Schizophrenia Research 119 (2010) 11–17

Contents lists available at ScienceDirect

Schizophrenia Research

journal homepage: www.elsevier.com/locate/schres

Suicidality before and in the early phases of first episode psychosis

Elizabeth A. Barrett [a,*], Kjetil Sundet [b], Ann Faerden [c], Ragnar Nesvåg [d], Ingrid Agartz [e,f], Roar Fosse [g,h], Erlend Mork [a,i], Nils Eiel Steen [a], Ole A. Andreassen [c,f], Ingrid Melle [c,f]

[a] Department of Mental Health, Oslo University Hospital, 0514 Oslo, Norway
[b] Department of Psychology, University of Oslo, 0317 Oslo, Norway
[c] Department of Psychiatry, Oslo University Hospital, 0407 Oslo, Norway
[d] Department of Psychiatry, Diakonhjemmet Hospital, 0319 Oslo, Norway
[e] Department of Research and Development, Diakonhjemmet Hospital, 0319 Oslo, Norway
[f] Institute of Psychiatry, University of Oslo, 0318 Oslo, Norway
[g] Vestre Viken State Hospital Trust, 1309 Rud, Norway
[h] Regional Centre of Violence and Traumatic Stress, University of Oslo, 0320 Oslo, Norway
[i] National Centre for Suicide Research and Prevention, University of Oslo, 0372 Oslo, Norway

ARTICLE INFO

Article history:
Received 26 January 2010
Accepted 14 March 2010

Keywords:
Psychotic disorders
Suicide
Duration of untreated psychosis

ABSTRACT

Introduction: The suicide risk in psychotic disorders is highest in the early phases of illness. Studies have typically focused on suicidality from treatment start rather than actual onset of psychosis. This study explored the prevalence and characteristics of suicidality in patients with a first episode of psychosis (FEP) in two time intervals: 1) prior to study entry and 2) explicitly in the period of untreated psychosis.
Method: One hundred seventy FEP-patients were interviewed as soon as possible after treatment start. The interview included assessments of diagnoses, suicidality, symptoms, substance use, and premorbid functioning.
Results: Nearly 26% of the patients attempted suicide prior to study entry and 14% made suicide attempts during the period of untreated psychosis. Of the patients who had been suicidal (i.e. experienced suicidal ideation or attempts), 70% were suicidal during the period of untreated psychosis. Suicide attempts prior to study entry were associated with female gender, more depressive episodes, younger age at psychosis onset, and history of alcohol disorder. Suicide attempts during untreated psychosis were also associated with more depressive episodes and younger age at illness onset, in addition to drug use the last six months and longer duration of untreated psychosis (DUP).
Conclusion: The prevalence of suicidality before and in the early phases of FEP is high, especially during untreated psychosis. As prolonged DUP is associated with suicide attempts during the period of untreated psychosis, reducing the DUP could have the effect of reducing the prevalence of suicide attempts in patients with FEP.

1. Introduction

The suicide rate in schizophrenia and other psychotic disorders is high (Radomsky et al., 1999). Most studies have focused on patients with schizophrenia, with a suicide rate of 5% (Palmer et al., 2005) and occurrence of non-fatal suicidal behaviour in as many as 50% of patients (Bolton et al., 2007). The suicide risk is elevated throughout the life course, but the risk is highest during the early phases of schizophrenia (Palmer et al., 2005). Due to diagnostic instability in early phases of psychotic disorders (Haahr et al., 2008), studies on patients with a first episode of psychosis (FEP) frequently include a broader range of psychotic disorders.

Studies of psychotic disorders have typically focused on suicidality in relation to treatment start rather than the actual

* Corresponding author. Department of Mental Health, AFF, Gaustad building 14, Oslo University Hospital, 0514 Oslo, Norway. Tel.: +47 22 92 37 91; fax: +47 22 92 34 70.
E-mail address: e.a.barrett@medisin.uio.no (E.A. Barrett).

0920-9964/$ – see front matter © 2010 Elsevier B.V. All rights reserved.
doi:10.1016/j.schres.2010.03.022

onset of psychosis. However, risk factors for suicidal behaviour like depression (Hawton et al., 2005) and substance use (Verdoux et al., 2001) are prevalent before treatment start (Larsen et al., 2006; Romm et al., 2010), indicating that the time before treatment start could be a period of increased suicide risk. In fact, studies have found that 14–28% of patients with FEP have attempted suicide prior to first treatment for psychosis (Bertelsen et al., 2007; Robinson et al., 2009). Also, patients with untreated psychosis appear to have a higher risk for violent suicide attempts compared to treated patients (Nielssen and Large, 2009).

A few studies have focused on suicidality explicitly in the period between psychosis onset and treatment start, i.e. during the period of untreated psychosis. Within this period, 6.5–11.3% of patients with a FEP attempted suicide (Clarke et al., 2006; Foley et al., 2008) or engaged in self-harm (Harvey et al., 2008). The duration of untreated psychosis (DUP) can be alarmingly long; across different studies the average mean DUP in FEP-patients lies between 1–2 years, and the median DUP at about 6 months (McGlashan, 1999). Some studies find that longer DUP is associated with increased risk for suicidal behaviour (Altamura et al., 2003; Clarke et al., 2006; Harvey et al., 2008), though not consistently (Bakst et al., 2009; Foley et al., 2008; Nordentoft et al., 2002; Preti et al., 2009). There is some evidence that risk factors for suicidal behaviour vary across different phases of illness (Addington et al., 2004; Clarke et al., 2006). The reason for the inconsistent association between DUP and suicidal behaviour could be that the studies measure suicidality in different time periods.

