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Survival of patients with severe mental disorders: influence of social functioning.

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Keywords:	schizophrenia, psychotic disorders, bipolar disorder, course, premature death
Abstract:	Background: Patients with severe mental disorders have a high risk of premature death due to the interaction of various factors. Social functioning is a strategic functional factor in understanding the course of psychotic disorders. Aim: Analyze the relationship between social functioning and its various dimensions and survival during a 10-year follow-up. Method: The Social Functioning Scale (SFS) was administered to 163 close relatives of patients under treatment at a Community Mental Health Unit. Survival was described by Kaplan-Meier analysis and any differences in survival by level of social functioning were found by long-rank analysis. Finally, Cox regression was used to predict premature mortality. Results: Significant differences in mortality were identified in the interpersonal behavior dimension of social functioning, while there were no significant gender or diagnostic differences in the rest of the dimensions. The interpersonal behavior dimension and age were found to be factors predicting premature death. Conclusion: These findings show the protective effect of social functioning retained by patients with psychotic disorders on their survival, and the need to apply evidence-based psychotherapy focused on recovery of social functioning in the early stages of the disorder.

Survival of patients with severe mental disorders: influence of social functioning.

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Introduction

Severe mental disorders are defined as psychotic spectrum disorders associated with severe functional impairment which have evolved over two or more years (NIMH, 1987). These disorders have a high risk of premature death, with a life expectancy 10-15 years lower than the general population (Chan et al., 2022; Laursen et al., 2017; Oakley et al., 2018; Simon et al., 2018). In schizophrenia, the specific mortality rate is 2-4 times higher than in the general population, and may increase up to 12-15 times in young patients (Hjorthøj et al., 2017; Laursen, 2011; Saha et al., 2007). Contrary to the increase in life expectancy in the general population during recent decades, the mortality gap of patients with psychotic disorders remains stable, and some studies even show that it has increased in recent years (Gur, et al., 2018; Nielsen et al., 2013). These are undoubtedly alarming data which make it an important public health problem.

This high mortality rate has been associated with interaction of several risk factors, including: a) those related to the patient: psychosis, negative symptoms, cognitive impairment and unhealthy lifestyle; b) related to treatment: absence or insufficient psychological treatment and adverse effects of medication; and c) related to healthcare services: difficult access to specific treatments, both for mental pathologies and other comorbid somatic pathologies diagnosed (De Hert et al., 2011a, 2011b). Casuistically, premature death may be divided into natural causes, of which the cardiovascular, metabolic and respiratory diseases are the most prevalent (Correll et al., 2017; Vancampfort et al., 2015, 2016), and non-natural causes, such as accidents and suicide (Björkenstam et al., 2014; Zaheer et al., 2018), in which contextual factors like alterations in family dynamics, social functioning deficits and behavior problems have the heaviest weight (Bellido-Zanin et al., 2015, 2017; Koutra et al., 2014; Thompson et al., 2019).

More profound study of functional factors has underlined some psychosocial achievements as indicators of a favorable course in psychosis (Harding et al., 1987a,

1987b; Liberman et al., 2002; Strauss & Carpanter, 1977). In this context, social functioning emerges as a core area in psychotic disorders, with agreement on its contribution to community adaptation (Johnstone et al., 1990), favorable evolution of the disease (Rajkumar & Thara, 1989) and treatment success (Burns & Patrick, 2007; Liberman et al., 2002; Peer et al., 2007), and may become a protective factor for survival in psychosis.

Social functioning is a multidimensional construct referring to personal qualities for developing social activities and maintaining an optimum social life (Birchwood et al., 1990; Hirschfeld et al., 2000). It is studied on several levels: 1) social achievements, with overall measures such as education, marital status or occupation (Hambrecht et al., 1992), 2) social roles, referring to development of specific roles, such as at work or in marriage, and 3) instrumental behavior, which involves the detailed study of functioning in different areas and dimensions, such as interpersonal behavior or leisure activities (Birchwood et al., 1990; Mueser & Tarrier, 1998). However, most studies focus on analyzing social functioning through overall aspects or social achievements (Gardner et al., 2019; Kua et al., 2003; Nevarez-Flores et al., 2019; Velthorst et al., 2017), and do not include an overall and dimensional analysis using specific instruments and their possible relationship as a protective factor for survival.

As far as we know, social functioning and its various dimensions have not been explored as a predictive variable in the analysis of survival in patients with psychotic disorders. The objective of our study was to analyze any relationship between social functioning and its dimensions and survival of patients with psychotic disorders during a 10-year follow-up period.

