

Preventing Poor Vocational Functioning in Psychosis Through Early Intervention

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Objective: This study tested the hypothesis that early detection of psychosis improves long-term vocational functioning through the prevention of negative symptom development.

Methods: Generalized estimating equations and mediation analysis were conducted to examine the association between employment and negative symptoms over ten years among patients in geographic areas characterized by usual detection (N=140) or early detection (N=141) of psychosis.

Results: Improved vocational outcome after ten years among patients in the early-detection area was mediated

by lower levels of negative symptoms during the first five years. Regardless of symptoms, rates of full-time employment or study were lower among patients in the usual-detection versus the early-detection area.

Conclusions: Patients from an early-detection area attained lower negative symptom levels earlier compared with patients from a usual-detection area, which seemed to have facilitated vocational careers.

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Although about 50% of persons with psychotic disorders attain long-term symptom remission (1), international and Norwegian unemployment rates for this group range from 56% to 90% (2,3). Furthermore, of the 25% of Norwegian high school pupils who drop out of school, 10% leave school because of mental illness (4).

Negative symptoms, which affect 10% to 20% of patients with psychotic disorders, are among the obstacles facing patients with regard to work. These symptoms are difficult to treat and are associated with impairments in independent living skills and social and vocational functioning (5).

Early detection of psychosis is associated with lower negative symptom levels at five-year follow-up and with increased work participation after ten years (1). [A figure comparing negative symptoms over time between patients in geographic areas with early-detection versus usual-detection practices is available as an online supplement to this report.] The aim of this study was to investigate whether early detection of psychosis produced higher employment rates by lowering levels of negative symptoms.

METHODS

TIPS (early Treatment and Intervention in PSychosis), which was conducted between January 1, 1997, and

December 31, 2000, was a quasi-experimental study that compared course and outcome of psychosis between geographical areas that practice early detection (Rogaland County, Norway) or usual detection of psychosis (Ullevaal Health Care Sector, Oslo County, Norway; and the mid-sector, Roskilde County, Denmark). Health care services are based on catchment areas and are publicly funded. The areas are sociodemographically similar. Unemployment and disability pension rates were also similar: 2.7% and 7.3%, respectively, in Rogaland; 3.9% and 5.4% in Oslo; and 4.5% and 5.3% in Roskilde (6,7) (1998).

The early-detection program is still ongoing and combines information campaigns to educate health professionals, educational and social facilities, and the general public about psychosis and easy access to mental health care (8). Treatment was standardized.

Recruitment was conducted between 1997 and 2001. The main inclusion criteria, described in detail elsewhere (8), were having a first episode of nonaffective, nonorganic psychosis and age 18 to 65.

A total of 281 patients entered the study. Assessments were carried out with informed consent at study inclusion and at one (N=272), two (N=259), five (N=197), and ten years

(N=174). The study was approved by the Regional Committee for Medical Research Ethics Health Region II and the Regional Committee for Medical Research Ethics Health Region East.

Duration of untreated psychosis (DUP) was the time from first positive psychotic symptom to start of treatment. Symptom levels were measured by the Positive and Negative Syndrome Scale (PANSS) (9) by using a five-factor model for analyses of positive, negative, cognitive, depressive, and excitatory symptoms (8). The Structured Clinical Interview for the DSM-IV (SCID) was used for diagnosis (10). Overall function and symptom levels were assessed by the Global Assessment of Functioning (GAF). The reliability of the assessments was measured throughout the study: diagnosis, $\kappa=.81$; function, intraclass correlation coefficient (ICC) (one-way, random-effects model)=.86; symptoms, ICC=.91; and DUP, ICC=.99. For the PANSS components, the ICCs ranged from .61 to .82 (1). The ICCs for the GAF were .83 (symptoms) and .88 (function). Employment and educational status was assessed by using the Strauss-Carpenter Level of Function scale (11). Symptom remission was defined by using international standardized criteria (12).

There was selective attrition at the ten-year follow-up, as described in an earlier publication (1)—more patients with higher levels of negative symptoms at previous time points had dropped out of the study in the usual-detection area compared with the early-detection area.

