

Short communication

Suicide attempts in schizophrenia and affective disorders with relation to some specific demographical and clinical characteristics

Daniel J. Müller^{a,b,c,*}, Katrin Barkow^b, Svetlana Kovalenko^{b,d}, Stephanie Ohlraun^{b,e},
Heiner Fangerau^{b,f}, Heike Kölsch^b, Matthias R. Lemke^g, Tilo Held^{g,h}, Markus M. Nöthen^{i,j},
Wofgang Maier^b, Reinhard Heun^b, Marcella Rietschel^{b,e}

^a Centre for Addiction and Mental Health, Neurogenetics Section, University of Toronto, 250 College Street, M5T 1R8 Toronto, ON, Canada

^b Department of Psychiatry, University of Bonn, Sigmund-Freud-Str. 25, 53105 Bonn, Germany

^c Clinic for Psychiatry and Psychotherapy, Charité Medecine Berlin, Campus Charité Mitte, Schumannstr. 20/21, 10117 Berlin, Germany

^d Clinic for Psychiatry and Psychotherapy, University Clinic Carl Gustav Carus, Technical University of Dresden, Fetscherstrasse 74, 01307 Dresden

^e Central Institute of Mental Health, J5, 68159 Mannheim, Germany

^f Institute for the History of Medicine, Heinrich-Heine-University Düsseldorf, Universitätsstrasse 1, 40225 Düsseldorf, Germany

^g Mental State Hospital Rheinische Kliniken Bonn, Kaiser-Karl-Ring 5, 53111 Bonn, Germany

^h Fliedner Clinic Berlin, Charlottenstraße 65, 10117 Berlin-Mitte, Germany

ⁱ Life & Brain Center, University of Bonn, Sigmund-Freud-Str. 25, 53105 Bonn, Germany

^j Institute of Human Genetics, University of Bonn, Wilhelmstr. 31, 53111 Bonn, Germany

Received 12 November 2003; accepted 12 May 2004

Available online 25 September 2004

Abstract

Demographical and clinical characteristics have been reported to modulate the risk for suicide. This study analysed demographical and clinical characteristics with respect to lifetime suicide attempts in 500 individuals affected with schizophrenic or affective disorders. Suicide attempts were associated with poor premorbid social adjustment, low age at onset, low scores on the “Global Assessment Scale” and childlessness in females.

© 2004 Elsevier SAS. All rights reserved.

Keywords: Suicide; Attempts; Risk factors; Schizophrenia; Affective disorders; Gender differences

1. Introduction

The aetiology of suicide is complex and may clinically be classified as continuum that ranges from suicidal ideation and suicide plans towards (non-violent or violent) attempted and completed suicide (for review see [12]). Overall, suicide has a strong association with mental disorders [7], particularly with schizophrenia and affective disorders [22,26]. However, despite considerable efforts in research and progresses in drug treatment over the last decades, suicide rates have not dropped significantly in patients with schizophrenia or affective disorders [15,21]. Patients suffering from such diagnoses seem to be at increased risk for suicide

in the presence of an early-disturbed psychosocial adjustment [17] and distinct demographic characteristics (e.g. male gender, [6–14]), while one of the most potent risk factor for inpatients is given by a history of previous suicide attempts [25,20]. Protective factors include being young, non-white, female and pregnancy or motherhood [12,1,9], despite the risk of postpartum depression and psychosis. Inclusion of demographic factors such as age proved to increase the predictive ability of suicide risk assessment scales (e.g. ‘Suicide Assessment Scale’; SUAS) in suicide attempters [19]. However, demographical and clinical risk factors may differ importantly between genders as evidenced for example by a study from Qin et al. [23], who performed joint and separate analyses with demographical (or socioeconomic) and clinical (or health) characteristics in a population based sample including patients who committed suicide compared to controls. For both genders, a history of hospitalised mental

* Corresponding author. Tel.: +1-416-535-8501x4421; fax: +1-416-979-4666.

E-mail address: daniel_mueller@camh.net (D.J. Müller).

illness was the most marked risk factor. Although the authors concluded that the observed gender differences could not be explained by differential exposure to demographical and clinical risk factors alone, analyses revealed that suicide risk was reduced in females when being a parent of a child less than 2 years old. In males, the relationship between socio-economic factors (e.g. being single, unemployment etc.) and suicide was more pronounced than in females.