Method

Participants

The study sample consisted of 163 patients diagnosed with schizophrenia and related psychotic disorders: 94 (57.7%) with schizophrenia (ICD-10 F20), 44 (27.0%) with other psychotic disorders (ICD-10 F21-F29) and 25 (15.3%) with bipolar disorder type 1 (ICD-10 F31) who were under treatment at a Community Mental Health Unit (CMHU, Virgen del Rocio University Hospital, Seville, Spain) at the beginning of follow-up. Of these, 106 were men (65%) and 57 women (35%). The mean age of the patients was 41.83 (*SD* = 12.82; range=18-77). Marital status was: 123 single (75.5%), 25 married (15.3%), 14 separated (8.6%) and 1 widow (0.6%).

Social functioning was evaluated by close relatives who had frequent contact with the patient at the beginning of the study. Participation was the following: 82 mothers (50.3%), 28 fathers (17.2%), 19 spouses (11.7%), 23 siblings (14.1%), 11 other family members (6.7%). Inclusion criteria were: 1) legal age, 2) diagnosis of schizophrenia or related psychotic disorders, and 3) agree to participate in the study. For close relatives, the inclusion criteria were voluntary participation in the study and having been selected by the patient as the person with the most knowledge of their condition. Exclusion criteria were severe organic disease and substance abuse or dependence.

Instruments and measures

The Social Functioning Scale (SFS, Birchwood et al., 1990) evaluates the most relevant areas of social functioning in schizophrenia and psychotic disorders. It is comprised of 77 items divided into seven dimensions: withdrawal/social engagement with scores of 0-15 (items such as “How often do you leave your home?”), interpersonal behavior with scores of 0-9 (with items like “Do you feel uncomfortable in a group of people?”), prosocial activities with scores of 0-66 (with items like “visit interesting places” or “go to parties”), recreation with scores of 0-45 (with items like “go for walks” or “go shopping”), independence-performance with scores of 0-39, independence-competence

with scores of 13-39. Although the last two dimensions contain the same items, in one, it is the perceived capacity that is evaluated and in the other it is the task really performed that is asked about (with items such as “prepare and cook meals” or “manage money”). Finally, employment/occupation with scores of 0-10 (with items such as “Do you have a regular job?” or “If you have a job: what kind of work?”). The items are scored from a minimum of 0 to maximum of 3, where higher scores show better social functioning. A total score also divides overall social functioning into low (<96 puntos), medium (96-106) and high (>106).

The instrument has two versions: self-report (SFS-SR), which is filled in by the patient and informant-report (SFS-IR), which is filled out by a close relative. The SFS-IR shows better sensitivity and fit (Jiménez-García-Bóveda et al., 2000), and was therefore the one used in this study. Its psychometric characteristics in both the English version (Birchwood et al., 1990) and its Spanish adaptation (Vázquez-Morejón & Jiménez-García-Bóveda, 2000), reinforce the validity and reliability of the scale, with an internal consistency (Cronbach’s alpha) of α=.85 and temporal reliability at three months of α=.84. In our sample, internal consistency was the following: withdrawal/social engagement α=.61, interpersonal behavior α=.86, prosocial activities α=.85, recreation α=.72, independence-performance α=.86, independence-competence α=.87, employment/occupation α=.36, total α=.91. This scale was selected because it is widely used for evaluating psychotic disorders and for the dimensional richness that can be studied with it. Furthermore, its items refer to observable and quantifiable behaviors, reducing any possible bias and making the evaluation more objective.

Procedure

The participants were selected based on a census of users with schizophrenia and other psychotic disorders who were under treatment at the beginning of the study and met the

inclusion criteria. The diagnosis had been made by a clinical psychologist or psychiatrist referring to each patient based on their clinical history and psychopathological exploration.

In a first stage, framed by appointments for checkups at the CMHU, according to the psychological evaluation protocol of the patients under treatment, a member of the team (the one with the most contact and/or confidence with the family) was responsible for requesting the participation of close relatives, and if they accepted, gave them the social functioning scale for its completion.

In a second stage, the patients who continued in the follow-up were tested when they went to their scheduled checkups at the CMHU for 10 years. Deaths were reported using the hospital computer application which updates the clinical history for each patient.

Statistical analysis

Analyses were performed using SPSS v.24. First the Kaplan-Meier method was employed to describe patient survival during the ten-year follow-up. Then a long-rank analysis was done to study whether there were any differences in the survival curves between patients with high, medium or low social functioning. Finally, a Cox regression analysis was done to predict mortality. Data had previously been checked by the Kolmogorov-Smirnov test to see that they followed a normal distribution and homoscedasticity was checked by the Levene's test. The Cohen's *d* was used to calculate the effect size, interpreted as: $d < 0.20$ = null; $\geq 0.20 < 0.50$ = small; $\geq 0.50 < 0.80$ = moderate; ≥ 0.80 = large (Cohen, 1988).

