

Differing correlates for suicide attempts among patients with schizophrenia or schizoaffective disorder in India and USA

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Abstract

Background: Suicide is one of the most common causes of death among persons with schizophrenia. Differing risk factors have been identified in published studies. The differences may have arisen because a uniform set of variables was not analyzed. Alternatively, the nature and effect of risk factors may vary in different settings. To test these possibilities, we investigated the same set of variables in two independent cross-national samples ascertained using identical protocols.

Methods: Patients with schizophrenia or schizoaffective disorder (DSM IV criteria) were recruited in India ($n=460$) and the USA ($n=424$).

Results: Consistent with earlier publications, a diagnosis of schizoaffective disorder, history of depression, pattern of symptoms and educational status were significantly associated with suicide attempts in the US sample. None of these variables were significantly associated in the Indian sample.

Conclusions: The impact of known risk factors for suicide attempts among patients with schizophrenia differs across ethnic groups. © 2006 Elsevier B.V. All rights reserved.

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1. Introduction

The lifetime suicide risk for suicide among persons with schizophrenia is estimated at about 9–13%, or 20–50 times higher than that of the general population

(Pinikahana et al., 2003). Suicide is one of the major causes of death among persons with schizophrenia (aggregated standardized mortality ratios of 9.6 for males and 6.8 for females), and accounts on average, for 28% of the excess mortality in this disorder (Mortensen and Juel, 1993). In a recent meta analysis, Palmer et al. (2005) have estimated that 4.9% of patients commit suicide during their lifetimes, usually around the time of onset of the illness. Suicidal risk increases with age (Bille-Brahe, 1993). On the other hand, Birchwood et al.

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(1998) concluded that the twenties age group represents the peak risk period for suicide in schizophrenia as compared to later periods. While most individuals with schizophrenia attempt suicide within the first ten years of illness, the risk of suicide remains elevated throughout the life span. Babidge et al. (2001) reported that men with schizophrenia committed suicide at significantly younger ages (in their twenties) than those without schizophrenia. However, other studies have reported equal rates (Modestin et al., 1992; Harris et al., 1996).

Correlations with psychopathology have also been suggested. Positive as well as negative associations between delusions (including “suspiciousness”) on one hand, and suicidal ideation and behavior on the other, have been reported (Kucharska-Pietura et al., 2000; Fenton et al., 1997). Radomsky et al. (1999) found a high rate of suicidal behavior among persons with psychosis, and observed that the rate of suicide attempts was higher among schizoaffective disorder patients and those affected with depression with psychotic features. Others concluded that increased severity of positive and depressive symptoms appears to increase suicidality, whereas the severity of negative symptoms appears to be inversely correlated with suicidality (Bralet et al., 2000) (Tandon, 2005).

Genetic factors may play an important and specific role in the etiology of suicide, regardless of co-morbid psychiatric illness (Turecki, 2001). Clinical studies of psychiatric patients suggest that the risk of suicide behavior is positively correlated with a family history of suicide attempts; an observation supported by twin and adoption studies (Roy, 1993). For example, the concordance rate for suicide attempts among monozygotic and dizygotic twin pairs was 13% vs. 0.7%, respectively, irrespective of any comorbid psychiatric disorder (Zalsman et al., 2002). Heritable factors accounted for approximately 45% of variance in suicidal thoughts and behavior (Statham et al., 1998). Baldessarini and Hennen (2004) reviewed seven available twin studies (including three reporting on individuals with psychiatric disorders). They found a higher average concordance for suicidal behavior among identical twins compared with fraternal twins or with relatives of other suicidal subjects. Suicide attempts are thus likely to reflect complex interactions between demographic, social and inherited variables (Turecki et al., 2001).

