our knowledge, simultaneously in an unselected population.

This study aims to investigate long- and short-term associations between marital status and labor market affiliation before and after the first admission with schizophrenia compared with population-based controls.

METHODS

Data were obtained by linking 3 Danish population-based registers by means of the unique personal identification number, which is assigned to all persons living in Denmark, thus ensuring accurate linkage of information between registers.²⁰ The Danish Psychiatric Central Register²¹ includes all admission and discharge dates and diagnoses according to the World Health Organization *International Classification of Diseases, Eighth Revision*²² and *In-*

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ternational Classification of Diseases, 10th Revision²³ classification of all psychiatric inpatient facilities in Denmark since 1969. There are no private psychiatric hospitals in Denmark, and all treatment is free of charge. Registration of outpatient activities was established in 1995. The Danish Medical Register on Vital Statistics contains dates and causes of all deaths in Denmark recorded from the Cause-of-Death Certificates since 1976 and for suicide since 1970.²⁴ The Integrated Database for Longitudinal Labour Market Research covers the total Danish population and contains detailed year-by-year information for the period 1980 and onward with information from administrative registers.²⁵ Information was recorded only as long as the person was living in the country on December 31, thus excluding people who emigrated or died within the year in question.

In total, 5341 cases were identified, which is the total sample of individuals who were diagnosed as having schizophrenia at their first admission in the period 1970 through 1999 at an age greater than 14 years, and who were alive and living in Denmark for at least 1 year during the period 1980 through 1997, and who had not previously been recorded as outpatients. A first admission was defined as the date on which the individual appeared in the Danish Psychiatric Central Register for the first time, where the records showed that the person had not been admitted before the beginning of the register in 1969. Schizophrenia was defined as *International Classification of Diseases, Eighth Revision* code 295 and *International Classification of Diseases, 10th Revision* code F20.

Each individual admitted with schizophrenia was matched to a representative random subsample of exactly 10 persons of the same sex, who were born the same year, who were alive and never admitted or who had never been recorded as an outpatient at the particular admission date and age (in days), and who were living in the country for at least 1 year during the period. This process yielded a total of 53 410 control subjects.

A person admitted in 1999 (and his or her matched controls) could be followed up in the Integrated Database for Longitudinal Labour Market Research from 1980 to 1997, which was from 19 until 2 years before admission. Similarly, a person admitted in 1970 could be followed up from 10 (1980) until 27 (1997) years after admission. However, individuals were only followed up until 25 years after the first admission date (and matching date), as the information was too sparse during the last 2 years.

When odds ratios associated with a particular year were calculated, only individuals who were alive and who were residing in Denmark were included. To minimize survival bias, controls matched to a particular case were removed if the case individual died or emigrated. Controls admitted after the matching date were kept in the analyses.

Because of the method of sampling controls, odds ratios associated with a year before the admission year can be interpreted as incidence rate ratios, and, furthermore, because of the rarity of schizophrenia, they can also be interpreted as risk ratios of being first admitted with schizophrenia between levels of marital and labor market status. The odds ratios associated with a year before or after admission can be interpreted as the odds ratio of the specific marital or labor market status between those who have been admitted with schizophrenia and those who have not been admitted.²⁶

Annual information on marital status as of December 31 was categorized as married and living with spouse, cohabiting and living with cohabitee, living alone, or being a child (which was excluded from the analysis because of age matching). Labor market affiliation during a given year was categorized into 6 disjoint categories: (1) fully employed or self-employed, (2) unemployed more than 1% of the year, (3) student, (4) recipient of social benefits, (5) outside the labor market (eg, housewives, children, and adolescents), and (6) receiving a pension for age

Numbers of Cases and Matched Controls Alive and Resident in Denmark in the Years Before and After the Matching Date When the Cases Were First Admitted With Schizophrenia

Years Before and After First Admission	No. of Cases (n = 5341)	No. of Controls (n = 53 410)
-19	107	978
-15	693	6361
-10	1628	14 935
-5	2364	21 720
-4	2539	23 388
-3	2719	25 125
-2	2905	26 896
-1	2992	27 702
0	3003	27 804
1*	2966	27 400
1†	551	5137
2*	2917	26 878
2†	598	5538
3*	2924	26 963
3†	558	5162
4*	2828	26 083
4†	530	4933
5*	2820	26 039
5†	501	4673
10*	2980	27 688
10†	520	4854
15*	2165	19 819
15†	340	3114
20*	1329	12 033
20†	206	1802
25*	483	4309
25†	68	587

*Still admitted or readmitted.

