Gender and the Course of Schizophrenia: Differences in Treated Outcomes

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Abstract

A survey of the literature suggests that women tend to exhibit a more favorable course of schizophrenia than men. This seems to be true for a range of outcome measures, such as hospital treatment, psychopathology, and social adaptation. Due to methodological limitations, however, the empirical evidence for gender differences in outcome is not wholly consistent. In 1983, a study of first-admitted patients with *DSM-III* diagnoses of schizophrenia or schizophreniform disorder (n = 278) from the Greater Hannover area in the Federal Republic of Germany followed patients for an average of 3 years. The present study has followed these patients for an average of 8 years. When confounding factors (e.g., age and marital status) were controlled for, schizophrenic women showed a better course of hospital treatment, experienced a shorter length of hospital stay, and survived longer in the community after their first hospital admission. Only the number of hospitalizations did not differ significantly between the sexes in the present study in contrast to the original study.

During the last decade, there has been a growing recognition of gender differences in schizophrenia. One of the most consistent findings of psychiatric epidemiology is that the onset of the disorder is on average earlier in men than in women and that schizophrenic men are hospitalized earlier than women (Angermeyer and Kühn 1988). In addition, in a number of studies, differences have been shown in symptomatology (Lewine 1981; Goldstein and Link 1988), family history (Bellodi et al. 1986; Goldstein et al., in press), biological indices (Seeman 1985; Nasrallah et al. 1986), and treatment response (Seeman 1983; Lewine and Meltzer 1985). This article focuses on gender differences in the course of the illness. In the first part, an extensive overview of the literature on gender and the course of schizophrenia is presented. There is some controversy about whether gender differences in the course are present over a short-term observation period and then dissipate over time. The present study has extended a previous study (Angermeyer et al. 1989) from a 3- to an 8-year observation period. Results focus on one dimension of outcome, the course of hospital treatment.

A search was conducted for all publications up to the present time, regardless of language, on gender differences in schizophrenia. It was possible to locate 102 studies reporting on gender and course of the illness. Only studies using specified outcome measures (i.e., course of hospital treatment, psychopathology, or social adaptation) were included. As in our previous work, a meta-analysis (Smith et al. 1980) was not possible, since the information in these articles was not only heterogeneous but often incomplete. Therefore, a box-score method was used to investigate the number of times significant gender differences were demonstrated, although this does not account for the size of the differences. The method tends to produce Type II errors: thus, the size of gender differences will be underestimated.

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Regardless of the outcome measure examined, the pattern was essentially the same. Approximately one-half of the studies found that the course of schizophrenia was better in women than in men, and the other half demonstrated no significant gender differences. This was true for all three indicators of hospital treatment: rate of rehospitalization (27 studies; see table 1), length of hospital stay (28 studies; see table 2), and number of hospital admissions (10 studies; see table 3). The same was true for relapse rate and psychopathological status at followup (23 studies; see table 4) and for clinical course (19 studies; see table 5). Finally, out of 37 studies dealing with social adaptation, again, one-half showed a better outcome in women, and the other half did not yield significant gender differences. The same was true for studies concerned with global social adaptation (16 studies; see table 6), occupational status (28 studies; see table 7), and social integration (11 studies; see table 8). Only six studies found that the illness had a more favorable course in men than in women. Two of them concerned the rate of rehospitalization (Israel and Johnson 1956; Lehrman 1960), another two dealt with clinical course (Bleuler 1972; Guggenheim and Babigian 1974), and two dealt with occupational status (Hall et al. 1966; Schooler et al. 1967).

The literature thus suggests that if gender differences in the course of schizophrenia really do exist, they may favor female patients. The findings should be interpreted with caution, however, since there are methodological limitations to many of the studies reviewed. For example, in a number of studies the diagnostic criteria were not specified. This is important since it has been shown that the use of more conservative diagnostic criteria may increase the gender effect (Lewine et al. 1984; Westermeyer and Harrow 1984). In addition, few studies used representative patient samples drawn from defined catchment areas. The fact that most studies included patients with multiple hospitalizations may have attenuated the effect of gender on outcomes, since the samples differentially excluded patients who were hospitalized once and recovered. If schizophrenic women do exhibit a better course of illness than schizophrenic men, the excluded patients will more likely be women (Goldstein 1988). Finally, there were few studies that controlled for confounding factors, such as age, age of onset, or marital status.

In tables 1–8, the studies are arranged according to the length of the observation period: < 5 years, 5-10 years, and ≥ 10 years. Inspection of the tables does not reveal a clear relationship between length of observation period and gender differences. However, two studies that had different followup periods suggest that gender differences may be attenuated over time (Biehl et al. 1986; Goldstein 1988).

This study tests whether gender differences in the course of hospital treatment observed in a group of schizophrenic patients followed, on an average, for 3 years, persist over an average of an 8-year observation period. The study attempts to replicate the findings that schizophrenic women experience fewer rehospitalizations, have shorter lengths of stay, and survive longer in the community than schizophrenic men.

Methods

The study was carried out in Hannover, the capital of Lower Saxony, in the Federal Republic of Germany. Hannover (population 537,000) is the commercial and cultural center of the State of Lower Saxony, which extends from the mountainous highland of central Germany to the North Sea. Study methods have been presented in detail in a previous publication (Angermeyer et al. 1989). In brief, all four psychiatric hospitals serving the Greater Hannover area were included in the study (Psychiatrische Klinik der Medizinischen Hochschule Hannover, Staedtische Nervenklinik Langenhagen, Niedersächsisches Landeskrankenhaus Wunstorf, and Wahrendorf'sche Anstalten Ilten). Four fourth-year medical students were trained to collect data systematically from the medical records of all first admission patients with a hospital diagnosis of schizophrenia (World Health Organization 1975) during the period between January 1, 1978, and December 31, 1982. Records for other clinical diagnoses that may have suggested the presence of schizophrenia were also checked (e.g., endogenous or functional psychosis and paranoid psychosis). Data were systematically checked by the first author for quality control. Only patients of German nationality who lived in the catchment area of the hospitals were included in the study to control for the effects of migration and transient residency.