The lack of consistency in these studies likely reflects the multiplicity of relevant variables and the failure to take such factors into account in the course of analyses. Such complexity is also likely to be increased when suicide attempts among individuals with SZ/SZA are

considered. For example, variables specifically related to the illness, such as the presence of ‘positive’ symptoms also appear to be involved, as reviewed above. In the present study, we attempted joint analysis of selected clinical and demographic variables previously noted to be associated with risk for suicide attempts. These analyses were conducted between two independent samples from India and USA, recruited using identical procedures. We reasoned that the simultaneous analyses would enable us to understand correlates of suicidal risk in two very different environmental settings. Risk factors demonstrable in these samples would presumably be robust and likely to be present in other settings.

2. Methods

2.1. Clinical sample

The present work is a part of ongoing investigations into the genetic epidemiology of schizophrenia using identical designs, in Pittsburgh, Pennsylvania and New Delhi, India. Patients with a consensus diagnosis of schizophrenia or schizoaffective disorder (DSM IV) are recruited. Two types of families are recruited: (1) patients having siblings with one of these diagnoses (affected sib pairs, ASP), (2) patients with available parents.

2.1.1. Pittsburgh

Recruitment occurred primarily at Western Psychiatric Institute and Clinic, a University affiliated tertiary care center that also serves as a catchment area hospital for a defined region of Allegheny County, PA. Inpatients and outpatients have also been sought at 35 University hospitals, non-academic community centers, hospitals and state facilities located within a 500-mile radius of Pittsburgh.

2.1.2. New Delhi

The primary recruitment site was Dr. Ram Manohar Lohia Hospital (RMLH), a publicly funded tertiary care center providing inpatient and outpatient care. In addition, all major hospitals and psychiatric facilities in New Delhi were approached regularly for referral of eligible participants.

2.1.3. Assessment

Potentially eligible subjects were informed about the study by their clinicians. If agreeable, they were contacted by project staff. In order to improve the quality of information, participation by one other

relative (usually a parent) was also required. All participants provided written informed consent, as approved by the Institutional Review Boards at Dr R M L Hospital, University of Delhi and the University of Pittsburgh.

Clinical information was obtained primarily using the English or Hindi versions of the Diagnostic Interview for Genetic Studies (DIGS) (Nurnberger et al., 1994; Deshpande et al., 1998). The DIGS is a comprehensive interview schedule, which acquires extensive clinical as well as demographic information. Information about suicide attempts including lethality, age and intent were obtained as part of the DIGS. Medical records were obtained if available. At both sites, consensus diagnoses were established by board certified psychiatrists in conjunction with the research associate who interviewed the patient.

2.1.4. Quality control

Uniform training in administration of the DIGS was provided to all research associates and co-investigators prior to the start of the studies. The training included didactic sessions regarding the structure of the DIGS, types of psychopathology rated in the DIGS, as well as issues related to differential diagnosis in the DSM IV classification system. Mock interviews using actors as well as patients followed. Interviewers were required to attain significant inter-rater reliability before starting interviews with research participants ($\kappa=0.7$ or better for consensus diagnoses, using video taped DIGS interviews, as well as printouts of past DIGS interviews). Ongoing semi-annual refresher training sessions were continued during the study, with annual cross-site visits by the investigators and discussion of difficult diagnostic issues. Intra-site reliability was checked throughout the study using video taped DIGS interviews, as well as printouts of past DIGS interviews (Deshpande et al., 2004). In addition, consensus diagnosis sessions were used to test agreement among attendees. Kappa values of 0.8 or greater were attained routinely. Consistency for rating certain individual items in the DIGS was also checked (e.g., course of illness, pattern of severity).

2.1.5. Measures used for comparisons

The following clinical and demographic variables from the DIGS were analyzed: depression (felt depressed for one week continuously at any time in life; Depression section item #1), auditory hallucinations (Psychosis section, item #1b), visual hallucinations (Psychosis section, item #1a), delusions (Psychosis section, item #1c), pattern of psychotic symptoms

(Psychosis section, item #100), Longitudinal course (Psychosis section, item #101), Pattern of severity (Psychosis section, item #102), diagnosis (schizophrenia and schizoaffective (all categories of schizoaffective disorder were combined in one broad category), age, sex, education and marital status (divorced, separated and widowed were put in one category).