†Discharged and not readmitted.

or disability. This information was obtained from the Integrated Database for Longitudinal Labour Market Research.

Data were analyzed by conditional logistic regression using the PHREG procedures in SAS software (version 8.1; SAS Institute Inc, Cary, NC), where each case (with matched controls) formed a separate stratum. For each year, odds ratios and 95% Wald confidence bands were computed.

RESULTS

The **Table** shows the number of cases and controls who formed the background for the present analysis. In any given row of the table, there is a range of ages at admission and cohorts of births. At the first admission, the average age of schizophrenic patients was 29.2 years (SD, 11.0 years) and 36.4 years (16.1 years) for males and females, respectively.

Figure 1 outlines the odds ratios of being single compared with being married for cases and controls associated with selected years before and after admission with schizophrenia. Odds ratios for cohabiting individuals were not shown. Up to 19 years before, individuals who were single or cohabiting were more likely to be admitted with schizophrenia, and single men had a particularly high risk. There were no sex differences among those who were cohabiting. Up to 25 years after admission, the odds of being single or cohabiting were higher for people with schizophrenia than for controls and were particularly high for single men. The odds ratios seemed



Figure 1. Odds ratios of being single for individuals with schizophrenia vs healthy control subjects with reference to married individuals. The rates are adjusted for age, sex, calendar year, and labor market affiliation.

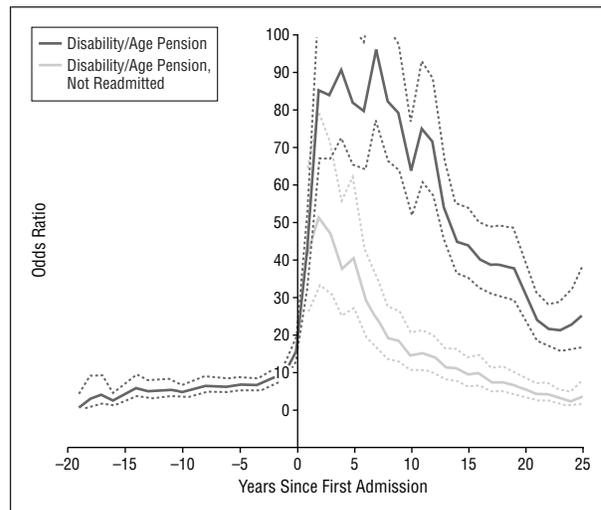


Figure 3. Odds ratios of receiving a pension for disability or age for individual with schizophrenia vs control subjects with reference to fully employed or self-employed individuals. The rates are adjusted for age, sex, calendar year, and marital status. Dotted lines are 95% confidence bands.

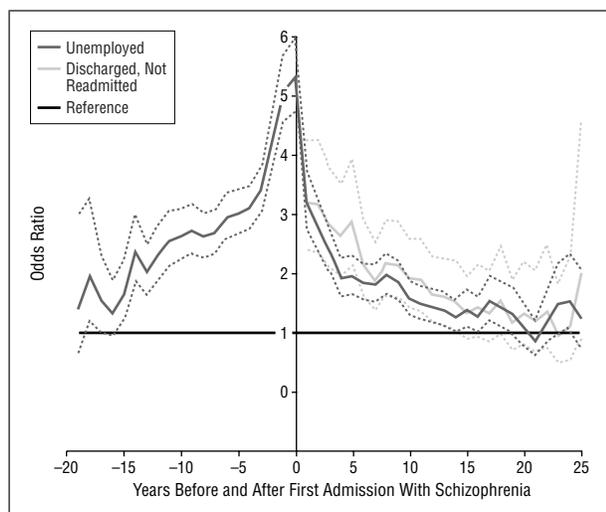


Figure 2. Odds ratios of being unemployed more than 1% of the year for individuals with schizophrenia vs control subjects with reference to fully employed or self-employed individuals. The rates are adjusted for age, sex, calendar year, and marital status. Dotted lines are 95% confidence bands.

to increase toward the admission year and peak 2 to 3 years after that year, after which they fell to the level before admission for both men and women. The odds ratio of being single was less elevated for those who had been discharged and not readmitted compared with controls, but the sex difference was maintained. Note that the reference category consisted of married individuals who were living with their spouse, and furthermore, that it is mandatory to report a change of address within 5 weekdays.