The present study of patients with FEP aimed at exploring the prevalence and characteristics of patients with suicidality in two different time intervals: 1) prior to study entry and 2) explicitly in the period of untreated psychosis. As previous attempted suicide is a strong predictor of later attempts and completed suicide (Hawton et al., 2005), we focused particularly on suicide attempts in the two time intervals.

2. Materials and methods

2.1. Participants

The study included 170 patients with FEP from the ongoing Thematic Organized Psychosis Research (TOP) study, consecutively recruited between September 2004 and July 2008 from in- and outpatient psychiatric units in three catchment areas of Oslo, Norway. Inclusion criteria were age 18–65 years and a FEP according to the DSM-IV (American Psychiatric Association, 1994), including schizophrenia, schizophreniform disorder and schizoaffective disorder (constituting "Schizophrenia spectrum disorders"); bipolar disorder and major depressive disorder, both with mood incongruent psychotic symptoms (constituting "Affective psychotic disorders"); delusional disorder, brief psychosis and psychosis NOS (constituting "Other psychotic disorders"). Patients were included up to 52 weeks following the start of adequate medication or hospitalisation for psychosis. They were not considered FEP-patients if they had previously been treated with antipsychotic medication in adequate dosage for more than 12 weeks or until remission. Exclusion criteria were history of severe head injury, brain damage, neurological disorder, and mental retardation. All participants signed written informed consent. The study was approved by the Regional Committee for Medical Research Ethics and the Norwegian Data Inspectorate.

2.2. Methods

Patients were included in the study as soon as possible after treatment start. Diagnoses were set according to the Structured Clinical Interview for DSM-IV Axis I disorders (SCID-I) (First et al., 1995), with additional information from hospital records. Age at psychosis onset and at first depression was defined as age at first SCID-verified psychotic symptom and depressive episode, respectively. Severity of positive psychotic symptoms and negative symptoms were assessed by the Positive and Negative Syndrome Scale (PANSS) (Kay et al., 1987). Illness insight was measured by the PANSS item G12. Psychosis was defined as a score of ≥ 4 on PANSS items P1, P3, P5, P6, or G9 for more than one week (Melle et al., 2004). DUP was measured in weeks from psychosis onset until start of adequate treatment. Suicidality was assessed by asking the patients whether they had been suicidal, i.e. experienced suicidal thoughts, suicidal plans, or attempted suicide before psychosis onset, during the period of untreated psychosis, or after treatment start, respectively. The merging of these three time periods constituted the time interval "prior to study entry". Also based on this information, patients were categorised into having either one of three levels of suicidality: non-suicidal, suicidal ideation (suicidal thoughts and -plans), and suicide attempts. In addition, the two former groups were collapsed into non-attempters for the purpose of investigating predictors of suicide attempts. Information on suicide attempts was cross-checked with the SCID-interview and hospital records. Current suicidality was assessed by item 8 on the Calgary Depression Scale for Schizophrenia (CDSS) (Addington et al., 1990), and current depression was assessed by CDSS total. Premorbid functioning was assessed with the Premorbid Adjustment Scale (PAS) (Cannon-Spoor et al., 1982) and divided into two domains; Academic and Social, with childhood scores and scores of premorbid change calculated for both (Haahr et al., 2008). Information about alcohol- and substance use during the six months prior to study entry was derived from a detailed history and hospital records. The reliability of SCID-I diagnoses, PANSS-scores and DUP are described in Faerden et al. (2010).

2.3. Statistical analyses

Analyses were performed with the statistical package SPSS, version 15.0. Parametric analyses were used for variables with normal distribution, and non-parametric analyses for variables with skewed distributions. Analyses were two-tailed with a preset level of significance of .050. Categorical variables were analysed with Chi-square tests. For continuous variables, Student *t*-tests and Mann–Whitney U tests were used for comparison of two groups, while One-way ANOVA (post hoc Scheffe's tests) and Kruskal–Wallis tests (post hoc Mann–Whitney U tests with Bonferroni corrections) were used for comparison of three groups. To examine clinical and demographical predictors of suicide attempts, binary logistic regression analyses were conducted with

suicide attempts/not attempts as the dependent variables. Clinical and demographical variables that differed significantly between the groups in question were entered as independent variables. The substance use most relevant for the dependent variable was chosen, i.e. lifetime substance use disorder was chosen for the prediction of attempted suicide prior to study entry, while substance use during the last six months prior to study entry was chosen for the prediction of attempts during untreated psychosis. The DUP-variable was log-transformed due to its skewed distribution. Drug use last six months was also highly skewed, and was dichotomized into use and non-use. Current age and age at psychosis onset were highly correlated, and to avoid multicollinearity, only age at psychosis onset was entered into the regression models. Likewise, depressive episodes correlated significantly with current depression (CDSS total) and current suicidality (CDSS item 8) respectively and thus the CDSS measurements were omitted from the regression analyses.