Patients were followed from the day of their first admission until December 31, 1988. The observation period was therefore on an average of 8 years (range 6–11 years). Rehospitalizations and lengths of hospital stays were obtained from hospital records and clinic charts. The risk of underestimating the course of hospitalizations for our sample was negligible, given a study by Siede (1973) who demonstrated

Table 1. Studies on gender differences in risk of rehospitalization

Duration of followup	Risk of rehospitalization significantly lower		No significant gender difference
	Females	Males	
< 5 years	Watt & Szulecka (1979) Pietzcker et al. (1982) Angermeyer et al. (1982) Holding et al. (1983) Westermeyer & Harrow (1984)[1] Angermeyer et al. (1989)		Orlinsky & D'Elia (1964) Schooler et al. (1967) Mandelbrote & Trick (1970) Westermeyer & Harrow (1984)[2] MacMillan et al. (1986) Klusmann & Angermeyer (1986) Lopes (1987)
5–10 years	Achté & Apo (1967)[3] Nystrup (1976)[5] Körmendy & Schäfer (1983) Schäfer (1983)	Lehrman (1960)	Rennie (1939) Shepherd (1957) Achté & Apo (1967)[4] Nystrup (1976)[6] Watt et al. (1983) MacMillan et al. (1986)
⩾ 10 years	Rennie (1939)	Israel & Johnson (1956)[7]	Harris & Lubin (1954) Israel & Johnson (1956)[8] Hinterhuber (1973)
Unspecified	Cropley & Gazan (1969)[9] Jordá-Moscardo & Munk-Jörgensen (1986) Strömgren (1987)		Cropley & Gazan (1969)[10] Müller (1971)

[1]*DSM-II.*
[2]*DSM-III.*
[3]Index admission 1950–52.
[4]Index admission 1957–59.
[5]Index discharge 1953.
[6]Index discharge 1962.
[7]Index admission 1913–22.
[8]Index admission 1923–32 or 1933–42.
[9]Living in foster home.
[10]Living in family or living alone.

that <10% of psychiatric patients living in Hannover were admitted to hospitals outside of the four in the Hannover area.

The Sample. Six hundred three patients were rediagnosed using *DSM-III-R* criteria (American Psychiatric Association 1987) by two research psychiatrists, one of whom was unaware of the study hypotheses. Rediagnoses were made from the medical records of the first hospital admission, which provided excellent information about patients' current state and development of psychopathology. Rediagnoses were reliably made as reflected in an overall k of 0.93. A detailed description of the reliability study and the final sample of patients is provided in our previous publication (Angermeyer et al. 1989). Schizophreniform disorder was included with schizophrenia, given that all of the patients were first admissions. A rationale for this is provided in Angermeyer et al. (1989).

Table 2. Studies on gender differences in length of hospital stay

Duration of followup	Length of hospital stay significantly shorter in		No significant gender difference
	Females	Males	
< 5 years	Angermeyer et al. (1982)		Gittelman-Klein & Klein (1969)
	Lopes (1987)		Watt & Szulecka (1979)
	Angermeyer et al. (1989)		Giel et al. (1984)
			Biehl et al. (1986)
			Kay & Lindenmayer (1987)
5–10 years	Auch (1962)[1]		Farina et al. (1963)
	Lassenius et al. (1973)[3]		Auch (1962)[2]
	Möller et al. (1982)		Helgason (1964)
	Salokangas (1983)[5]		Achté (1967)
	Goldstein (1988)		Lassenius et al. (1973)[4]
	Munk-Jörgensen (1986)		Salokangas (1983)[6]
			Nyman & Jonsson (1983)
			Biehl et al. (1986)
⩾ 10 years	Ciompi & Müller (1976)		Harris & Lubin (1954)
	Goldstein (1988)		Hinterhuber (1973)
Unspecified	Raskin & Golob (1966)		Harrow et al. (1969)
	Cropley & Gazan (1969)[7]		Cropley & Gazan (1969)[8]
	Stern (1970)		McCabe (1975)
	Bland (1977)		
	Strömgren (1987)		

[1]Index admission 1958–60.
[2]Index admission 1946–51.
[3]Index admission 1959–60.
[4]Index admission 1944–46.
[5]Index admission 1969.
[6]Index admission 1965–67.
[7]Living in foster home.
[8]Living in family or living alone.

In brief, the sample consisted almost equally of men (n = 137 or 49%) and women (n = 141 or 51%). They were young, with over half being under 30 years of age. The majority (57%) had never been married, although almost one-third (29%) were currently married. One-third had completed college or university level, while another third had completed only elementary school. Thirty-five and one-half percent were unemployed or not in training. Finally, they came equally from urban and rural areas around Hannover. Schizophrenic men were significantly younger at their first admission, more often never married, and more likely to be employed (Angermeyer et al. 1989).

Variables of Interest. The outcomes for this study included number of hospitalizations, duration of hospitalizations, and survivorship in the community after discharge from the first psychiatric admission. The number of hospitalizations was divided by the duration of observation (in years), thus indicating person-years of followup. Duration of hospitalization was defined as the total number of days spent in inpatient treatment, divided by duration of observation in years. Outcome variables were transformed to their natural logarithm in the multivariate analyses. A rationale for this is provided in Angermeyer et al. (1989).

Table 3. Studies on gender differences in number of hospitalizations

Duration of followup	Number of hospitalizations significantly lower in		No significant gender difference
	Females	Males	
< 5 years	Angermeyer et al. (1982, 1989)		Gittelman-Klein & Klein (1969)
5–10 years	Fallik & Liron (1976) Gam (1980) Goldstein (1988)		Achté (1967) Salokangas (1983)
⩾ 10 years	Goldstein (1988)		Affleck et al. (1976)
Unspecified	Cropley & Gazan (1969)[1]		Cropley & Gazan (1969)[2]

[1]Living in foster home.
[2]Living in family or living alone.

Table 4. Studies on gender differences in psychopathological status at followup or relapse rate

Duration of followup	Psychopathological status better/ relapse rate lower in		No significant gender difference
	Females	Males	
< 5 years	Brown et al. (1972) Glick et al. (1976) Vaughn & Leff (1976) Müller (1982) Vaughn et al. (1984)		Hogarty et al. (1974) Astrachan et al. (1974) Westermeyer & Harrow (1984) Giel et al. (1984) Kay & Lindenmayer (1987)
5–10 years	Nyman (1978) Salokangas (1983) Nyman & Jonsson (1983) Johnstone et al. (1984) Prudo & Blum (1987)		Achté (1967) Müller et al. (1982)
⩾ 10 years	Lo & Lo (1977) Müller et al. (1986)		Huber et al. (1979) Rzewuska & Angst (1982) Ogawa et al. (1987) Steinmeyer et al. (1989)

Covariates used to explain gender differences in treatment outcomes were limited, given that this was a record study. Variables that have been found to be significantly and differentially related to gender among schizophrenic patients were included, such as age at first hospitalization and premorbid functioning (Gittelman-Klein and Klein 1969; Nyman and Jonsson 1983; Angermeyer and Kühn 1988).