2.1.6. Statistical analysis

Binary logistic regression was carried out for demographic and clinical variables with suicide. Chi square tests were carried out for association of genetic markers with suicide. The Statistical Package for Social Sciences (SPSS, version 11.5 for Windows) was used for all analyses.

3. Results

3.1. Demographic and clinical variables; cross-site comparisons

The distribution of selected demographic and clinical variables in the US and Indian samples is provided in Table 1. The Indian sample included 460 patients (379

Table 1
Distribution of demographic and clinical variables

Variables	Indian cases (n=460)	US cases (n=424)	Chi square
Suicide attempt (yes/no)	107/353	205/219	59.4 ($p<.001$)
Gender (male/female)	255/205	269/154	33.6 ($p<.001$)
Age in years	31.3	38.18	10.2 ($p<.001$) ^a
Marital status (married/separated, divorced or widowed/ unmarried)	135/50/275	31/91/301	79.04 ($p<.001$)
Delusions (yes/no)	425/34	400/12	9.57 ($p<.008$)
Auditory hallucinations (yes/no)	263/189	373/41	133.24 ($p<.001$)
Visual hallucinations (yes/no)	171/281	275/125	104.37 ($p<.001$)
Longitudinal course ^b	135/64/ 216/32/12	114/24/ 199/24/8	13.14 ($p<.01$)
Pattern of severity ^c	45/120/ 168/119/8	29/65/104/ 169/19	42.49 ($p<.001$)

Data were missing for some of the variables.

^a This is t value.

^b Episodic with interepisode residual symptoms/episodic/continuous/single episode in partial remission/single episode in full remission.

^c Episodic shift/mild deterioration/moderate deterioration/severe deterioration/relatively stable.

with schizophrenia and 81 with schizoaffective disorder). The US sample comprised 424 patients (246 patients with schizophrenia and 178 with schizoaffective disorder). There were significantly more patients with schizoaffective disorder in US sample than in Indian sample ($p < 0.01$, Table 1). Other demographic and clinical variables for these two samples are listed in Table 1. Notably, there were significant differences in the ages, gender distribution, marital status, prevalence of delusions or hallucinations, as well as the longitudinal course and severity. A total of 107 Indians (23.3%) and 205 US patients (48.3%) reported ever having attempted suicide. Significantly more patients attempted suicide in US sample than in Indian sample ($p < 0.01$, Table 1).

In the DIGS, the lethality of the most serious attempt is rated from 'no danger' to 'extreme' on a six point scale. The distribution of lethality ratings in the US sample was as follows: no danger (5.7%); minimal (12.5%); mild (19.3%); moderate (35.4%); severe (19.8%); extreme (3.6%); unknown (3.6%). The analogous distribution for the Indian sample was: no danger (35.8%); minimal (12.3%); mild (17.9%); moderate (17.9%); severe (9.4%); extreme (5.7%); unknown (.9%). In the US sample 42% of the cases reported a serious desire to die during their most serious suicide attempt, while in the Indian sample 18% of cases reported similar intent.

3.2. Correlations with suicide attempts: multivariate analyses

Separate regression analyses were conducted among the Indian and US patients who reported a lifetime history of suicide attempt (Table 2). None of the selected demographic variables (sex, age, education and marital

status) or clinical variables (depression, hallucinations, severity of illness, longitudinal course and pattern of symptoms) was significantly correlated with suicide attempts among the Indian patients. Among the US patients, in contrast, diagnosis, depression, pattern of symptoms (positive symptoms) and education were significant predictors for suicide attempts. US subjects who had been depressed continuously for one week at any point in their lifetime were more prone to suicide attempts, as were patients with schizoaffective disorder.

US patients with continuously positive symptoms, as defined in the DIGS were most prone to suicide attempts, in contrast to patients with other patterns of symptoms (see Tables 1 and 2). Patients least at risk for suicide attempts had 'predominantly positive converting to predominantly negative' pattern of symptoms ('predominantly negative' pattern of symptoms were 2.99 times more prone than 'predominantly positive converting to predominantly negative', and 'continuously positive pattern of symptoms' 2.49 times more prone). 'Pattern of symptoms' was not a significant predictor of suicide attempt in Indian sample.