3. Results

Prior to study entry, 60 patients (35.3%) were non-suicidal, 66 (38.8%) had suicidal ideation, and 44 (25.9%) had attempted suicide. Clinical and demographical group differences are presented in Table 1. There were group differences in gender, age at psychosis onset, DUP, depressive episodes, current depression, current suicidality, PAS childhood academic functioning, and alcohol the last six months.

When splitting the sample into non-attempters ($n=126$) and attempters ($n=44$), group differences remained the same except for a non-significant ($p=.061$) difference in PAS childhood academic functioning. In addition the attempters

Table 1
Clinical and demographical characteristics in patients with no suicidality, suicidal ideation or suicide attempts prior to study entry ($n=170$).

	Prior to study entry					
	Group 1	Group 2	Group 3			
	Non-suicidal ($N=60$)	Suicidal ideation ($N=66$)	Suicide attempts ($N=44$)	Test statistics[a]	p	Post hoc[b]
Age (years), mean (SD)	28.9 (8.1)	27.2 (9.5)	25.0 (6.1)	$F=2.8$	.065	
Gender, n (%)						
Male	42 (70)	49 (74)	22 (50)			
Female	18 (30)	17 (26)	22 (50)	$\chi^2=7.5$	.024	$2\neq3$
Diagnosis, n (%)						
Schizophrenia spectrum	34 (57)	40 (60)	24 (55)			
Affective psychoses	6 (10)	9 (14)	7 (16)			
Other psychoses	20 (33)	17 (26)	13 (29)	$\chi^2=1.5$	.823	
Course of illness						
Age at psychosis onset (years), mean (SD)	26.8 (7.8)	24.0 (8.4)	20.3 (6.4)	$F=9.0$	<.001	1,2>3
DUP (weeks), median (min–max)	19 (0–780)	40 (0–1040)	59.5 (2–1040)	$\chi^2=10.0$[c]	.007	1<3
Age at first depression[d] (years), mean (SD)	23.9 (6.5)	20.3 (8.3)	19.2 (5.8)	$F=3.1$	.051	
Depressive episodes, median (min–max)	0 (0–5)	1 (0–10)	2 (0–10)	$\chi^2=30.9$[c]	<.001	1<2<3
PANSS, mean (SD)						
Positive scale	14.8 (5.3)	16.0 (5.0)	16.1 (4.4)	$F=1.2$	.292	
Negative scale	15.4 (7.0)	15.4 (6.2)	15.5 (6.0)	$F=0.0$	.990	
Lack of insight (item G12)	3.0 (1.4)	2.7 (1.4)	2.6 (1.4)	$F=0.9$	.399	
CDSS, mean (SD)						
Current depression (CDSS total)	3.3 (2.8)	7.2 (3.8)	9.9 (5.6)	$F=34.9$	<.001	1<2<3
Current suicidality (CDSS item 8)	0.1 (0.3)	0.7 (0.7)	0.7 (0.8)	$F=18.5$	<.001	1<2,3
PAS, median (min–max)						
Social functioning childhood[e]	0 (0–4.5)	0.8 (0–6)	1.0 (0–6)	$\chi^2=2.2$[c]	.339	
Social functioning change[f]	0 (−2–5)	0.5 (−2.5–5)	0.8 (−6–3.5)	$\chi^2=4.6$[c]	.101	
Academic functioning childhood[f]	1 (0–5.5)	1.5 (0–5.5)	1.8 (0–5)	$\chi^2=9.5$[c]	.009	1<2,3
Academic functioning change[g]	1.0 (−2.5–4.5)	1.5 (−4–5)	2.3 (−4.5–6)	$\chi^{2c}=4.0$	.136	
Lifetime alcohol disorder, n (%)						
None	52 (87)	53 (80)	30 (68)			
Alcohol disorder	8 (13)	13 (20)	14 (32)	$\chi^2=5.4$	.069	
Lifetime drug disorder, n (%)						
None	44 (73)	45 (68)	24 (55)			
Drug disorder	16 (27)	21 (32)	20 (45)	$\chi^2=4.2$	.125	
Substance use last 6 months prior to study entry						
Alcohol units[g,h], median (min–max)	14.5 (0–624)	18 (0–1274)	78 (0–2016)	$\chi^2=8.4$[c]	.015	1,2<3
Drugs (times used), median (min–max)	0 (0–276)	0 (0–182)	0.5 (0–2288)	$\chi^2=3.5$[c]	.170	

DUP = duration of untreated psychosis; PANSS = Positive and Negative Syndrome Scale, CDSS = Calgary Depression Scale for Schizophrenia; PAS = Premorbid Adjustment Scale.

[a] χ^2 = Pearson's chi square, F = One-way ANOVA.
[b] Scheffe's test, Mann–Whitney U test.
[c] χ^2 = Kruskal–Wallis test.
[d] $n=96$.
[e] $n=169$.
[f] $n=168$.
[g] $n=167$.
[h] One alcohol unit = 12.5 g alcohol.

Table 2
Logistic regression with suicide attempts prior to study entry as dependent variable ($n = 170$).