Three variables were used as estimates of premorbid competence, since the variable itself was not available in the medical records. Education, marital status, and employment status were used as indicators of functional development. Although this was far from ideal, both education and marital status

Table 5. Studies on gender differences in clinical course

Duration of followup	Clinical course more favorable		No significant gender difference
	Females	Males	
< 5 years	World Health Organization (1979)		Biehl et al. (1986)
5–10 years	Guggenheim & Babigian (1974)[1] Nyman (1978) Watt et al. (1983) Fähndrich & Richter (1986)	Guggenheim & Babigian (1974)[2]	Langfeldt (1937) Körmendy & Schäfer (1983) Biehl et al. (1986)
⩾ 10 years	Huber et al. (1979) Müller et al. (1986)	Bleuler (1972)	Ciompi & Müller (1976) Khramelashvili & Liberman (1976) Sternberg (1981)
Unspecified	Liberman (1974) Shmaonova & Liberman (1979)		Angst et al. (1973) Buzanova (1981) Shmaonova & Liberman (1979) Iursinova (1982)

[1]Only catatonic type, duration of psychotic episodes.
[2]Only catatonic type, frequency of psychotic episodes.

Table 6. Studies on gender differences in global social adaptation

Duration of followup	Global social adaptation better in		No significant gender difference
	Females	Males	
< 5 years	Holding et al. (1983) Schubart et al. (1986)		Schooler et al. (1967) World Health Organization (1979) Giel et al. (1984) Kay & Lindenmayer (1987)
5–10 years	Soskis et al. (1969) Salokangas (1983) Johnstone et al. (1984) Wattie & Kedward (1985)[1] Prudo & Blum (1987)		Nyman et al. (1978) Biehl et al. (1986)
⩾ 10 years	Bland & Orn (1978)		Bland et al. (1976) Ogawa et al. (1987)

[1]Duration of followup 18 months–10 years.

Table 7. Studies on gender differences in occupational status

Duration of followup	Occupational status better in		No significant gender difference
	Females	Males	
< 5 years	Raskin & Dyson (1968) Pietzcker et al. (1982) Westermeyer & Harrow (1984)[1]	Hall et al. (1966) Schooler et al. (1967)	Gittelman-Klein & Klein (1969) Vogel & Vliegen (1975) Mantonakis et al. (1982) Westermeyer & Harrow (1984)[2] Giel et al. (1984) Kay & Lindenmayer (1987)
5–10 years	Gam (1980) Körmendy & Schäfer (1983) Salokangas (1983) Nyman & Jonsson (1983) Wattie & Kedward (1985)[3]		Lassenius et al. (1973) Nyman (1978) Möller et al. (1982)
⩾ 10 years	Affleck et al. (1976) Huber et al. (1979) Steinmeyer et al. (1989)		Masterson (1956) Bleuler (1972) Bland et al. (1976) Ciompi & Müller (1976) Bland & Orn (1978) Müller et al. (1986)

[1]*DSM-II.*
[2]*DSM-III.*
[3]Followup 18 months–10 years.

Table 8. Studies on gender differences in social integration

Duration of followup	Social integration better in		No significant gender difference
	Females	Males	
< 5 years	Raskin & Dyson (1968)		Gittelman-Klein & Klein (1969) Westermeyer & Harrow (1984) Giel et al. (1984) Kay & Lindenmeyer (1987)
5–10 years	Nyman (1978) Körmendy & Schäfer (1983) Salokangas (1983)		Nyman & Jonsson (1983)
⩾ 10 years			Ciompi & Müller (1976)

have been found to be highly correlated with overall premorbid social competence scores (Zigler and Levine 1981).

Analytic Methods. Student's *t* tests were used to examine the relationship between gender and number of hospitalizations and length of hospital stays. Three analytic procedures were then used to examine gender differences in outcomes. Survival analysis was used to test for gender differences in community survival time (Lee 1980; Thompson and Weissman 1981). Survival analysis, using the Kaplan-Meier method, provides estimates that represent the probability that rehospitalization will occur at a particular time over the observation period. This method is advantageous because it controls for confounding due to mortality and makes full use of longitudinal data when there are varying observation periods. A multivariate survival analysis using Cox's regression model was used to explain gender differences in community survival (Cox 1972; Lee 1980). Ordinary least-squares regression was used to explain gender differences in length of hospital stays.

Results

Table 9 shows that the average number of hospitalizations did not differ significantly for men and women, although schizophrenic women were hospitalized less often than schizophrenic men. Schizophrenic women also spent significantly fewer days in the hospital than schizophrenic men over the 8-year observation period.

Figure 1 depicts the results of the survival analysis with gender predicting survivorship in the community. The difference between the genders was most marked at the beginning of the observation period and was attenuated toward the end of the observation period (Breslow $\chi^2 = 4.21$, $df = 1$, $p = 0.04$) (Breslow 1974). By 1-year postdischarge, 45 percent of the schizophrenic men had been rehospitalized as compared with 26 percent of the schizophrenic women. By the end of the second year after discharge from the first inpatient treatment, the rates of rehospitalization were 52 percent and 37 percent, respectively. However, 3 years later (i.e., 5 years postdischarge), almost as many men as women had been rehospitalized (69% vs. 63%).

The next set of analyses tested whether the effect of gender on length of hospital stay and survivorship in the community could be explained or was mediated by factors found in past research to be related to both gender and length of hospital treatment. Therefore, length of hospital stay was regressed on age at first hospitalization, education, marital status, and employment status. These covariates were also used in the Cox regression model, in which rehospitalization after a first inpatient admission defined the hazard (Cox 1972). The results of the multiple regression showed that the effects of the covariates did not wholly account for the effect of gender on length of hospital stay. Gender still had a significant effect after covariates were partialed out (see table 10).

In addition, to explain gender differences in community survival, the same covariates were used in Cox's regression model. Results showed that there remained an overall trend for men to be at higher risk for rehospitalization, even after these covariates were controlled ($\chi^2 = 10.52$, $df = 5$, $p = 0.06$).