In light of these findings, we analysed the association between suicide attempts and specific demographical and clinical characteristics in male and female individuals exclusively affected with schizophrenic (including schizoaffective) or affective disorders. Since all of our included study subjects belonged to a high-risk group for suicide, we were interested which risk factor may particularly be associated with suicide attempts and if specific factors may have a stronger impact on one of both genders.

2. Subjects and methods

2.1. Study population

Patients with a diagnosis of schizophrenia or affective disorder admitted to the psychiatric departments at the University of Bonn or the Mental State Hospital (Rheinische Kliniken Bonn) were routinely asked for participation in our study program as were patients' relatives. Written informed consent was obtained from all participants prior to examination. Thus, we were able to perform face-to-face interviews on 500 individuals personally.

2.2. Clinical assessments and data collection

Lifetime consensus diagnoses according to DSM-IV criteria [3] were given to each individual and carried out by trained psychiatrists on the basis of a multi-dimensional phenotype characterization inventory including a personal structured interview (SADS-L) [5], family history method (FISC) [11], OPCRIT documentation [16] and a systematic review of medical records. Patient relatives were interviewed using the same methods. Out of this sample patients were grouped into those who had (i.e. case) and those who had not attempted suicide (i.e. controls). Lifetime occurrence of suicide attempt was defined as a potential life threatening act intended to result in death.

We analysed demographical variables (age, gender, children status and educational level) and clinical variables with respect to diagnosis, course and severity of the disorder (DSM-IV diagnosis, comorbidity, lowest level of the 'Global Assessment Scale' (GAS) [4], age at onset, premorbid social adjustment, and lack of insight) for association with suicide attempts.

The level of education was divided into two classes according to the common school system in Germany, those with up to 10 years of scholastic education, and those with more.

Comorbidity refers to all other psychiatric diagnoses other than when the main diagnosis was schizophrenia (DSM-IV: 295.XX), affective disorder (major depression or bipolar disorder, DSM-IV: 296.XX). In those patients suffering from both schizophrenia and affective disorders, schizophrenia was considered to be the main diagnosis and affective disorder to be the comorbid disorder. The lowest lifetime score on the GAS was chosen to reflect the highest impairment that was clinically attributable to the main disorder. Age at onset of psychiatric disease was defined as the age when the criteria of the main psychiatric disorder were fulfilled for the first time. The variables 'poor premorbid social adjustment' and 'lack of insight' were based on the criteria applied in the OPCRIT checklist.

2.3. Statistical analysis

Each variable was tested for association with suicide attempt(s) using univariate analyses (χ^2 -tests for categorical and *t*-tests for continuous variables) and by calculating odds ratios. Subsequently, a logistic regression analysis was performed which included all variables, i.e., no successive inclusion or exclusion procedure took place. An inclusive analysis was chosen in order to evaluate the combined effects of all variables. Finally, this analysis was separately performed for both genders. For all analyses the significance level was set at 2-sided $P < 0.05$. Data were analysed using the 'Statistical Package for the Social Sciences' (SPSS).

3. Results

The sample comprised 500 individuals (277 females and 223 males), 170 with schizophrenia, 315 with affective disorder (109 with bipolar disorder, 206 with depressive disorders) while 15 had depressive or psychotic symptoms in the context of other psychiatric disorders without reaching thresholds for full-blown episodes of major depression or schizophrenia. Out of this sample, 147 individuals had a lifetime history of attempted suicide (i.e. cases) and 353 individuals had not (i.e. controls). Results of our analyses are shown in [Table 1](#). Comorbidity, lower age at interview and poor social premorbid adjustment were significantly associated with suicide attempts in univariate analyses ($P < 0.05$). However, we did not perform correction for multiple testing. The strongest associations were found for the lowest lifetime GAS scores and for age at onset of the main psychiatric diagnosis that were significantly higher in controls than in suicide attempters ($P < 0.001$). In a next step, variables were adjusted for each other performing logistic regression analysis. Odds ratios for the variables 'comorbidity', 'lowest level of GAS', 'age at onset of the main psychiatric diagnosis', and 'poor premorbid social adjustment' remained significant, while odds ratio for 'age at interview' became insignificant.