	B	S.E.	*p*	Exp(*B*)	95% CI
Gender	0.966	0.420	0.021	2.626	1.154–5.978
Depressive episodes	0.390	0.115	0.001	1.477	1.179–1.850
Age at psychosis onset (years)	−0.073	0.032	0.021	0.929	0.873–0.989
Alcohol disorder (yes/no)	1.129	0.484	0.020	3.093	1.199–7.979
logDUP	0.131	0.124	0.292	1.139	0.894–1.452

DUP = duration of untreated psychosis.
Model Chi Square = 41.784, $df = 5$, $p < .001$. The model as a whole explained between 21.8% (Cox and Snell R^2) and 32.0% (Nagelkerke R^2) of the variance and correctly indentified 80.6% of the cases.

were significantly younger ($p = .040$) and had to a larger extent a history of alcohol disorder ($p = .032$) compared to non-attempters. We examined clinical and demographical predictors of attempted suicide before study entry in a binary logistic regression model including the following variables: gender, depressive episodes, age at psychosis onset, alcohol disorder, and DUP (Table 2). The model indicated that female gender, more depressive episodes, younger age at psychosis onset and lifetime history of alcohol disorder were associated with suicide attempts before study entry. Among the patients with suicidality prior to study entry, 60 patients (54.5%) were suicidal before the onset of psychosis, 39 (35.5%) became suicidal during untreated psychosis, and 11 (10.0%) became suicidal after treatment start. There were no differences in clinical and demographical variables between patients with onset of suicidality before and after psychosis onset. Twenty-five patients (22.7%) were persistently suicidal across all the time periods, while 85 (77.3%) were non-persistently suicidal. Patients with persistent suicidality differed from patients with non-persistent suicidality only in being more currently depressed (Mean [SD] = 10.5 [4.5] vs. 7.6 [4.7], $p = .008$) and currently suicidal (1.1 [0.7] vs. 0.5. [0.7], $p < .001$).

During untreated psychosis, 93 patients (54.7%) were non-suicidal, 53 (31.2%) had suicidal ideation and 24 (14.1%) had attempted suicide. Thus, in the group of patients who were suicidal prior to study entry ($n = 110$), 77 (70.0%) were suicidal in relation to untreated psychosis, and of all the attempters ($n = 44$), 24 (54.4%) attempted suicide in this period. Clinical and demographical differences between patients with different levels of suicidality during untreated psychosis are presented in Table 3. There were group differences in age at psychosis onset, DUP, depressive episodes, PANSS positive symptoms, current depression, current suicidality, history of alcohol disorder and drug disorder, and alcohol- and drug use the last six months.

When splitting the sample into non-attempters ($n = 146$) and attempters ($n = 24$) during the period of untreated psychosis, group differences remained the same except for a non-significant difference on the PANSS positive subscale ($p = .636$), and in addition attempters were significantly younger than non-attempters ($p = .025$). Clinical and demographical predictors of attempted suicide during untreated psychosis were tested in a binary logistical regression model including the following variables: depressive episodes, age at psychosis onset, alcohol last six months, drugs last six months, and DUP (Table 4). The model indicated that more depressive episodes, younger age at psychosis onset, use of drugs, and longer DUP were associated with suicide attempts during untreated psychosis.

4. Discussion

Our main findings were that suicidal behaviour was highly prevalent before and in the early phases of FEP; prior to study entry, 38.8% had experienced suicidal ideation and 25.9% had attempted suicide. More than half of the suicide attempters made attempts during the period of untreated psychosis, and prolonged DUP was associated with increased risk for attempting suicide during this particular period of time.

The prevalence of suicide attempts in the early phases of psychosis varies across different studies (Nielssen and Large, 2009). Our result is in the higher range, but comparable to rates in similar samples (Nordentoft et al., 2002). Confined to the period of untreated psychosis, 31.2 % had suicidal ideation while 14.1% had attempted suicide. This rate of suicide attempts is somewhat higher than the rates reported previously (9.6% and 6.5%) (Clarke et al., 2006; Foley et al., 2008). Of the patients who had been suicidal, 70.0 % had been suicidal during untreated psychosis, underlining that suicidality is especially prevalent during untreated psychosis.

We found that attempted suicide was associated with female gender for the period before study entry, but not for the confined period of untreated psychosis. In the general population and in other severe mental disorders, men complete suicide more often than women, while women make suicide attempts more often than men. In patients with schizophrenia (Harkavy-Friedman and Nelson, 1997) and also bipolar disorders (Tondo et al., 2007), the gender ratios for attempts seem less clear. Our finding is consistent with results from the FEP-studies that do find a gender difference in relation to suicide attempts (Bertelsen et al., 2007; Cotton et al., 2009; Nordentoft et al., 2002). Attempting suicide was also associated with younger age at psychosis onset, both before study entry and explicitly during untreated psychosis. This is in line with a recent study (Joa et al., 2009) reporting an association between early onset of psychosis and higher rates of lifetime suicidality, and indicates a need to pay particular attention to FEP-patients with illness onset at an early age. In both time intervals we also found that attempted suicide was associated with more depressive episodes. This result was expected, as depression is a well-known risk factor for suicidal behaviour (Hawton et al., 2005; Nordentoft et al., 2002).