Finally, analyses were conducted controlling for duration of symptoms before the first hospitalization to examine possible differences between patients with schizophrenia versus schizophreniform disorder. One hundred ninety-nine cases out of the 278 (or 72%) had sufficient information to code this variable. Results again showed that when duration of symptoms before the first hospitalization was controlled, schizophrenic men spent significantly more time in the hospital ($b = -0.103$, $\beta = 0.173$, $p = 0.01$) and tended to be at higher risk for rehospitalization ($\chi^2 = 12.35$, $df = 6$, $p = 0.05$).

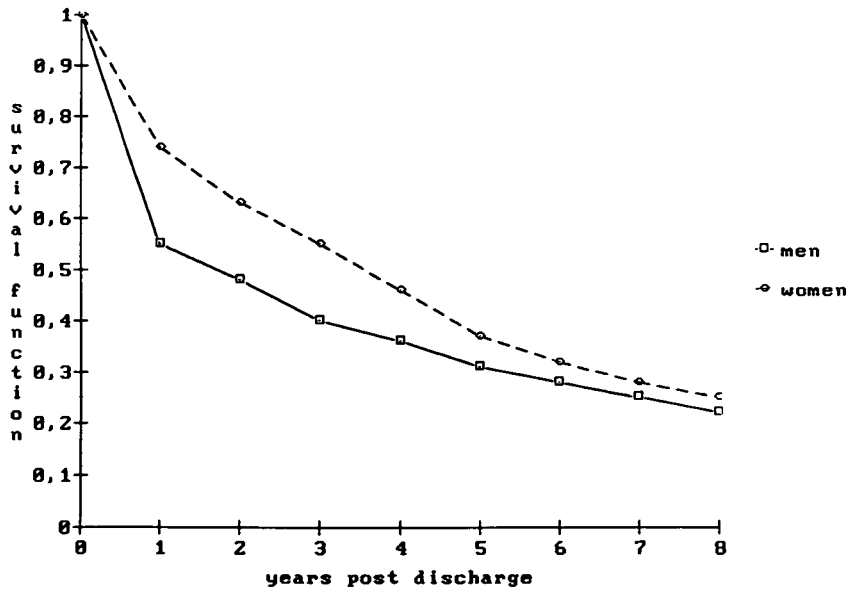
Discussion

Our findings demonstrate that over an observation period of, on average, 8 years, there remain significant gender differences in the course of treatment. This is an extension of our previous work showing that gender had an impact after a 3-year observation period. Schizophrenic men spent significantly more time in the hospital and were at significantly higher risk for rehospitalization than schizophrenic women. These findings were not wholly explained by social background characteristics such as age, marital status, education, or employment status. In addition, gender differences in outcomes were not an artifact of the inclusion of schizophreniform disorder in the sample, since findings remained when controlling for duration of symptoms before first hospital admission. Schizophrenic men also experienced fewer hospitalizations than schizophrenic women, but the differences were not significant. The

Table 9. Gender differences in number of hospitalizations and length of hospital stay (*t* test, 2-tailed)

	Men (*n* = 137)		Women (*n* = 141)			
	Mean	SD	Mean	SD	*t*	*p*
Number of hospitalizations (per year)	0.39	0.35	0.34	0.29	1.27	0.204
Length of hospital stay (per year)	34.9	34.4	24.0	16.6	3.35	0.001

Figure 1. Survivorship outside hospital after discharge from first inpatient treatment by gender



failure to find a significant difference is in contrast to our previous study demonstrating significant gender differences in the number of hospitalizations over a 3-year period.

The lack of a significant gender difference for number of hospitalizations is somewhat surprising given that other previous work has demonstrated such differences over observation periods longer than 8 years (Goldstein 1988). However, the Goldstein study also showed that gender differences were attenuated at 10 years as compared to 1- to 5-year observation periods (Goldstein 1988). That may in part be due to the finding that schizophrenic women respond better and to lower doses of neuroleptics (Seeman 1983). Reflecting the fact that differences in neuroleptic response are most likely due to the effects of estrogens, these differences are found primarily for women at premenopausal ages (see Seeman and Lang 1990, this issue). Thus, as women age and reach menopause, gender differences in the course of treatment are attenuated or may disappear over time (Seeman and Lang 1990, this issue). Since a number of the women in our study were in their forties and older at 8 years after admission, they may have already experienced menopause.

The study reported here was a record study, and therefore information was not under the control of the authors. As mentioned previously, however, less than 10 percent of patients in the Greater Hannover area are not hospitalized at the study hospitals, and therefore it is unlikely that the attenuation of gender differences in number of hospitalizations was due to loss of information.

Findings in this study also showed that gender differences in treatment were not wholly accounted for by age at first hospitalization or premorbid indicators such as education, marital status, and employment status. Future studies must examine other factors found to be differentially related to gender among schizophrenic patients to illuminate gender differences in the course of treatment. These include a wide variety of factors ranging from genetic history (Bellodi et al. 1986; Goldstein et al., in press), structural and functional brain differences (Nasrallah et al. 1986; Gur and Gur 1990, this issue; Lewine et al. 1990, this issue), and response to neuroleptics (Young and Meltzer

Table 10. Regression coefficients for prediction of total length of hospital stay for gender, controlling for age and indicators of premorbid social competence

	b	*β*	*t*	*p*
Age	0.002	0.084	1.16	0.25
Marital status[1]	−0.046	−0.076	−0.97	0.33
Education[2]	−0.006	−0.008	−0.13	0.89
Occupational status[3]	0.058	0.087	1.42	0.16
Gender[4]	−0.107	−0.179	−2.63	<0.01

Note.—R^2 = 0.04; R^2 adjusted for number of variables and sample size = 0.025; F = 2.39; df = 5,272; p = 0.038.

[1]Never married = 0; ever married = 1.
[2]9 years of school or less = 0; over 9 years of school = 1.
[3]Employed (paid work) = 0; unemployed = 1.
[4]Men = 0; women = 1.

1980; Nedopil et al. 1983; Seeman 1983), to illness and family behavior and the social consequences of illness (Niskanen and Pikhanen 1972; Kessler et al. 1979; Clausen et al. 1982; Pruss et al. 1984; Gibbons et al. 1984; Hogarty 1985; Goldstein and Kreisman 1988; Haas et al. 1988; Linden et al. 1988).

Further, an understanding of gender differences in treatment may in part be related to gender differences in other dimensions of outcome. Our review of the literature suggests that schizophrenic women tend to show a better course of illness than schizophrenic men, regardless of the outcome. Thus, gender differences in constitution, early premorbid history, and adult social role expectations may provide advantages for women that generalize across domains of outcome. An understanding of these differences and their relationship to the course of illness and treatment may provide clues to the nature of schizophrenia and thus are important to consider in future research endeavors.