Odds ratios of (1) being a student, (2) receiving a pension for age or disability, (3) receiving social security, (4) being outside the labor market, (5) being unemployed, and (6) being fully employed or self-employed for cases vs controls were calculated. As long as 15 years before admission, individuals who were not fully employed or self-employed had a significantly higher risk of being admitted with schizophrenia. In general, the

odds ratios increased from those who were students through the unemployed, and from those outside the labor market and those who were pension recipients to those who were recipients of social security benefits; furthermore, the rates increased in the years toward the admission year. In the years succeeding the admission years, the odds of not being fully employed or self-employed increased, whereas later they declined to some extent. This pattern was particularly pronounced for students, pension recipients, social security recipients, and those outside the labor market, but was also evident for the unemployed.

Generally, the odds of being a pension recipient, being a social security recipient, and being outside the labor market were less marked for those who had been discharged and not yet readmitted. **Figure 2** displays the odds ratios associated with being unemployed more than 1% of the year for cases vs controls. The odds ratios associated with unemployment increased steadily toward the admission year, after which they decreased both for those who were still admitted, or had been readmitted, and for those who had been discharged and not readmitted, when compared with controls. **Figure 3** shows that individuals who would be or who had been admitted with schizophrenia had a higher odds ratio of receiving a pension than healthy controls. The odds ratios increased slowly until the matching year, where there was a steep increase, especially for those who were still admitted or had been readmitted, after which they decreased gradually as individuals in the general population retired.

COMMENT

This population-based study shows that individuals with schizophrenia differ from the general population with respect to marital and labor market behavior 15 to 20 years before, as well as up to 20 to 25 years after, their first admission to a psychiatric hospital. The main finding is

the strong long-term association between schizophrenia, singleness, disadvantaged socioeconomic position, and labor market marginalization. Furthermore, these relationships were relatively unaffected by admission to a psychiatric hospital—except for the transition into disability. These findings have strong implications for understanding the onset and course of schizophrenia.

Although untreated psychosis and acute and insidious onset of illness are indistinguishable in our study, evidence is added to the conjecture that schizophrenia does not appear suddenly,^{12,27} since our study shows that the social disadvantage is present up to 15 to 20 years before the actual first admission. In the ABC (Age, Beginning, and Course) Schizophrenia Study, which includes information on a sample of 232 first-admitted patients with schizophrenia, Hafner and colleagues^{16,28-30} suggested that negative symptoms, and presumably associated social disadvantage, appear up to 5 years before admission, and psychotic symptoms up to 2 years before admission. As opposed to the ABC studies, our study findings suggest that social disadvantage, and presumably associated negative symptoms, might emerge earlier, which has been suggested in some studies of premorbid factors.³¹⁻³⁴ Apparently, the etiologically relevant period is very long and the effects of single status, or low social status, accumulate very slowly to an etiologic threshold, which eventually precipitates an episode of hospitalization.

The long-term association between social disadvantage and schizophrenia is not in conflict with the neurodevelopmental hypothesis of schizophrenia, which assumes a disruption in the normal development of the brain, secondary to genetic and environmental factors.³⁵⁻³⁷ Central to the neurodevelopmental hypothesis of schizophrenia is the idea that neurologic or behavioral abnormalities or deficits preceding overt clinical symptoms of adult schizophrenia characterize those at risk during childhood and adolescence.^{31,36-40} Although our socioeconomic measures apply only to the adult population, our findings are not in keeping with models of schizophrenia that hypothesize that abnormalities develop relatively close to the illness onset.⁴¹

Individuals who are young at the admission or matching date were children during the years before, which implies that their marital status and labor market status are recorded as “child” and “outside the labor market,” respectively, and the matching by age accounts for this. Therefore, it is primarily information on those who are older at the admission or matching date that contributes to the odds ratios measured several years before, which means that the onset of schizophrenia must be relatively late for these cases. Social isolation and withdrawal are recognized as premorbid and prodromal syndromes,^{15,42-44} and our finding suggests that individuals with a late disease onset could have had a prolonged premorbid or initial prodromal phase, where they were living alone or where they were marginalized from the labor market. Our study could not examine whether the length of these early phases of schizophrenia had a predictive value for the illness course,⁴⁵⁻⁴⁸ and it should be noted that the first hospitalization is only an indicator of the first illness episode.¹⁵ However, individuals whose socioeconomic and marital status could be observed sev-

eral years before had an admission or matching date later in the calendar period, which further ensures that the admission actually is the first admission.