While attempting suicide before study entry was associated with a history of alcohol disorder, attempt during untreated psychosis was associated with use of drugs the last six months prior to study entry. These findings are consistent with several other studies finding substance abuse to increase the suicide risk (Hawton et al., 2005; Robinson et al., 2010; Verdoux et al., 1999). However, it is noteworthy that while cannabis and other drugs have received much attention in psychosis research (Gregg et al., 2007), we find that alcohol disorder may also be associated with serious negative outcomes.

Table 3
Clinical and demographical characteristics in patients with no suicidality, suicidal ideation, or suicide attempts during the period of untreated psychosis ($n=170$).

	During the period of untreated psychosis					
	Group 1 Non-suicidal ($N=93$)	Group 2 Suicidal ideation ($N=53$)	Group 3 Suicide attempts ($N=24$)	Test statistics[a]	p	Post hoc[b]
Age (years), mean (SD)	28.3 (8.3)	27.0 (8.9)	23.7 (6.0)	$F=3.0$	.052	
Gender, n (%)						
Male	63 (68)	38 (72)	12 (50)			
Female	30 (32)	15 (28)	12 (50)	$\chi^2=3.6$	.162	
Diagnosis, n (%)						
Schizophrenia spectrum	52 (56)	33 (62)	13 (54)			
Affective psychoses	13 (14)	6 (11)	3 (13)			
Other psychoses	28 (30)	14 (27)	8 (33)	$\chi^2=0.8$	.940	
Course of illness						
Age at psychosis onset (years), mean (SD)	25.9 (7.4)	23.9 (8.6)	16.9 (4.8)	$F=13.8$	<.001	1,2>3
DUP (weeks), median (min–max)	20 (0–1040)	53 (0–1040)	225 (3–1040)	$\chi^2=22.0$[c]	<.001	1<2<3
Age at first depression[d] (years), mean (SD)	21.6 (6.6)	20.8 (8.6)	18.4 (5.9)	$F=1.4$	.262	
Depressive episodes, median (min–max)	0 (0–8)	1 (0–10)	1.5 (0–10)	$\chi^2=15.0$[c]	.001	1<3
PANSS, mean (SD)						
Positive scale	14.7 (5.2)	16.9 (4.7)	16.0 (4.3)	$F=3.3$	.038	1<2
Negative scale	15.5 (6.7)	15.3 (6.3)	15.6 (6.0)	$F=0.0$	.983	
Lack of insight (item G12)	2.9 (1.4)	2.7 (1.4)	2.6 (1.5)	$F=0.6$	.578	
CDSS, mean (SD)						
Current depression (CDSS total)	4.9 (4.2)	7.8 (4.2)	10.0 (5.7)	$F=16.3$	<.001	1<2,3
Current suicidality (CDSS item 8)	0.2 (0.5)	0.7 (0.7)	0.8 (0.8)	$F=15.4$	<.001	1<2,3
PAS, median (min–max)						
Social functioning childhood[e]	0.5 (0–6.0)	0 (0–6.0)	1.0 (0–6.0)	$\chi^2=2.1$[c]	.353	
Social functioning change[f]	0 (−6.0–5.0)	0.8 (−2.5–4.0)	0.5 (−3.5–3.5)	$\chi^2=5.8$[c]	.055	
Academic functioning childhood[f]	1.0 (0–5.5)	1.5 (0–5.5)	2.0 (0–5.0)	$\chi^2=6.1$[c]	.048	n.s
Academic functioning change[g]	1.5 (−3.5–5.0)	1.5 (−4.0–5.0)	2.0 (−4.5–6.0)	$\chi^2=1.8$[c]	.415	
Lifetime alcohol disorder, n (%)						
None	77 (83)	45 (85)	13 (54)			
Alcohol disorder	16 (17)	8 (15)	11 (46)	$\chi^2=11.0$	.004	1,2≠3
Lifetime drug disorder, n (%)						
None	65 (70)	39 (74)	9 (37)			
Drug disorder	28 (30)	14 (26)	15 (63)	$\chi^2=10.7$	.005	1,2≠3
Substance use last 6 months prior to study entry						
Alcohol units[g, h] median (min–max)	17.5 (0–624)	18 (0–1274)	90 (0–2016)	$\chi^2=9.7$[c]	.008	1,2<3
Drugs (times used), median (min–max)	20 (0–276)	0 (0–182)	2.5 (0–2288)	$\chi^2=13.3$[c]	.001	1,2<3

DUP = duration of untreated psychosis; PANSS = Positive and Negative Syndrome Scale, CDSS = Calgary Depression Scale for Schizophrenia; PAS = Premorbid Adjustment Scale; n.s. = not significant.
[a] χ^2 = Pearson's chi square, F = One-way ANOVA.
[b] Scheffe's test, Mann–Whitney U test.
[c] χ^2 = Kruskal–Wallis test.
[d] $n=96$.
[e] $n=169$.
[f] $n=168$.
[g] $n=167$.
[h] One alcohol unit = 12.5 g alcohol.

The most important difference between suicide attempts prior to study entry and during the period of untreated psychosis was that only suicide attempts made specifically during untreated psychosis were associated with prolonged DUP. In line with Clarke et al. (2006) we found that the DUP became significantly longer with each level of increasingly

Table 4
Logistic regression with suicide attempts during the period of untreated psychosis as dependent variable ($n=167$).