References

Achté, K.A. On prognosis and rehabilitation in schizophrenic and paranoid psychoses. *Acta Psychiatrica Scandinavica*, Suppl. 196, 1967.

Achté, K.A., and Apo, M. Schizophrenic patients in 1950-1952 and 1957-1959. *Psychiatric Quarterly*, 41:422-441, 1967.

Affleck, J.W.; Bruns, J.; and Forrest, A.D. Long-term follow-up of schizophrenic patients in Edinburgh. *Acta Psychiatrica Scandinavica*, 53:227-237, 1976.

American Psychiatric Association. *DSM-III-R: Diagnostic and Statistical Manual of Mental Disorders*. 3rd ed., revised. Washington, DC: American Psychiatric Press, 1987.

Angermeyer, M.C.; Goldstein, J.M.; and Kühn, L. Gender differences in schizophrenia: Rehospitalization and community survival. *Psychological Medicine*, 19:365-382, 1989.

Angermeyer, M.C.; Hofmann, J.; and Robra, B.-P. Geschlechtsunterschiede in der Institutionskarriere Schizophrener—ein Beitrag zur Sozialepidemiologie psychischer Erkrankungen. *Psychiatrische Praxis*, 9:27-33, 1982.

Angermeyer, M.C., and Kühn, L. Gender differences in age at onset of schizophrenia: An overview. *European Archives of Psychiatry and Neurological Sciences*, 237:351-364, 1988.

Angst, J.; Baastrup, P.; Grof, P.; Hippius, H.; Pöldinger, W.; Varga, E.; Weiss, P.; and Wyss, F. Statistische Aspekte des Beginns und Verlaufs schizophrener Psychosen. In: Huber, G., ed. *Verlauf und Ausgang schizophrener Erkrankungen*. Stuttgart/New York: Schattauer, 1973. pp. 67-70.

Astrachan, B.M.; Brauer, L.; Harrow, M.; and Schwartz, C. Symptomatic outcome in schizophrenia. *Archives of General Psychiatry*, 31:155-160, 1974.

Auch, W. Untersuchungen über das Ersterkrankungsalter endogener Psychosen. *Vita Humana*, 5:87-110, 1962.

Bellodi, L.; Bussoleni, C.; Scorza-Smeraldi, R.; Grassi, G.; Zacchetti, L.; and Smeraldi, E. Family study of schizophrenia: Exploratory analysis for relevant factors. *Schizophrenia Bulletin*, 12:120-128, 1986.

Biehl, H.; Maurer, K.; Schubart, C.; Krumm, B.; and Jung, E. Prediction of outcome and utilization of medical services in a prospective study of first onset schizophrenics. *European Archives of Psychiatry and Neurological Sciences*, 234:139-147, 1986.

Bland, R.C. Demographic aspects of functional psychoses in Canada. *Acta Psychiatrica Scandinavica*, 55:369-380, 1977.

Bland, R.C., and Orn, H. 14-year outcome in early schizophrenia. *Acta Psychiatrica Scandinavica*, 55:327-338, 1978.

Bland, R.C.; Parker, J.H.; and Orn, H. Prognosis in schizophrenia. *Archives of General Psychiatry,* 33:949-954, 1976.

Bleuler, M. *Die schizophrenen Geistesstörungen im Lichte langjähriger Kranken- und Familiengeschichten.* Stuttgart: Thieme, 1972.

Breslow, N. Covariance analysis of censored survival data. *Biometrics,* 30:89-99, 1974.

Brown, G.W.; Birley, J.L.T.; and Wing, J.K. Influence of family life on the course of schizophrenic disorders: A replication. *British Journal of Psychiatry,* 121:241-258, 1972.

Buzanova, V.E. Schizophrenia u bol'nykh-zhitele'i gorroda i sel'sko'i mestnosti: Sravnitel'naia kliniko-demograhicheskaia kharakteristika (po dannym 'epidemiologicheskogog i zucheniia). [Schizophrenia among urban and rural patients: Comparative clinicodemographic characteristics (according to the results of an epidemiologic study)]. *Zhurnal Nevropatologii i Psikhiatrii Imeni S.S. Korsakova,* 81:729-734, 1981.

Ciompi, L., and Müller, C. *Lebensweg und Alter der Schizophrenen.* Berlin/Heidelberg/New York: Springer, 1976.

Clausen, J.A.; Pfeffer, N.G.; and Huffine, C.L. Help-seeking in severe mental illness. In: Mechanic, D., ed. *Symptoms, Illness Behavior, and Help-Seeking.* New York: Neale Watson Academic Publications, 1982. pp. 135-155.

Cox, D. Regression models and life tables. *Journal of the Royal Statistical Society,* Series, B34:187-220, 1972.

Cropley, A.L., and Gazan, A. Some data concerning readmission of discharged schizophrenic patients. *British Journal of Social Clinical Psychology,* 8:286-289, 1969.

Fähndrich, E., and Richter, S. Zum Verlauf schizophrener Ersterkrankungen. Eine 5-Jahres-Katamnese. *Nervenarzt,* 57:705-711, 1986.

Fallik, A., and Liron, R. A follow-up on schizophrenics from various social subgroups seven years after initial hospitalization. *Israel Annals of Psychiatry,* 14:229-239, 1976.

Farina, A.; Garmezy, N.; and Barry, H. Relationship of marital status to incidence and prognosis of schizophrenia. *Journal of Abnormal and Social Psychology,* 67:624-630, 1963.

Gam, J. A 5-year retrospective investigation of all first admitted schizophrenics to Danish psychiatric institutions in the fiscal year from April 1st, 1970, to April 1st, 1971. In: Strömgren, E., et al., eds. "Epidemiological Research as Basis for the Organization of Extramural Psychiatry." *Acta Psychiatrica Scandinavica,* Suppl. 285, 1980.

Gibbons, J.S.; Horn, S.H.; Powell, J.M.; and Gibbons, J.L. Schizophrenic patients and their families: A survey in a psychiatric service based on a DGH unit. *British Journal of Psychiatry,* 144:70-77, 1984.

Giel, R.; Wiersma, D.; deJong, P.A.; and Slooff, C. Prognosis and outcome in a cohort of patients with non-affective functional psychosis. *European Archives of Psychiatry and Neurological Sciences,* 234:97-101, 1984.