4. Discussion

We set out to evaluate correlations between a selected set of clinical and demographic variables and suicide attempts among patients with schizophrenia/schizoaffective disorder in two samples. These samples were recruited from two different environmental settings. Our goal was to determine whether any correlations/associations were shared in these disparate samples, with the hope of identifying robust predictors of suicide attempts among persons with schizophrenia. No shared predictors were identified, suggesting that the architec-

Table 2
Multivariate analyses, with lifetime history of suicide attempt as the outcome

Variables	India ($n = 107/353$) ^a				USA ($n = 205/219$) ^a			
	<i>N</i>	Significance	Odds ratio	CI	<i>N</i>	Significance	Odds ratio	CI
Ever depressed (yes/no)	120/340	0.91	.78	0.46–1.81	293/115	0.0001	2.65	1.5 9–4.4 0
Pattern of symptoms	197/36/43/2/105	0.75	0.98	0.87–1.11	201/16/37/1/205	0.05	0.88	0.7 8–1.0 0
Diagnosis (schizophrenia/ schizoaffective disorder)	379/81	0.37	1.15	0.84–1.57	246/178	0.0001	2.78	1.80–4.30
Age	31.30±10.34	0.22	0.98	0.96–1.01	38.18±9.36	0.055	1.02	1.000–1.04
Years of schooling	11.39±3.893	0.80	1.01	0.95–1.07	12.63±9.363	0.05	0.92	.851–.99

OR: odds ratio.

CI: 95% confidence interval.

Only significantly correlated variables are shown.

The following variables were not significantly correlated with suicide attempts in either group: marital status, longitudinal history, pattern of severity, auditory hallucinations, visual hallucinations, and delusions.

^a Patients with/without a lifetime history of suicide attempt.

ture for suicide risk is constituted differently in these settings.

As our samples may not be representative of patients in their respective nations, formal cross-site comparisons may not reflect population-wise differences. Nevertheless, some cross-site differences are notable. There were fewer suicide attempts among the Indian patients (India: 23.3%; USA: 48.3%). It is unclear whether the difference reflects under-reporting by the Indian patients. Following interviews with Indian professionals, it has been suggested that Indian society is not very tolerant of suicide, viewing it as an act of cowardice and betrayal of friends and relatives (Toussignant et al., 1998). These negative views may contribute to reduced reported rates of suicide attempts. This factor could also raise the threshold of intensity of suicidal ideation necessary for a suicidal attempt. Individuals who committed suicide successfully could not be included in the sample. It is possible that different numbers of US and Indian individuals were thus excluded from the sample. This could account for some of the cross-site differences.

Differences in social supports may also impact on the different rates in the samples. Most of our Indian patients were living with their families and were taken care of by their relatives, the majority of the US patients were living alone (Deshpande et al., 2004). More Indian patients were married, unlike the US patients (Bhatia et al., 2004). It is possible that familial support and different moral perceptions of suicide reduced the rate of suicide attempts in India. Farooqi (2004) and colleagues compared suicide attempts among Pakistani and American psychiatric patients, all of whom reported a positive history of suicide attempts (Farooqi, 2004). The US patients in their study reported a larger number of social 'precipitants' (family conflicts, work pressure, wish for death, loneliness, financial problems, and drug withdrawal) than did the Pakistani sample. The Pakistani social situation is similar to the background of our Indian patients. Indeed, suicide attempts were punishable by law in both India and Pakistan until recently. Indian people rely heavily on strongly held religious beliefs, prayers, fasting and faith in the divine to provide solace and maintain hope. The basic tenet of Hindu philosophy is to maintain a fatalistic attitude, and consequently many individuals resign themselves to their current situation rather than striving actively to change it, because they believe it is their destiny (Latha et al., 1996).