	B	S.E.	p	Exp(B)	95% CI
Depressive episodes	0.308	0.134	0.022	1.361	1.045–1.771
Age at psychosis onset (years)	−0.226	0.066	0.001	0.798	0.701–0.909
Alcohol units[a] last 6 months prior to study entry	−0.001	0.001	0.400	0.999	0.997–1.001
Drugs last 6 months prior to study entry (yes/no)	2.233	0.703	0.002	9.325	2.349–37.018
logDUP	0.423	0.188	0.024	1.527	1.057–2.205

DUP = duration of untreated psychosis.
Model Chi Square = 54.816, $df=5$, $p<.001$. The model as a whole explained between 28.0% (Cox and Snell R^2) and 49.9% (Nagelkerke R^2) of the variance and correctly indentified 91.0% of the cases.
[a] One alcohol unit = 12.5 g alcohol.

severe suicidality, with a median DUP of more than four years for patients who attempted suicide during untreated psychosis.

Studies on the relationship between DUP and suicide attempts have yielded apparently inconsistent results. Some studies have found an association between longer DUP and suicide attempts (Altamura et al., 2003; Clarke et al., 2006; Harvey et al., 2008), while other studies have not (Bakst et al., 2009; Foley et al., 2008; Nordentoft et al., 2002). A recent study even found that shorter DUP was correlated with suicide attempts (Preti et al., 2009), but this finding could be explained by the exclusion of patients with substance dependency, a group with increased risk for suicide attempts (Verdoux et al., 1999) and prolonged DUP (Cougnard et al., 2004). Our finding of a relationship between prolonged DUP and higher risk for suicide attempts are in line with the only two studies that measured predictors of suicide attempts specifically during untreated psychosis (Clarke et al., 2006; Harvey et al., 2008). The studies that did not find a relationship between DUP and suicide attempts measured attempts in phases extending beyond the period of untreated psychosis, and our finding of a non-relationship between DUP and attempted suicide prior to study entry is thus consistent with their findings. In sum, our findings indicate that the length of untreated psychosis has relevance for the suicide risk specifically during the period of untreated psychosis.

A possible explanation for the relationship between prolonged DUP and suicide attempts during untreated psychosis is that the DUP is a proxy factor for another variable associated both with the DUP and suicidal acts. For instance, Clarke et al. (2006) suggest that patients with long DUPs may have more malignant forms of illness likely to be associated with suicidality. If so, it is likely that DUP would be associated not only with suicide attempts during untreated psychosis, but also with suicide attempts prior to study entry. This was not the case in the present study. Other explanations for the association between DUP and suicide attempts during untreated psychosis could be longer opportunity time per se, or alternatively longer exposure to psychosis (Clarke et al., 2006). Experiencing psychotic symptoms is traumatic and distressing (Birchwood, 2003) and a majority of patients develop depression concurrent with acute psychosis (Birchwood et al., 2000). Furthermore, a majority of patients experience loss of hope and aspirations, disruption, and social isolation as a consequence of onset of FEP (Tarrier et al., 2007). In line with this, patients with FEP have diminished quality of life already at treatment start, and diminished quality of life was associated with prolonged DUP (Browne et al., 2000). It is possible that experiencing psychotic- and related symptoms over longer periods of time, before treatment commences, increases the risk for attempting suicide. Finally, FEP-patients with poor premorbid functioning and at-risk behaviour (e.g. substance use) are more likely to have delayed treatment start and hence long DUP (Cougnard et al., 2004). It is possible that the patients with prolonged DUP in our study had levels of functioning or behaviours that delayed them from coming to treatment, unless they finally attempted suicide. Our study cannot conclude on this matter, as we did not register specifically whether suicidality was part of the reason for coming to treatment.

The main limitation of this study is that suicidal behaviour was measured retrospectively, and data on the timing of suicidal behaviour could have been affected by memory bias. However, the main analyses involved suicide attempts, and information on suicide attempts was cross-checked in multiple sources. The strength of the study is that it included a catchment area-based sample of both in- and outpatients, increasing the likelihood of a representative FEP sample.

In conclusion, the association between prolonged DUP and increased risk for attempting suicide during untreated psychosis is of importance as it indicates that early intervention, with the intent to reduce DUP, could have a specific effect on preventing suicidal behaviour. In line with this, Melle et al (2006) found that FEP patients from an area with an early detection programme, involving coming to treatment at an earlier phase of the disorder and with lower symptom levels, reported less severe suicidality than patients from areas without the detection programme. Also, other predictors of suicide attempts, i.e. depression, may benefit from treatment, and hence early intervention may serve to reduce suicidal behaviour in different ways.

Role of funding source

Funding for this study was provided by the South-Eastern Norway Regional Health Authority and Oslo University Hospital. The funding sources had no involvement in study design, in collection, analysis and interpretation of data, the writing of the manuscript, or the decision to submit the paper for publication.

Contributors

EAB, KS, IA, RF, OAA, and IM contributed to the study design. EAB, AF, RN, NES, and EM contributed to data collection. EAB conducted the statistical analyses. EAB and IM interpreted the data and drafted the manuscript. All authors participated in critical revision of manuscript drafts and approved the final version.