Although patients with early- and late-onset illness might have different pathways to admission, the finding in the present study cannot be used to resolve the ongoing controversies of whether early- and late-onset schizophrenia are different or similar disorders.^{28,49} On the basis of our findings, it could be argued that patients with late-onset disease might have needed treatment years earlier, which adds weight to the point of view that early- and late-onset schizophrenia are more similar disorders. On the other hand, the fact that individuals with late onset manage to stay out of the hospital could mean that they suffer less severe symptoms and, therefore, that there might be differences regarding the symptoms of schizophrenia. However, on the basis of our findings, it could be claimed that early- and late-onset schizophrenia become indistinguishable over time, which is in accordance with earlier reports.⁵⁰⁻⁵³ On the basis of our findings, it could be argued that patients with late-onset schizophrenia might have suffered a decline from an already achieved social status (ie, social drift),⁵⁴ or our findings could suggest a less-than-expected achievement years before the first admission (ie, social selection),⁵⁵ which is in keeping with other studies.^{56,57}

The first hospital episode with schizophrenia is preceded by a period of years, where future patients increasingly often live alone or are marginalized from the labor market. Three explanations seem immediately evident: The incidence of untreated psychosis or insidious symptoms is higher close to the admission, or the duration of illness before the first hospital admission is skewed toward short durations, or future patients might be more likely to remain unemployed, marginalized, or single after entering the labor and marital markets. The data from our analysis suggest that the first admission episode with schizophrenia is followed by a period of leveling, during which the social status is not further deteriorated. However, the odds ratio of becoming a disability pension recipient is overwhelming, which could reflect that psychiatrists at mental hospitals tend to endorse a disability pension once the diagnosis has been established, or that the social welfare system recognizes the disabling impact of schizophrenia. The decreasing rates associated herewith primarily reflect the transition into age pension in the general population, but possibly also that the disability attributed to schizophrenia generally ameliorates.^{58,59} One plausible explanation for the leveling could be that hospital treatment is actually beneficial, which could also explain the differences between individuals who have been discharged and not readmitted and those who are readmitted or still admitted.

The odds ratios associated with being single or recipients of disability pensions or social security benefits are smaller among individuals who have been discharged and not readmitted. This leads us to conclude that the more severely ill schizophrenic patients are also more likely to be readmitted or to stay in the hospital. In addition, the data from the present study show decreasing odds ratios associated with singleness, which could reflect that patients find a spouse or a cohabitee

around the time of hospitalization, or it could reflect high rates of divorce in the general population during the period, an argument that generally applies in our study. We found a sex difference insofar as the odds ratios associated with singleness were greater in men than women, which is a well-established finding.^{3,60} However, the mean first-admission age was higher in women, which has previously been reported,^{61,62} whereas a decreasing first admission rate for schizophrenia in Denmark also was reported, which probably could be attributed to a shift to outpatient cases. In our study, the first-admission age was rather high, as only patients who were diagnosed as having schizophrenia at the first admission were enrolled, and the first-admission rates of schizophrenia in Denmark have been significantly increasing since the late 1980s.⁶³

Studies on the cost of illness have shown that schizophrenia imposes an enormous economic burden on both society and the individual person.^{59,64,65} Our study suggests that these costs, and in particular the indirect costs in terms of lost income and productivity, could be biased and conservatively estimated, as the costs associated with the period before the first hospitalization might be underestimated. Furthermore, our study shows that the long-term indirect cost in patients with relapses is higher than in those who are not readmitted, and presumably that the quality of life and the social functioning are also higher in these patients. Hence, effective treatments used early in the course of schizophrenia may help reduce the costs associated with schizophrenia beyond the immediate reduction in direct costs and in alleviating the personal burden of the illness.⁶⁶⁻⁶⁸

In this study, social patterning such as early social drift and putative biological risk factors are indistinguishable. However, sustained low socioeconomic status, rather than acute social problems, is associated with hospital admission, or, alternatively, schizophrenia deteriorates or hinders social achievement long before the actual admission to a psychiatric hospital.

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