Gittelman-Klein, R., and Klein, D.F. Premorbid asocial adjustment and prognosis in schizophrenia. *Journal of Psychiatric Research,* 7:35-53, 1969.

Glick, I.D.; Hargreaves, W.A.; Drues, J.; and Showstack, J.A. Short versus long hospitalization: A prospective controlled study. IV. One-year follow-up results for schizophrenic patients. *American Journal of Psychiatry,* 133:509-514, 1976.

Goldstein, J.M. Gender differences in the course of schizophrenia. *American Journal of Psychiatry,* 145:684-689, 1988.

Goldstein, J.M.; Faraone, S.; Chen, W.; Tolomiczenko, G.; and Tsuang, M. Gender differences in the familial transmission of schizophrenia. *British Journal of Psychiatry,* in press.

Goldstein, J.M., and Kreisman, D. Gender, family environments, and schizophrenia. *Psychological Medicine,* 18:861-872, 1988.

Goldstein, J.M., and Link, B.G. Gender and the expression of schizophrenia. *Journal of Psychiatric Research,* 22:141-155, 1988.

Guggenheim, F.G., and Babigian, H.M. Catatonic schizophrenia: Epidemiology and clinical course. *Journal of Nervous and Mental Disease,* 158:291-305, 1974.

Gur, R.E., and Gur, R.C. Gender differences in regional cerebral blood flow. *Schizophrenia Bulletin,* 16:247-254, 1990.

Haas, G.L.; Glick, I.D.; Clarkin, J.F.; Spencer, J.H.; Lewis, A.B; Peyser, J.; DeMane, N.B.; Good-Ellis, M.; Harris, E.; and Lestelle, V. Inpatient family intervention: A randomized clinical trial. II. Results at hospital discharge. *Archives of General Psychiatry,* 45:217-224, 1988.

Hall, J.C.; Smith, K; and Shimkunas, A. Employment problems of schizophrenic patients. *American Journal of Psychiatry,* 123:536-540, 1966.

Harris, A., and Lubin, A. The prognosis of the functional psychoses.

Monatsschrift für Psychiatrie und Neurologie, 724:126–145, 1954.

Harrow, M.; Tucker, G.J.; and Bromet, E. Short-term prognosis of schizophrenic patients. *Archives of General Psychiatry*, 21:195–202, 1969.

Helgason, T. Epidemiology of mental disorders in Iceland. *Acta Psychiatrica Scandinavica*, Suppl. 173, 1964.

Hinterhuber, H. Zur Katamnese der Schizophrenien. *Fortschritte der Neurologie und Psychiatrie*, 41:527–558, 1973.

Hogarty, G.E. Expressed emotion and schizophrenic relapse: Implications from the Pittsburgh study. In: Alpert, M., ed. *Controversies in Schizophrenia*. New York: Guilford Press, 1985. pp. 354–365.

Hogarty, G.E.; Goldberg, S.C.; Schooler, N.R.; and Ulrich, R.F. Drug and sociotherapy in the aftercare of schizophrenic patients. *Archives of General Psychiatry*, 31:603–618, 1974.

Holding, T.A.; Urbanc, S.; and Kay, D.W.K. Social outcome after first admission for schizophrenia in Tasmania: A study of matched pairs. *Social Psychiatry*, 18:145–152, 1983.

Huber, G.; Gross, G.; and Schüttler, R. *Schizophrenie Eine Verlaufs- und sozialpsychiatrische Langzeitstudie*. Berlin/Heidelberg/New York: Springer, 1979.

Israel, R.H., and Johnson, N.A. Discharge and readmission rates in 4,254 consecutive first admissions of schizophrenia. *American Journal of Psychiatry*, 112:903–909, 1956.

Iursinova, M.Sh. Nekotorye rezul'taty 'epidemiologicheskogo issledovaniia bol'nykh shizofrenie 'iv Samarkande. [Various results of an epidemiologic study of schizophrenic patients in Samarkand] *Zhurnal Nevropatologii i Psikhiatrii Imeni S.S. Korsakova*, 82:93-98, 1982.

Johnstone, E.C.; Owens, D.G.; Gold, A.; Crow, T.J.; and McMillan, J.F. Schizophrenic patients discharged from hospital—A follow-up study. *British Journal of Psychiatry*, 145:586–590, 1984.

Jordá-Moscardo, E., and Munk-Jörgensen, P. A comparative census study of Danish schizophrenic patients in 1977 and 1982. *European Archives of Psychiatry and Neurological Sciences*, 235:323–327, 1986.

Kay, S.R., and Lindenmayer, J.-P. Outcome predictors in acute schizophrenia: Prospective significance of background and clinical dimensions. *Journal of Nervous and Mental Disease*, 175:152–160, 1987.

Kessler, R.; Reuter, J.; and Greenley, J. Sex differences in the use of psychiatric outpatient facilities. *Social Forces*, 58:557–571, 1979.

Khramelashvili, V.V., and Liberman, Y.I. Predicting the frequency of episodes of schizophrenia (results of an epidemiological investigation). *Neuroscience and Behavioral Physiology*, 7:239–244, 1976.

Klusmann D., and Angermeyer, M.C. Ökologische Faktoren und Rehospitalisierungsrisiko bei psychotisch Erkrankten. *European Archives of Psychiatry and Neurological Sciences*, 235:231–242, 1986.

Körmendy, E., and Schäfer, E. Empirische Verlaufsuntersuchung schizophrener Erkrankungen im Bereich eines kommunalen psychiatrischen Dienstes. *Nervenarzt*, 54:347–353, 1983.

Langfeldt, G. *The Prognosis in Schizophrenia and the Factors Influencing the Course of the Disease*. Copenhagen: Levin & Munksgaard; London: Humphrey Milford, 1937.

Lassenius, B.; Ottosson, J.O.; and Rapp, W. Prognosis in schizophrenia: The need for institutionalized care. *Acta Psychiatrica Scandinavica*, 49:294–505, 1973.

Lee, E.T. *Statistical Methods for Survival Data Analysis*. Belmont, CA: Lifetime Learning Publications, 1980.

Lehrman, N.S. A State hospital population five years after admission: A yardstick for evaluative comparison of follow-up studies. *Psychiatric Quarterly*, 34:658–668, 1960.

Lewine, R.R.J. Sex differences in schizophrenia: Timing or subtype? *Psychological Bulletin*, 90:432–444, 1981.