Finally, logistic regression analysis was performed separately for both genders. Males and females were found to be

Table 1

Risk factors for suicide attempts—results of univariate analyses and logistic regression analyses including all variables (for the whole sample and separated for males and females)

Variable	Category	Distributions (%) or means (SD)		χ^2 (df, <i>P</i>) or <i>t</i> (df, <i>P</i>)	OR (95% CI)	OR adjusted for all variables ^b	OR (95% CI) adjusted by all variables	
		Cases ^a (<i>n</i> = 147)	Controls ^a (<i>n</i> = 353)				Males ^c	Females ^d
DSM-IV-category	Schizophrenia/ schizoaffective disorder	36.7%	32.9%	$\chi^2 = 0.895$ (df = 2, <i>P</i> = 0.639)	0.931 (0.303–2.856)	0.234 (0.053–1.033)	0.043 **	1.471 (0.124–17.381)
	Affective disorder	59.9%	64.3%		0.775 (0.258–2.332)	0.497 (0.124–1.990)	0.173 (0.024–1.221)	1.960 (0.186–20.623)
	Other disorders ^e	3.4%	2.8%		1.00	1.00	1.00	1.00
Comorbidity	Yes	45.8%	33.6%	$\chi^2 = 6.503$ (df = 1, <i>P</i> = 0.011)	1.671 (1.124–2.483) *	1.662 (1.008–2.739) *	1.583 (0.713–3.513)	1.748 (0.892–3.427)
Age at interview		38.99 ^f (12.78)	41.84 ^f (13.98)	<i>t</i> = 2.128 (df = 498, <i>P</i> = 0.034) ^g	0.985 (0.970–0.999) * ^h	1.016 (0.990–1.043) ^h	1.025 (0.982–1.070) ^h	1.019 (0.984–1.056) ^h
Sex	Female	61.2%	53.0%	$\chi^2 = 2.859$ (df = 1, <i>P</i> = 0.091)	1.402 (0.947–2.075)	1.445 (0.871–2.397)		
Having children	No	48.6%	50.7%	$\chi^2 = 0.182$ (df = 1, <i>P</i> = 0.670)	0.919 (0.623–1.356)	1.841 (0.990–3.421)	0.933 (0.305–2.849)	2.499 (1.078–5.791) *
Educational level	Low	32.4%	38.3%	$\chi^2 = 1.505$ (df = 1, <i>P</i> = 0.220)	0.774 (0.514–1.166)	0.852 (0.502–1.443)	0.938 (0.417–2.109)	0.815 (0.381–1.743)
Lowest level of Global Assessment Scale (GAS)		28.654 ^f (12.080)	35.334 ^f (12.009)	<i>t</i> = 5.266 (df = 433, <i>P</i> < 0.000) ^g	0.953 (0.935–0.971) ** ^h	0.951 (0.928–0.974) ** ^h	0.959 (0.927–0.993) ** ^h	0.936 (0.902–0.973) ** ^h
Age at onset of psychiatric disorder		26.79 ^f (10.19)	32.97 ^f (12.33)	<i>t</i> = 5.329 (df = 495, <i>P</i> < 0.000) ^g	0.952 (0.933–0.970) ** ^h	0.940 (0.911–0.969) ** ^h	0.955 (0.909–1.004) ^h	0.930 (0.893–0.970) ** ^h
Poor premorbid social adjustment	Yes	25.2%	15.3%	$\chi^2 = 6.412$ (df = 1, <i>P</i> = 0.011)	1.857 (1.145–3.013) *	2.107 (1.086–4.089) *	2.065 (0.802–5.317)	2.755 (0.998–7.606)
Lack of insight	Yes	14.7%	12.9%	$\chi^2 = 0.288$ (df = 1, <i>P</i> = 0.592)	1.166 (0.665–2.043)	0.806 (0.395–1.644)	1.083 (0.407–2.881)	0.554 (0.175–1.751)