Conflict of interest

OAA has received speaker's honorarium from AstraZeneca, GSK, Janssen and BMS.

The other authors declare no conflicts of interest.

Acknowledgements

The authors thank the patients for participating in the study. We also thank the Psychiatric emergency ward at Oslo University Hospital (Aker) for making convenient and necessary arrangements for the work on this article, and the TOP study group members for contributing with data collection.

References

Addington, D., Addington, J., Schissel, B., 1990. A depression rating scale for schizophrenics. Schizophr Res. 3, 247–251.

Addington, J., Williams, J., Young, J., Addington, D., 2004. Suicidal behaviour in early psychosis. Acta Psychiatry Scand. 109, 116–120.

Altamura, A.C., Bassetti, R., Bignotti, S., Pioli, R., Mundo, E., 2003. Clinical variables related to suicide attempts in schizophrenic patients: a retrospective study. Schizophr Res. 60, 47–55.

American Psychiatric Association, 1994. Diagnostic and statistical Manual of Mental Disorders, Fourth Edition. American Psychiatric Association, Washington, D.C.

Bakst, S., Rabinowitz, J., Bromet, E.J., 2009. Antecedents and patterns of suicide behavior in first-admission psychosis. Schizophr Bull. doi:10.1093/schbul/spbp001.

Bertelsen, M., Jeppesen, P., Petersen, L., Thorup, A., Ohlenschlaeger, J., Le, Q.P., Christensen, T.O., Krarup, G., Jorgensen, P., Nordentoft, M., 2007. Suicidal behaviour and mortality in first-episode psychosis: the OPUS trial. Br. J. Psychiatry Suppl. 51, s140–s146.

Birchwood, M., 2003. Pathways to emotional dysfunction in first-episode psychosis. Br. J. Psychiatry 182, 373–375.