Variations in rates of reported depressive episodes also point to the different sets of correlations in the US and the Indian samples. Far fewer Indian patients

affirmed "constant feelings of sadness or low mood for most of the time for at least one week" (DIGS Section F question 1), compared with the US patients. Consistent with these rates, schizoaffective disorder was diagnosed less frequently in the Indian sample (India: 17.6%, USA: 42.78%). Nurnberger et al. (1994) have reported that the reliability of the DIGS is excellent for diagnostic categories such as schizophrenia, bipolar disorder and major depressive disorder. It is lower for schizoaffective disorder presumably because it can be difficult to accurately estimate the duration of mood syndromes relative to psychosis as required in the DSM IV classification. To improve the diagnostic reliability for schizoaffective disorder, these workers recommend collection of additional information from reliable informants and medical records, as was attempted here. We also established criteria for diagnosing schizoaffective disorder within our group (significant mood changes lasting for over one third of the duration of the illness). Nevertheless, the diagnostic uncertainty for schizoaffective disorder may have introduced a confounding factor in our analyses. About 22% of the patients with schizophrenia attempted suicide, compared with 28% of schizoaffective patients. There was no statistically significant difference between these diagnoses on suicide attempts in India. Indeed, US schizoaffective patients were 3.21 times more prone to suicide attempts compared to their compatriots diagnosed with schizophrenia. Similar comparisons among Indian patients were not statistically significant. Young white men diagnosed with schizophrenia who are depressed, unmarried, unemployed, socially isolated, and functionally impaired and who lack external support are the most vulnerable to suicide in the early stages of their illness (Pinikahana et al., 2003; Modestin et al., 1992). Other studies also describe depressive symptoms as the strongest predictor of suicidal behavior in schizophrenia (De Hert et al., 2001; Goodwin et al., 2002; Krupinski et al., 2000; Schwartz and Cohen, 2001). Depression and associated feelings of hopelessness have been correlated to suicide attempts in both schizophrenia and affective psychoses. Hopelessness, substance abuse, greater insight into illness, and higher cognitive function are associated with greater risk for suicidal behavior in chronic schizophrenia, with hopelessness being the principal predictor (Kim et al., 2003). A recent review also found that the most common correlates of suicidality in schizophrenia are depressive symptoms and the depressive syndrome, although severe psychotic and panic-like symptoms may contribute as well (Siris, 2001).

Suicide attempts were not related to the lifetime occurrence of hallucinations or delusions in either of the samples, but the longitudinal pattern of psychotic symptoms was an important predictor in the US sample. While Grunebaum et al. (2001) did not find evidence that presence of delusions affects suicidality, Kucharska-Pietura et al. (2000) reported that delusions, hallucinations and subjective awareness of these phenomena increased the risk for suicide attempts. The level of insight is lower among subjects with predominantly negative symptoms compared with subjects with predominantly positive symptoms (Sevy et al., 2004). Our analysis of US patients regarding patterns of symptoms are consistent with these reports.

Some methodological issues need to be kept in mind while interpreting these results. The differences between the US and Indian samples with regard to correlates of suicidal attempts may reflect reduced sensitivity of the DIGS, a Western diagnostic instrument in the Indian setting. This is an important concern. Before using the Hindi version of the DIGS, standard validation exercises were conducted (Deshpande et al., 1998). The senior authors (SND, VLN), who have practiced psychiatry in India as well as in the west, attempted appropriate adjustments to the Hindi version. The research staff who used the diagnostic instruments in the study are bilingual and are sensitive to potential errors due to cultural nuances. It is our impression after conducting hundreds of interviews that the cross-cultural sensitivity issue is less germane in a cosmopolitan city such as New Delhi.

These analyses were based on ratings of specific items in the DIGS. The reliability and validity of abstracting specific items from the DIGS in this manner may be questioned. Most of the variables are standard demographic variables such as age and gender. Others, such as estimates of severity or course of illness, are admittedly more subjective. We have standardized the ratings for such items in the DIGS evaluation within our research group. The variables that are significantly correlated with suicidal attempts in the US sample are generally consistent with other published reports. Nevertheless, replicate studies are needed.