^a Cases (or controls): individuals with (or without) a lifetime history of attempted suicide.^b Results of logistic regression analysis including all variables.^c Results of logistic regression analysis including all variables for males.^d Results of logistic regression analysis including all variables for females.^e Reference category.^f Mean (standard deviation).^g *t* (df, *P*), * *P* < 0.05 (Wald's χ^2), ** *P* < 0.01 (Wald's χ^2).^h OR refers to the increased risk when the continuous variable increases by one unit.

concordant in that lower GAS scores were associated with higher rates of suicide attempts although the odds ratios suggest small effects. Males with schizophrenic disorders were less likely to attempt suicide than males with affective or other disorders. In females, lower age at onset was significantly related to suicide attempts. Additionally, females were more likely to attempt suicide if they were childless.

4. Discussion and conclusion

Preventing suicide remains a difficult task in clinical practice. The main purpose of this study was to analyse demographical and clinical characteristics and their relation to suicide attempts in a large German sample of individuals affected with schizophrenia and/or affective disorders. Since risk (or protective) factors are known to differ between males and females, we performed additional gender specific analyses. The selection of health and socioeconomic indicators and statistical methods were mainly based on a previous study that included gender specific analyses (Qin et al. [23]), although we did include some other characteristics in addition (e.g., lack of insight). The major difference, however, is given by the fact that Qin et al. [23] performed their analyses in suicide completers using Danish longitudinal register databases while our study comprised suicide attempters and was mainly based on an inpatient sample.

In the total sample, individuals with a history of suicide attempts were more often affected by more than one psychiatric disorder (i.e. comorbidity), low scores on the Global Assessment Scale (GAS), low age at onset, and poor premorbid social adjustment. Overall, these characteristics are indicative for more severe and chronic forms of psychiatric disorders and these results are consistent with previous findings [12,17,6,20,10]. Analyses stratified by gender revealed that males affected with schizophrenia were less likely to attempt suicide when compared to males with diagnoses other than schizophrenia. However, we cannot exclude that this finding might be due to an ascertainment bias in our sample. Schizophrenic males have been reported to be at particular risk for completed suicide [8] and this particular group may be under represented in our sample of suicide attempters. In females, lower age at onset was a risk factor not seen in males, however, the strongest factor associated with suicide attempt(s) in females was childlessness. Despite methodological differences between both studies, our finding is consistent with that of Qin et al. [23] who reported that having a child less than 2 years is a protective factor against suicide in females.

One important limitation of our study is that the assessment of variables was conducted for lifetime occurrence and that a direct or causal relationship between suicide attempt and some specific variables (e.g., having children, lack of insight) may not have been present in all cases. Moreover, as GAS scores include suicidality, patients with a history of attempted suicide will be given lower GAS scores and thus

our significant association between lower GAS scores and suicide attempts may not allow concluding that lower GAS scores are risk factors for suicide attempts.

In conclusion, we here report that in our sample suicide attempts were associated with poor premorbid social adjustment, low age at onset, low GAS scores and childlessness in females. Odds ratios, albeit reaching statistical significance, were predominantly small in our study. In other words, the effect sizes (or the predictive value) of clinical demographical characteristics per se are likely to be of little relevance in clinical practice. This is in accordance with previous findings [2], however, demographical and clinical risk factors should not be ignored but need to be applied in addition and in context with standard clinical procedures [18]. Only then may the consideration of characteristics associated with suicide be beneficial and help reducing the excess mortality in the mentally ill. However, future studies are needed that are designed to focus on demographical and clinical characteristics in suicide attempters and completers.

Acknowledgments

DJM is the recipient of a postdoctoral fellowship award supported by the Canadian Institutes of Health Research (CIHR). Thanks to Matthew Lanktree for assistance in preparation of this manuscript.