Birchwood, M., Iqbal, Z., Chadwick, P., Trower, P., 2000. Cognitive approach to depression and suicidal thinking in psychosis. 1. Ontogeny of post-psychotic depression. Br. J. Psychiatry 177, 516–521.
Bolton, C., Gooding, P., Kapur, N., Barrowclough, C., Tarrier, N., 2007. Developing psychological perspectives of suicidal behaviour and risk in people with a diagnosis of schizophrenia: we know they kill themselves but do we understand why? Clin Psychol. Rev. 27, 511–536.
Browne, S., Clarke, M., Gervin, M., Waddington, J.L., Larkin, C., O'Callaghan, E., 2000. Determinants of quality of life at first presentation with schizophrenia. Br. J. Psychiatry 176, 173–176.
Cannon-Spoor, H.E., Potkin, S.G., Wyatt, R.J., 1982. Measurement of premorbid adjustment in chronic schizophrenia. Schizophr. Bull. 8, 470–484.
Clarke, M., Whitty, P., Browne, S., Mc, T.O., Kinsella, A., Waddington, J.L., Larkin, C., O'Callaghan, E., 2006. Suicidality in first episode psychosis. Schizophr. Res. 86, 221–225.
Cotton, S.M., Lambert, M., Schimmelmann, B.G., Foley, D.L., Morley, K.I., McGorry, P.D., Conus, P., 2009. Gender differences in premorbid, entry, treatment, and outcome characteristics in a treated epidemiological sample of 661 patients with first episode psychosis. Schizophr Res. 114, 17–24.
Cougnard, A., Kalmi, E., Desage, A., Misdrahi, D., Abalan, F., Brun-Rousseau, H., Salmi, L.R., Verdoux, H., 2004. Pathways to care of first-admitted subjects with psychosis in South-Western France. Psychol Med. 34, 267–276.
Faerden, A., Finset, A., Friis, S., Agartz, I., Barrett, E.A., Nesvag, R., Andreassen, O.A., Marder, S.R., Melle, I., 2010. Apathy in first episode psychosis patients: one year follow up. Schizophr Res. 116, 20–26.
First, M., Spitzer, R., Gibbon, M., Williams, J.B.W., 1995. Structured Clinical Interview for DSM-IV Axis I Disorders: Patient Edition (SCID-P), Version 2 New York State Psychiatric Institute. Biometrics Research, New York, NY.
Foley, S., Jackson, D., McWilliams, S., Renwick, L., Sutton, M., Turner, N., Kinsella, A., O'Callaghan, E., 2008. Suicidality prior to presentation in first-episode psychosis. Early Intervention Psychiatr. 2, 242–246.
Gregg, L., Barrowclough, C., Haddock, G., 2007. Reasons for increased substance use in psychosis. Clin Psychol. Rev. 27, 494–510.
Haahr, U., Friis, S., Larsen, T.K., Melle, I., Johannessen, J.O., Opjordsmoen, S., Simonsen, E., Rund, B.R., Vaglum, P., McGlashan, T., 2008. First-episode psychosis: diagnostic stability over one and two years. Psychopathology 41, 322–329.
Harkavy-Friedman, J.M., Nelson, E., 1997. Management of the suicidal patient with schizophrenia. Psychiatr. Clin North Am. 20, 625–640.
Harvey, S.B., Dean, K., Morgan, C., Walsh, E., Demjaha, A., Dazzan, P., Morgan, K., Lloyd, T., Fearon, P., Jones, P.B., Murray, R.M., 2008. Self-harm in first-episode psychosis. Br. J. Psychiatry 192, 178–184.
Hawton, K., Sutton, L., Haw, C., Sinclair, J., Deeks, J.J., 2005. Schizophrenia and suicide: systematic review of risk factors. Br. J. Psychiatry 187, 9–20.
Joa, I., Johannessen, J.O., Langeveld, J., Friis, S., Melle, I., Opjordsmoen, S., Simonsen, E., Vaglum, P., McGlashan, T., Larsen, T.K., 2009. Baseline profiles of adolescent vs. adult-onset first-episode psychosis in an early detection program. Acta Psychiatr. Scand. 116, 494–500.
Kay, S.R., Fiszbein, A., Opler, L.A., 1987. The positive and negative syndrome scale (PANSS) for schizophrenia. Schizophr. Bull. 13, 261–276.
Larsen, T.K., Melle, I., Auestad, B., Friis, S., Haahr, U., Johannessen, J.O., Opjordsmoen, S., Rund, B.R., Simonsen, E., Vaglum, P., McGlashan, T.H., 2006. Substance abuse in first-episode non-affective psychosis. Schizophr. Res. 88, 55–62.
McGlashan, T.H., 1999. Duration of untreated psychosis in first-episode schizophrenia: marker or determinant of course? Biol Psychiatry. 46, 899–907.
Melle, I., Johannesen, J.O., Friis, S., Haahr, U., Joa, I., Larsen, T.K., Opjordsmoen, S., Rund, B.R., Simonsen, E., Vaglum, P., McGlashan, T., 2006. Early detection of the first episode of schizophrenia and suicidal behavior. Am. J. Psychiatry 163, 800–804.
Melle, I., Larsen, T.K., Haahr, U., Friis, S., Johannessen, J.O., Opjordsmoen, S., Simonsen, E., Rund, B.R., Vaglum, P., McGlashan, T., 2004. Reducing the duration of untreated first-episode psychosis: effects on clinical presentation. Arch. Gen. Psychiatry. 61, 143–150.
Nielssen, O.B., Large, M.M., 2009. Untreated psychotic illness in survivors of violent suicide attempts. Early Intervention Psychiatr. 3, 116–122.
Nordentoft, M., Jeppesen, P., Abel, M., Kassow, P., Petersen, L., Thorup, A., Krarup, G., Hemmingsen, R., Jorgensen, P., 2002. OPUS study: suicidal behaviour, suicidal ideation and hopelessness among patients with first-episode psychosis. One-year follow-up of a randomised controlled trial. Br. J. Psychiatry Suppl. 43, s98–s106.
Palmer, B.A., Pankratz, V.S., Bostwick, J.M., 2005. The lifetime risk of suicide in schizophrenia: a reexamination. Arch. Gen. Psychiatry 62, 247–253.
Preti, A., Meneghelli, A., Pisano, A., Cocchi, A., 2009. Risk of suicide and suicidal ideation in psychosis: results from an Italian multi-modal pilot program on early intervention in psychosis. Schizophr. Res. 113, 145–150.
Radomsky, E.D., Haas, G.L., Mann, J.J., Sweeney, J.A., 1999. Suicidal behavior in patients with schizophrenia and other psychotic disorders. Am. J. Psychiatry 156, 1590–1595.
Robinson, J., Cotton, S., Conus, P., Schimmelmann, B.G., McGorry, P., Lambert, M., 2009. Prevalence and predictors of suicide attempt in an incidence cohort of 661 young people with first-episode psychosis. Aust. N Z J. Psychiatry 43, 149–157.
Robinson, J., Harris, M.G., Harrigan, S.M., Henry, L.P., Farrelly, S., Prosser, A., Schwartz, O., Jackson, H., McGorry, P.D., 2010. Suicide attempt in first-episode psychosis: a 7.4 year follow-up study. Schizophr. Res. 116, 1–8.
Romm, K.L., Rossberg, J.I., Berg, A.O., Barrett, E.A., Faerden, A., Agartz, I., Andreassen, O.A., Melle, I., 2010. Depression and depressive symptoms in first episode psychosis. J. Nerv Ment. Dis. 198, 67–71.
Tarrier, N., Khan, S., Cater, J., Picken, A., 2007. The subjective consequences of suffering a first episode psychosis: trauma and suicide behaviour. Soc. Psychiatry Psychiatr Epidemiol. 42, 29–35.
Tondo, L., Lepri, B., Baldessarini, R.J., 2007. Suicidal risks among 2826 Sardinian major affective disorder patients. Acta Psychiatr. Scand. 116, 419–428.
Verdoux, H., Liraud, F., Gonzales, B., Assens, F., Abalan, F., van, O.J., 1999. Suicidality and substance misuse in first-admitted subjects with psychotic disorder. Acta Psychiatr. Scand. 100, 389–395.
Verdoux, H., Liraud, F., Gonzales, B., Assens, F., Abalan, F., van, O.J., 2001. Predictors and outcome characteristics associated with suicidal behaviour in early psychosis: a two-year follow-up of first-admitted subjects. Acta Psychiatr. Scand. 103, 347–354.