In conclusion, different predictors of suicide attempts were noted in two independent US and Indian samples recruited using identical criteria. The differences may be attributed to differential rates for reported suicide attempts, cultural factors, as well as variations in clinical presentation. Intriguing differences in rates of suicide attempts, as well as prevalence of depressive episodes were also observed.

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References

- Babidge, N.C., Buhrich, N., Butler, T., 2001. Mortality among homeless people with schizophrenia in Sydney, Australia: a 10-year follow-up. *Acta Psychiatr. Scand.* 103 (2), 105–110.
- Baldessarini, R.J., Hennen, J., 2004. Genetics of suicide: an overview. *Harv. Rev. Psychiatry* 12 (1), 1–13.
- Bhatia, T., Franzos, M.A., Wood, J.A., Nimgaonkar, V.L., Deshpande, S.N., 2004. Gender and procreation among patients with schizophrenia. *Schizophr. Res.* 68 (2–3), 387–394.
- Bille-Brahe, U., 1993. The role of sex and age in suicidal behavior. *Acta Psychiatr. Scand. Suppl.* 371, 21–27.
- Birchwood, M., Todd, P., Jackson, C., 1998. Early intervention in psychosis. The critical period hypothesis. *Br. J. Psychiatry Suppl.* 172 (33), 53–59.
- Bralet, M.C., Yon, V., Loas, G., Noisette, C., 2000. Cause of mortality in schizophrenic patients: prospective study of years of a cohort of 150 chronic schizophrenic patients. *Encephale* 26 (6), 32–41.
- De Hert, M., McKenzie, K., Peuskens, J., 2001. Risk factors for suicide in young people suffering from schizophrenia: a long-term follow-up study. *Schizophr. Res.* 47 (2–3), 127–134.
- Deshpande, S.N., Bhatia, T., Wood, J., Brar, J.S., Thelma, B.K., Ganguli, R., Day, R., Deshpande, S.N., Mathur, M.N., Das, S.K., Bhatia, T., Sharma, S., Nimgaonkar, V.L., 1998. A Hindi version of the Diagnostic Interview for Genetic Studies. *Schizophr. Bull.* 24 (3), 489–493.
- Deshpande, S.N., Bhatia, T., Wood, J., Brar, J.S., Thelma, B.K., Ganguli, R., Day, R., Gottesman, I.I., Nimgaonkar, V.L., 2004. Evaluation of familial influences on the course and severity of schizophrenia among US and Indian cases. *Soc. Psychiatry Psychiatr. Epidemiol.* 39 (5), 369–374.
- Farooqi, Y.N., 2004. Comparative study of suicide potential among Pakistani and American psychiatric patients. *Death Stud.* 28 (1), 19–46.
- Fenton, W.S., McGlashan, T.H., Victor, B.J., Blyler, C.R., 1997. Symptoms, subtype, and suicidality in patients with schizophrenia spectrum disorders. *Am. J. Psychiatry* 154 (2), 199–204.
- Goodwin, R., Lyons, J.S., McNally, R.J., 2002. Panic attacks in schizophrenia. *Schizophr. Res.* 58 (2–3), 213–220.
- Grunebaum, M.F., Oquendo, M.A., Harkavy-Friedman, J.M., Ellis, S. P., Li, S., Haas, G.L., Malone, K.M., Mann, J.J., 2001. Delusions and suicidality. *Am. J. Psychiatry* 158 (5), 742–747.
- Harris, E.C., Barraclough, B.M., Grundy, D.J., Bamford, E.S., Inskip, H.M., 1996. Attempted suicide and completed suicide in traumatic spinal cord injury. Case reports. *Spinal Cord.* 34 (12), 752–753.
- Kim, C., Lesage, A., Seguin, M., Chawky, N., Vanier, C., Lipp, O., Turecki, G., 2003. Patterns of co-morbidity in male suicide completers. *Psychol. Med.* 33 (7), 1299–1309.
- Krupinski, M., Fischer, A., Grohmann, R., Engel, R.R., Hollweg, M., Moller, H.J., 2000. Schizophrenic psychoses and suicide in the clinic risk factors, psychopharmacologic treatment. *Nervenarzt* 71 (11), 906–911.