References

- [1] Appleby L. Suicide during pregnancy and in the first postnatal year. *Bmj* 1991;302(6769): 137–40.
- [2] Busch KA, Fawcett J, Jacobs DG. Clinical correlates of inpatient suicide. *J Clin Psychiatry* 2003;64(1):14–9.
- [3] Diagnostic and statistical manual of mental disorders. 4th ed. Washington (DC): American Psychiatric Association APA; 1994.
- [4] Endicott J, Spitzer RL, Fleiss JL, Cohen J. The global assessment scale. A procedure for measuring overall severity of psychiatric disturbance. *Arch Gen Psychiatry* 1976;33(6): 766–71.
- [5] Endicott J, Spitzer RL. A diagnostic interview: the schedule for affective disorders and schizophrenia. *Arch Gen Psychiatry* 1978; 35(7): 837–44.
- [6] Goh SE, Salmons PH, Whittington RM. Hospital suicides: are there preventable factors? Profile of the psychiatric hospital suicide. *Br J Psychiatry* 1989;154:247–9.
- [7] Harris EC, Barraclough B. Suicide as an outcome for mental disorders. A meta-analysis. *Br J Psychiatry* 1997;170:205–28.
- [8] De Hert M, McKenzie K, Peuskens J. Risk factors for suicide in young people suffering from schizophrenia: a long-term follow-up study. *Schizophr Res* 2001;47(2–3):127–34.
- [9] Hoyer G, Lund E. Suicide among women related to number of children in marriage. *Arch Gen Psychiatry* 1993;50(2):134–7.
- [10] Kessler RC, Borges G, Walters EE. Prevalence of and risk factors for lifetime suicide attempts in the National Comorbidity Survey. *Arch Gen Psychiatry* 1999;56(7): 617–26.
- [11] Mannuzza S, Fyer AJ, Endicott J, Klein DF. Family Informant Schedule and Criteria (FISC). New York: Anxiety Disorder Clinic, New York State Psychiatric Institute; 1985.
- [12] Maris RW. Suicide. *Lancet* 2002;360(9329): 319–26.

- [13] Martin BA. The Clarke Institute experience with completed suicide: 1966 to 1997. *Can J Psychiatry* 2000;45(7):630–8.
- [14] Marusic A, Tavcar R, Dernovsek M, Steblaj T. Comparison of psychiatric inpatient suicides with suicides completed in the surrounding community. *Nord J Psychiatry* 2002;56(5): 335–8.
- [15] Meltzer HY, Conley RR, de Leo D, Green AI, Kane JM, Knesevich AM, et al. Intervention strategies for suicidality. *J Clin Psychiatry Audiograph Series* 2003;6(2): 2–18.
- [16] McGuffin P, Farmer A, Harvey I. A polydiagnostic application of operational criteria in studies of psychotic illness. Development and reliability of the OPCRIT system. *Arch Gen Psychiatry* 1991;48(8): 764–70.
- [17] Modestin J, Zarro I, Waldvogel D. A study of suicide in schizophrenic in-patients. *Br J Psychiatry* 1992;160:398–401.
- [18] Morgan HG, Stanton R. Suicide among psychiatric in-patients in a changing clinical scene. Suicidal ideation as a paramount index of short-term risk. *Br J Psychiatry* 1997;171:561–3.
- [19] Nimeus A, Alsen M, Traskman-Bendz L. The suicide assessment scale: an instrument assessing suicide risk of suicide attempters. *Eur Psychiatry* 2000;15(7): 416–23.
- [20] Powell J, Geddes J, Deeks J, Goldacre M, Hawton K. Suicide in psychiatric hospital in-patients. Risk factors and their predictive power. *Br J Psychiatry* 2000;176:266–72.
- [21] van Praag HM. Why has the antidepressant era not shown a significant drop in suicide rates? *Crisis* 2002;23(2): 77–82.
- [22] Proulx F, Lesage AD, Grunberg F. One hundred in-patient suicides. *Br J Psychiatry* 1997;171: 247–50.
- [23] Qin P, Agerbo E, Westergaard-Nielsen N, Eriksson T, Mortensen PB. Gender differences in risk factors for suicide in Denmark. *Br J Psychiatry* 2000;177: 546–50.
- [24] Rossau CD, Mortensen PB. Risk factors for suicide in patients with schizophrenia: nested case-control study. *Br J Psychiatry* 1997;171: 355–9.
- [25] Roy A, Draper R. Suicide among psychiatric hospital in-patients. *Psychol Med* 1995;25(1): 199–202.
- [26] Steblaj A, Tavcar R, Dernovsek MZ. Predictors of suicide in psychiatric hospital. *Acta Psychiatr Scand* 1999;100(5):383–8.