The statistical analyses were conducted by using SPSS, version 20.0 (13). Cross-sectional, zero-order associations were estimated at study inclusion and follow-up by using independent-samples *t* tests for continuous variables and chi-square analyses and comparison of relative risks with confidence intervals for categorical variables. Nonparametric analyses (Mann-Whitney *U* test) were applied for comparison of skewed data. All tests were two tailed and corrected by using the Bonferroni method when appropriate. For a desired alpha of .05, the Bonferroni-corrected level was $p=.008$ for the diagnostic categories and $p=.01$ for the five PANSS components.

To investigate the effects of negative symptoms and early detection on vocational outcome, we used generalized estimating equations (GEEs). The PANSS negative symptoms component was entered as a separate variable, whereas the four other symptom components were collapsed into one variable. Both were entered as time-dependent predictors, whereas time was entered as factor. Educational level, log-transformed DUP (because of skewness), early detection, core schizophrenia (schizophrenia, schizophreniform disorder, and schizoaffective disorder), and gender were entered as predictors that were not time dependent. The interaction term of early detection and negative symptoms was entered in the GEE in order to investigate whether the effect of negative symptoms on vocational outcome was different in the two geographic areas, and the interaction term of early detection and follow-up time point was entered to investigate differences between the areas in vocational

outcome over time. We used a robust estimator and an unstructured covariance matrix. Associations of all variables (time point, gender, core schizophrenia, and early detection) with rates of employment were analyzed by using a Wald chi-square test. Cross-correlations with time lags were conducted in order to explore the possibility of causality in the association between negative symptoms and vocational outcome.

Mediation analysis was performed to investigate whether there was an association between early detection of psychosis and vocational status over time that was mediated by negative symptoms. We conducted a path analysis on the basis of maximum likelihood estimation by using the PROCESS (14) macro added to SPSS, using bootstrapping to estimate the robustness of the mediation effects (15), and the mediating effect was quantified as the product of its constituent paths. Inferences about indirect effects were based on tests of the product after bootstrapping (simulated resampling $\times 1,000$ obtained 1,000 estimates of the indirect [mediation] effect, with the distribution approaching the sampling distribution in an original population).

Full-time (37.5 hours per week) employment or study was the dependent variable, early detection was the independent variable, and the negative symptoms component was proposed as mediator. Gender, core schizophrenia, symptom burden minus negative symptoms, education, and DUP were included as covariates.

RESULTS

The sample at inclusion consisted of 141 patients in the early-detection area and 140 patients in the usual-detection area. [A table summarizing characteristics of the sample at study inclusion by usual- or early-detection area is available as an online supplement to this report.] Patients in the early-detection area had shorter DUP and lower symptom levels on all PANSS components at inclusion.

At all time points, the proportion of patients working or studying full-time was larger in the early-detection area compared with the usual-detection area; however, the difference was statistically significant only at one and ten years [see online supplement]. Eight of 124 (7%) patients in the usual-detection area and 25 of 127 (20%) patients in the early-detection area were engaged in full-time work or studies after one year ($p<.002$). Eleven of 72 (15%) patients in the usual-detection area and 31 of 101 patients (31%) in the early-detection area were engaged in full-time work or studies after ten years ($p<.02$).

The results of the GEE model are outlined in Table 1. Over the ten-year follow-up as a whole, there was a small but significant main effect of early detection. There was a significant main effect of time, and there was an interaction between time and detection area, indicating that the development of vocational status in the two detection areas differed over time. A higher level of negative symptoms and overall symptoms minus negative symptoms was associated

TABLE 1. Associations between patient characteristics and other study variables and full-time employment over time^a