- Kucharska-Pietura, K., Loza, B., Szymona, K., Makara-Studzinska, M., 2000. Suicidal attempts among young people hospitalized in the Department of Psychiatry of the Medical Academy in Lublin in 1990–1997. *Psychiatr. Pol.* 34 (3), 423–433.
- Latha, K.S., Bhat, S.M., D'Souza, P., 1996. Suicide attempters in a general hospital unit in India: their socio-demographic and clinical profile—emphasis on cross-cultural aspects. *Acta Psychiatr. Scand.* 94 (1), 26–30.
- Modestin, J., Zarro, I., Waldvogel, D., 1992. A study of suicide in schizophrenic inpatients. *Br. J. Psychiatry* 160, 398–401.
- Mortensen, P.B., Juel, K., 1993. Mortality and causes of death in first admitted schizophrenic patients. *Br. J. Psychiatry* 163, 183–189.
- Numberger Jr., J.I., Blehar, M.C., Kaufmann, C.A., York-Cooler, C., Simpson, S.G., Harkavy-Friedman, J., Severe, J.B., Malaspina, D., Reich, T., 1994. Diagnostic interview for genetic studies. Rationale, unique features, and training. NIMH Genetics Initiative. *Arch Gen Psychiatry* 51, 11, 849–859 (discussion 863–4).
- Palmer, B.A., Pankratz, V.S., Bostwick, J.M., 2005. The lifetime risk of suicide in schizophrenia: reexamination. *Arch Gen Psychiatry* 62 (3), 849–859.
- Pinikahana, J., Happell, B., Keks, N.A., 2003. Suicide and schizophrenia: a review of literature for the decade (1990–1999) and implications for mental health nursing. *Issues Ment. Health Nurs.* 24 (1), 27–43.
- 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 (10), 1590–1595.
- Roy, A., 1993. Serotonin, suicide and schizophrenia. *Can. J. Psychiatry* 38 (5), 369.
- Schwartz, R.C., Cohen, B.N., 2001. Psychosocial correlates of suicidal intent among patients with schizophrenia. *Compr. Psychiatry* 42 (2), 118–123.
- Sevy, S., Nathanson, K., Visweswaraiyah, H., Amador, X., 2004. The relationship between insight and symptoms in schizophrenia. *Compr. Psychiatry* 45 (1), 16–19.
- Siris, S.G., 2001. Suicide and schizophrenia. *J. Psychopharmacol.* 15 (2), 127–135.
- Statham, D.J., Heath, A.C., Madden, P.A., Bucholz, K.K., Bierut, L., Dinwiddie, S.H., Slutske, W.S., Dunne, M.P., Martin, N.G., 1998. Suicidal behaviour: an epidemiological and genetic study. *Psychol. Med.* 28 (4), 839–855.
- Tandon, R., 2005. Suicidal behavior in schizophrenia. *Expert. Rev. Neurother.* 5 (1), 95–99.
- Tousignant, M., Seshadri, S., Raj, A., 1998. Gender and suicide in India: a multiperspective approach. *Suicide Life-Threat Behav.* 28 (1), 50–61.
- Turecki, G., 2001. Suicidal behavior: is there a genetic predisposition? *Bipolar Disord.* 3 (6), 335–349.
- Turecki, G., Zhu, Z., Tzenova, J., Lesage, A., Seguin, M., Tousignant, M., Chawky, N., Vanier, C., Lipp, O., Alda, M., Joobor, R., Benkelfat, C., Rouleau, G.A., 2001. TPH and suicidal behavior: a study in suicide completers. *Mol. Psychiatry* 6 (1), 98–102.
- Zalsman, G., Frisch, A., Apter, A., Weizman, A., 2002. Genetics of suicidal behavior: candidate association genetic approach. *Isr. J. Psychiatry Relat. Sci.* 39 (4), 252–261.