Lewine, R.R.J.; Burbach, D.; and Meltzer, H.Y. Effect of diagnostic criteria on the ratio of male to female schizophrenic patients. *American Journal of Psychiatry*, 141:84–87, 1984.

Lewine, R.R.J.; Gulley, L.R.; Risch, S.C.; Jewart, R.; and Houpt, J.L. Sexual dysmorphism, brain morphology, and schizophrenia. *Schizophrenia Bulletin*, 16:195–203, 1990.

Lewine, R.R.J., and Meltzer, H.Y. Negative symptoms and platelet monoamine oxidase activity in male schizophrenics. *Psychiatry Research*, 12:99–109, 1985.

Liberman, I.U.I. K Probleme zabolevaemosti shizofrenie'i (materialy kliniko-epidemiologicheskogo obsledovaniia). [The incidence of schizophrenia (materials from a clinico-epidemiologic study)] *Zhurnal Nevropatologii i Psikhiatrii Imeni S.S. Korsakova*, 74:1224–1233, 1974.

Linden, M.; Nather, J.; and Wilms, H.V. Zur Definition, Bedeutung und Messung der Krankheitskonzepte von Patienten.

Die Krankheitskonzeptskala (KK-Skala) für schizophrene Patienten. *Fortschritte der Neurologie und Psychiatrie*, 56:35–43, 1988.

Lo, W.H., and Lo, T. A ten-year follow-up study of Chinese schizophrenics in Hong Kong. *British Journal of Psychiatry*, 131:63–66, 1977.

Lopes, R.G. "Verlauf und Wiedererkrankungshäufigkeit bei hospitalisierten Schizophrenen im Zweiländervergleich." Dissertation, University of Heidelberg, 1987.

MacMillan, J.F.; Crow, T.J.; Johnson, A.L.; and Johnstone, E.C. III. Short-term outcome in trial entrants and trial eligible patients. *British Journal of Psychiatry*, 148:128–133, 1986.

Mandelbrote, B.M., and Trick, K.L.K. Social and clinical factors in the outcome of schizophrenia. *Acta Psychiatrica Scandinavica*, 46:24–31, 1970.

Mantonakis, J.E.; Jemos, J.J.; Christodoulou, G.N.; and Lykouras, E.P. Short-term social prognosis of schizophrenia. *Acta Psychiatrica Scandinavica*, 66:306–310, 1982.

Masterson, J.F., Jr. Prognosis in adolescent disorders: Schizophrenia. *Journal of Nervous and Mental Disease*, 124:219–232, 1956.

McCabe, M.S. Demographic differences in functional psychoses. *British Journal of Psychiatry*, 127:320–323, 1975.

Möller, H.J.; Werner-Eilert, K.; Wüschner-Stockheim, M.; and Zerssen, D.v. Relevante Merkmale für die 5-Jahres-Prognose von Patienten mit schizophrenen und verwandten paranoiden Psychosen. *Archiv für Psychiatrie und Nervenkrankheiten*, 231:305–322, 1982.

Müller, H.W. Störungen des psychosozialen Milieus und ihr Einfluß auf schizophrene Krankheitsverläufe. In: Kranz, H., und Heinrich, K., Hrsg. *Schizophrenie und Umwelt*. Stuttgart: Thieme, 1971. pp. 58–72.

Müller, P. *Zur Rezidivprophylaxe schizophrener Psychosen*. Stuttgart: Enke, 1982.

Müller, P.; Günther, U.; and Lohmeyer, L. Behandlung und Verlauf schizophrener Psychosen über ein Jahrzehnt. *Nervenarzt*, 57:332–341, 1986.

Munk-Jörgensen, P. Schizophrenia in Denmark. *Acta Psychiatrica Scandinavica*, 73:172–180, 1986.

Nasrallah, H.; Andreasen, N.; Coffman, J.; Olson, S.; Dunn, V.; Ehrhardt, J.; and Chapman, S. A controlled magnetic resonance imaging study of corpus callosum thickness in schizophrenia. *Biological Psychiatry*, 21:274–282, 1986.

Nedopil, N.; Pflieger, R.; and Rüther, E. The prediction of acute response, remission and general outcome of neuroleptic treatment in acute schizophrenic patients. *Pharmacopsychiatry*, 16:201–205, 1983.

Niskanen, P., and Pikhanen, T.A. Attitudes of the relatives of schizophrenic patients. *Acta Psychiatrica Scandinavica*, 48:174–185, 1972.

Nyman, A.K. Non-regressive schizophrenia: Clinical course and outcome. *Acta Psychiatrica Scandinavica*, Suppl. 272, 1978.

Nyman, A.K., and Jonsson, H. Differential evaluation of outcome in schizophrenia. *Acta Psychiatrica Scandinavica*, 68:458–475, 1983.

Nyman, G.E.; Nyman, A.K.; and Nylander, B.I. Non-regressive schizophrenia: 1. A comparative study of clinical picture, social prognosis, and heredity. *Acta Psychiatrica Scandinavica*, 57:165–192, 1978.

Nystrup, J. A hospital population of schizophrenic patients undergoing change. *Acta Psychiatrica Scandinavica*, 53:211–226, 1976.

Ogawa, K.; Miya, M.; Watarai, A.; Nakazawa, M.; Ynasa, S.; and Utena, H. A long-term follow-up study of schizophrenia in Japan—With special reference to the course of social adjustment. *British Journal of Psychiatry*, 151:758–765, 1987.

Orlinsky, N., and D'Elia, E. Rehospitalization of the schizophrenic patient. *Archives of General Psychiatry*, 10:47–54, 1964.

Pietzcker, A.; Gaebel, W.; and Poppenberg, A. Prognose des Verlaufs nach Klinikentlassung bei schizophrenen Kranken. In: Heinrich, K., ed. *Der Schizophrene außerhalb der Klinik*. Bern/Stuttgart/Wien: Huber, 1982. pp. 92–104.

Prudo, R., and Blum, M. Five-year outcome and prognosis in schizophrenia: A report from the London Field Research Centre of the International Pilot Study of Schizophrenia. *British Journal of Psychiatry*, 150:345–354, 1987.

Pruss, U.; Rose, H.K.; and Zecher, A. Depotneuroleptika in der sozialpsychiatrischen Praxis. *Psychiatrische Praxis*, 11:101–108, 1984.

Raskin, M., and Dyson, W.L. Treatment problems leading to readmissions of schizophrenic patients. *Archives of General Psychiatry*, 19:356–360, 1968.