Results

Descriptive analysis

Table 1 shows the analysis of the dimensions, the overall score and low, medium and high social functioning levels by diagnosis and gender. Patients with schizophrenia had a lower

mean score on the various dimensions and in total social functioning, and men had a lower mean score in social functioning than women.

Survival analysis

Figure 1 presents the distribution of mortality in the study. As shown, 20 patients died during the follow-up period, of whom 16 were men and 4 were women, while 143 continued under treatment at the end of the follow-up, with a mean survival of 9.43 years. By diagnosis, 12 had schizophrenia, 6 other psychotic disorders and 2 had bipolar disorder. As shown in Table 2, no significant differences in mortality were found between schizophrenia and other psychotic disorders (p=.990, d= -0.029, null effect size), between schizophrenia and bipolar disorder (p=.815, d= 0.160, null effect size) or between other psychotic disorders and bipolar disorder (p=.793, d= 0.189, null effect size). Neither were there any significant differences by gender (p=.136, d= 0.255, small effect size) (Table 3). There were no significant differences in mortality between patients with low, medium or high levels (χ^2 (2) = .271, p= .873) of social functioning (Figure 2). The mean age of mortality was: low = 44.67; medium = 52.83; high = 63.

Predictors of premature death

The results of the Cox regression analysis with mortality as the dependent variable and social functioning (withdrawal/social engagement, interpersonal behavior, prosocial activities, recreation, independence-performance, independence-competence, employment/occupation) and age as the independent predictor variables may be seen in Table 4. The final model [χ^2 *(9)* p=.010] identified two variables with predictive capacity: interpersonal behavior (p=.045) and age (p=.018). Specifically, deficient functioning in interpersonal behavior and older age were predictors of premature death. On the contrary, the rest of the dimensions had no explanatory power.

Analysis of the interpersonal behavior factor found that the items with the lowest mean scores were 2 (“have a stable partner”, mean = .67), 9 (“Do you feel uncomfortable in a group of people?”, mean 1.46) and 10 (“Do you prefer to spend time alone?”, mean 1.17). As shown in Table 1, the interpersonal behavior dimension also had the lowest score in schizophrenia and in men in all the dimensions comprising social functioning.

Discussion

In general, the results found social functioning to be a role protector for survival in psychotic disorders. These results agree with previous research that underlines the importance of social functioning as a strategic factor in understanding the course of psychotic disorders (Liberman et al., 2002; Morin & Franck, 2017), and specifically, with an association between patients social functioning maintained and community integration (Johnstone et al., 1990), positive prognosis of the disease (Rajkumar & Thara, 1989) and meeting treatment goals (Burns & Patrick, 2007; Liberman et al., 2002; Peer et al., 2007). Our findings showed a trend of higher premature death in patients with lower social functioning. These results can be related to previous studies that have shown an association between impairment of the social area in early stages of the disorder and increase in autolytic behavior and suicide (Anderson et al., 2018; Kurdyak et al., 2021). Furthermore, severe impairment of social functioning in early stages has also been related to an unfavorable prognosis strengthening social isolation and use of toxic substances, alteration of family dynamics and more use of healthcare resources (Harvey et al., 2007; He et al., 2021; Raudino et al., 2014; Velthrost et al., 2017).

Our instrumental analysis of social functioning showed that deficiency in interpersonal behavior can predict premature death, exerting a protective role for maintaining functioning in other dimensions. In view of the content of the items, impaired interpersonal behavior may be related to a poor social network, both in size and quality

of the interaction (Guerrero-Jiménez et al., 2021). The possible relationship between interpersonal behavior and social support must be studied as there is a consensus that the social network is a relevant factor in understanding the course of psychotic disorders, emphasizing associations between a deficit in social support and an increase in clinical symptoms, chronicity and premature death in psychosis (Degnan et al, 2018; Holt-Lunstad et al, 2015; Vázquez-Morejón et al., 2018).

There were no significant differences in mortality by diagnostic category in the ten-year follow-up. One possible explanation is that social functioning may undergo stability and recovery during the course of schizophrenia and in other psychotic disorders if effective interventions, such as training in social skills, job support, assertive community training or family interventions are developed (Armijo et al., 2013; Gee et al., 2016; Harrow et al., 2005; Strauss et al., 2010). Therefore, psychosocial intervention in the early stages that stimulates social functioning, and indirectly, contributes to clinical and functional recovery, must be guaranteed (Michel et al., 2017; Schmidt et al., 2015).