Variable	Main effect			Parameter estimates		
	Wald χ^2	df	p	B	OR	95% CI
Intercept	.8	1	.386	-.3	.7	.1–4.7
Male (reference: female)	7.1	1	.008	-.6	.6	.3–.8
Age at inclusion	.4	1	.510	-.0	1.0	.9–1.0
Education (years)	9.3	1	.002	.1	1.2	1.1–1.3
DUP (log transformed)	2.8	1	.096	-.1	.9	.7–1.0
Early detection (reference: usual detection)	6.8	1	.009	1.2	3.3	.8–13.8
Time (years) (reference: inclusion)	64.8	4	.001			
1		1	<.001	-2.7	.7	.0–.2
2		1	<.001	-1.7	.2	.1–.4
5		1	<.001	-1.5	.2	.1–.5
10		1	<.001	-1.8	.2	.1–.4
Negative symptoms	7.5	1	.006	-.1	.9	.8–1.0
Overall symptom burden, minus negative symptoms	7.2	1	.007	-.0	.9	.9–1.0
Core schizophrenia spectrum diagnosis (reference: no) ^b	3.4	1	.065	-.4	.7	.4–1.0
Early detection \times negative symptoms	5.3	1	.022	-.8	.9	.9–1.0
Early detection \times time (years)	12.0	4	.018			
1		1	.028	1.1	2.9	1.1–7.3
2		1	.528	.2	1.3	.5–3.0
5		1	.615	-.2	.8	.3–2.0
10		1	.587	.9	.6	.9–6.7

^a Full-time employment included full-time studies. The main effect represents the association between the variable and rates of employment. The parameter estimate represents the odds of full-time employment associated with each variable. Corrected quasi-likelihood under independence model criterion=955.4

^b Schizophrenia, schizophreniform disorder, and schizoaffective disorder

with poorer vocational outcome. In this multivariate model, male gender was associated with more employment. A longer period of education predicted vocational outcome as well, but DUP or having a core schizophrenia disorder diagnosis did not.

The time lag cross-correlation of negative symptoms (x) and work or educational status amounted to $-.19$ when time lag was equal to x_{h-1} , compared with $-.22$ when time lag was equal to x_{h-0} ; therefore, having fewer negative symptoms at a given time point (h) correlated with more full-time work or studies at the next follow-up time point ($h+1$). The mediation analysis indicated that early detection indirectly influenced vocational outcome through its association with negative symptoms [see online supplement]. Patients from the early-detection area had lower negative symptom levels, and patients with lower negative symptom levels had a higher chance of full-time work or employment. Further, in this model, early detection acted through negative symptoms to affect vocational outcome. Gender, education, and symptom burden minus negative symptoms also all had significant main effects ($p < .001$). Bias-corrected mean confidence intervals (CIs) for the indirect effect of early detection through negative symptoms were all above zero (CI=.06–.25). The model including all five variables (negative symptoms, early detection, gender, diagnosis, and DUP) was a better

fit than the constant-only model ($\chi^2=113.52$, $df=5$, $p=.001$). Hence, there is some evidence that the early-detection effect on vocational outcome was partially associated with the lower negative symptom levels in the early-detection area; however, other symptoms, education, and gender played their part as well.

DISCUSSION

This study had several main findings. First, higher employment among patients with psychosis may be mediated by negative symptoms, which were lower in the early-detection area during the first half of the follow-up period. Second, 31% of patients in the early-detection area were engaged in full-time employment or studies ten years after diagnosis compared with 15% in the usual-detection area, and early detection was a significant predictive factor for full-time employment or study. Third, negative symptoms had a stronger negative impact on chances of employment in the early- versus the usual-detection area, where chances of employment appeared lower regardless of symptoms. Fourth, male gender and a longer period of education also had positive effects on vocational outcome at ten years. Finally,

symptom burden minus negative symptoms had a negative effect on vocational outcome at ten years.

As a group, patients in the early-detection area had lower negative symptom levels throughout the study, possibly preventing some of the social damage that could have been done. In the usual-detection area, vocational outcome was generally poor and, according to statistical analyses, was independent of symptom levels.

The study had several limitations. Twenty-three percent of eligible patients declined participation; however, they were evenly distributed over early- and usual-detection areas. The statistical analyses could not fully compensate for the nonrandomness of attrition. Having a higher dropout rate among patients with negative symptoms in the usual-detection area may have led to a restriction of range. In turn, statistical power may have become limited, making it less likely to detect a link between negative symptoms and vocational outcome. Finally, we were not able to control for possible regional differences in the emphasis placed on helping people attain employment.

CONCLUSIONS

Early detection of psychosis can prevent negative symptom development, thereby increasing chances of good vocational outcomes. However, some patients continued to have

negative symptoms despite early detection, and for those, vocational careers were still largely unattainable. Combining early detection and intervention with early psychosocial interventions—for example, individual placement and support—might further improve employment outcomes.

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