Raskin, A., and Golob, R. Occurrence of sex and social class differences in premorbid competence, symptom and outcome measures in acute schizophrenics. *Psychological Reports*, 18:11–22, 1966.

Rennie, T.A.C. Follow-up study of five hundred patients with schizophrenia admitted to the hospital from 1913 to 1923. *Archiv für Neurologie und Psychiatrie*, 42: 877-891, 1939.

Rzewuska, M., and Angst, J. Aspects of the course of bipolar manic-depressive, schizo-affective, and paranoid schizophrenic psychoses. *Archiv für Psychiatrie und Nervenkrankheiten*, 231:487-501, 1982.

Salokangas, R.K.R. Prognostic implications of the sex of schizophrenic patients. *British Journal of Psychiatry*, 142:145-151, 1983.

Schooler, N.R.; Goldberg, S.C.; Boothe, H.; and Cole, J.O. One year after discharge: Community adjustment of schizophrenic patients. *American Journal of Psychiatry*, 123:986-995, 1967.

Schubart, C.; Krumm, B.; Biehl, H.; and Schwarz, R. Measurement of social disability in a schizophrenic patient group. *Social Psychiatry*, 21:1-9, 1986.

Seeman, M.V. Interaction of sex, age, and neuroleptic dose. *Comprehensive Psychiatry*, 24:125-128, 1983.

Seeman, M.V. Sex and schizophrenia. *Canadian Journal of Psychiatry*, 30:313-315, 1985.

Seeman, M.V., and Lang, M. The role of estrogens in schizophrenia gender differences. *Schizophrenia Bulletin*, 16:185-194, 1990.

Shepherd, M. *A Study of the Major Psychoses in an English County*. London: Institute of Psychiatry, 1957.

Shmaonova, L.M., and Liberman, I.U.I. Role of sex and age in the occurrence and course of attack-like schizophrenia: Based on epidemiological study data. *Zhurnal Nevropatologii i Psikhiatrii Imeni S.S. Korsakova*, 79:611-617, 1979.

Siede, H. Die derzeitige (1970) Situation an den psychiatrischen LKH Niedersachsens. *Sozialpsychiatrische Informationen*, 13:10-23, 1973.

Smith, M.L.; Glass, G.V.; and Miller, T.I. *The Benefits of Psychotherapy*. Baltimore, MD: Johns Hopkins University Press, 1980.

Soskis, D.A.; Harrow, M.; and Detre, T.P. Long-term follow-up of schizophrenics admitted to a general hospital psychiatric ward. *Psychiatric Quarterly*, 43:525-534, 1969.

Steinmeyer, E.M.; Marneros, A.; Deister, A.; Rohde, A.; and Jünemann, H. Long-term outcome of schizoaffective and schizophrenic disorders: A comparative study. II. Causal-analytical investigations. *European Archives of Psychiatry and Neurological Sciences*, 238:126-134, 1989.

Stern, E.S. A statistical study of departures from a mental hospital. *British Journal of Psychiatry*, 116:57-64, 1970.

Sternberg, E. Verlaufsgesetzlichkeiten der Schizophrenie im Lichte von Langzeituntersuchungen bis zum Senium. In: Huber, G., ed. *Schizophrenie Stand und Entwicklungstendenzen der Forschung*. Stuttgart/New York: Schattauer, 1981. pp. 251-262.

Strömgren, E. Changes in the incidence of schizophrenia? *British Journal of Psychiatry*, 150:1-7, 1987.

Thompson, W.D., and Weissman, M.W. Quantifying lifetime risk of psychiatric disorder. *Journal of Psychiatric Research*, 16:113-126, 1981.

Vaughn, C.E., and Leff, J.P. The influence of family and social factors on the course of psychiatric illness: A comparison of schizophrenic and depressed neurotic patients. *British Journal of Psychiatry*, 129:125-137, 1976.

Vaughn, C.E.; Snyder, K.S.; Jones, S.; Freeman, W.B.; and Falloon, I.R.H. Family factors in schizophrenic relapse. *Archives of General Psychiatry*, 41:1169-1177, 1984.

Vogel, Th., and Vliegen, J. Soziale Auswirkungen der Schizophrenie. *Nervenarzt*, 46:569-575, 1975.

Watt, D.C.; Katz, K.; and Shepherd, M. The natural history of schizophrenia: A 5-year prospective follow-up of a representative sample of schizophrenics by means of a standardized clinical and social assessment. *Psychological Medicine*, 13:663-670, 1983.

Watt, D.C., and Szulecka, T.K. The effect of sex, marriage and age at first admission on the hospitalization of schizophrenics during 2 years following discharge. *Psychological Medicine*, 9:529-539, 1979.

Wattie, B.J.S., and Kedward, H.B. Gender differences in living conditions found among male and female schizophrenic patients on a follow-up study. *International Journal of Social Psychiatry*, 31:205-216, 1985.

Westermeyer, J.F., and Harrow, M. Prognosis and outcome using broad (*DSM-II*) and narrow (*DSM-III*) concepts of schizophrenia. *Schizophrenia Bulletin*, 10:624-637, 1984.

World Health Organization. *Manual of the International Statistical Classification of Diseases, Injuries, and Causes of Death*. 9th rev. Geneva: The Organization, 1975.

World Health Organization. *Schizophrenia: An International Follow-*

up Study. Chichester/New York/ Brisbane: Wiley, 1979.

Young, M.A., and Meltzer, H.Y. The relationship of demographic, clinical, and outcome variables to neuroleptic treatment requirements. *Schizophrenia Bulletin*, 6:88–101, 1980.

Zigler, E., and Levine, J. Age on first hospitalization of schizophrenics: A developmental approach. *Journal of Abnormal Psychology*, 90:458–467, 1981.

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Videotape on Schizophrenia Available

The Video Center of the George Warren Brown School of Social Work, Washington University, in collaboration with the St. Louis Chapter of the Alliance for the Mentally Ill and the Department of Mental Health of the State of Missouri, has produced a videotape entitled **Living with Schizophrenia: A Video Manual for Families Caring for Mentally Ill Relatives.**

The videotape was designed to provide an inexpensive channel for furnishing a basic level of psychoeducation to families who may otherwise not receive any information. Specifically targeted for the family that lives with a mentally ill relative, the videotape uses the experiences of actual families to present practical information about coping with problems common to families living with a mentally ill person.

For more information about the rental or purchase of this videotape, please contact:

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