The strengths of this study that should be mentioned are that it is longitudinal following up patients with severe mental disorders for 10 years, and secondly, that evaluation of social functioning was done by a close relative, which decreases any self-evaluative biases. With respect to the limitations, the sample size was small because it was a longitudinal study in a single CMHU, so inclusion of patients from other care centers would have provided our study with stronger representativeness and results. We also think it worth mentioning that we could not control for the specific causes of mortality of patients who died during the follow-up, whether from natural causes or not. Finally, social functioning evaluation was done by a single family member, and it might be of interest to include other members of the family or professionals (clinical psychologists, psychiatrists or nurses) who could make a more objective evaluation (Sabbag et al., 2011).

Future research could study what variables (frequency, intensity, individual or group, etc.) of effective psychological intervention in psychotic disorders best explain favorable evolution of social functioning and its protective effect on survival. It would also be of interest to study the possible relationship between social functioning and suicidal behavior, and suicide committed during both first psychotic episodes and during the course of the disorder, any gender differences and factors that could be explaining that variability.

In conclusion, our study emphasizes the importance of psychosocial factors in the course of psychotic disorders. The results confirm the protective effect of social functioning for survival, underlining a deficit in interpersonal behavior as a predictive dimension of premature death. Therefore, we believe that psychological intervention based on evidence directed at social functioning must be applied in the early stages of the disorder.

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Conflict of interest

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Background: Patients with severe mental disorders have a high risk of premature death due to the interaction of various factors. Social functioning is a strategic functional factor in understanding the course of psychotic disorders.

Aim: Analyze the relationship between social functioning and its various dimensions and survival during a 10-year follow-up.

Method: The Social Functioning Scale (SFS) was administered to 163 close relatives of patients under treatment at a Community Mental Health Unit. Survival was described by Kaplan-Meier analysis and any differences in survival by level of social functioning were found by long-rank analysis. Finally, Cox regression was used to predict premature mortality.

Results: Significant differences in mortality were identified in the interpersonal behavior dimension of social functioning, while there were no significant gender or diagnostic differences in the rest of the dimensions. The interpersonal behavior dimension and age were found to be factors predicting premature death.

Conclusion: These findings show the protective effect of social functioning retained by patients with psychotic disorders on their survival, and the need to apply evidence-based psychotherapy focused on recovery of social functioning in the early stages of the disorder.

Keywords: schizophrenia, psychotic disorders, bipolar disorder, course, premature death.

Table 1. Descriptive analysis of social functioning by diagnosis and gender (N=163).

	Schizophrenia (n=94)		**Other psychotic (n=44)**		**BAD (n=25)**		**Men (n=106)**		**Women (n=57)**	
	M	S.D.	M	S.D.	M	S.D.	M	S.D.	M	S.D.
Withdrawal/social engagement	9.22	2.67	9.95	3.07	9.44	2.35	9.01	2.86	10.28	2.30
Interpersonal behaviour	5.55	2.35	6.27	2.47	7.48	1.41	5.75	2.38	6.60	2.23
Prosocial activities	13.55	9.66	17.11	10.53	15.08	8.21	13.61	8.99	16.86	10.83
Recreation	14.63	6.42	15.73	6.38	15.40	7.36	14.37	6.64	16.30	6.20
Independence-performance	23.41	8.48	24.91	9.23	26.40	8.39	21.84	7.72	28.80	8.65
Independence-competence	32.96	4.93	34.09	6.16	33.72	6.61	32.56	5.28	34.91	5.75
Employment/occupation	4.10	3.52	6.07	3.27	6.44	3.76	4.46	3.48	5.98	3.71
Total SF	103.44	28.85	114.14	31.70	113.96	26.36	101.59	27.89	119.74	29.24
	n	%	n	%	n	%	n	%	n	%
SF Low	35	37.2	10	22.7	8	32.0	42	39.6	11	19.3
SF Medium	13	13.9	7	15.9	1	4.0	14	13.2	7	12.3
SF High	46	48.9	27	61.4	16	64.0	50	47.2	39	68.4

BAD: Bipolar affective disorder.

Table 2. Differences in survival by diagnosis.

		Mean difference	Error	*p*	Cohen´s *d*
Schizophrenia (n=94)	Other psychotic (n=44)	-.01	.06	.990	-0.029 N
	BAD (n=25)	-.05	.07	.815	0.160 N
Other psychotic (n=44)	BAD (n=25)	.06	.08	.793	0.189 N

N: Null effect size.

Table 3. Differences in survival by gender.

Men (n=106)		Women (n=57)		*p*	Cohen´s *d*	C.I.
M	S.D.	M	S.D.			
0.15	0.36	0.07	0.26	.136	0.255 S	[-0.026 , 0.187]

S: Small effect size

Table 4. Prediction of death.

χ^2	df	*p*
21.663	9	.010

Predictor variables	B	S.E.	*p*	C.I.
Withdrawal/social engagement	-.088	.105	.405	[.745 , 1.126]
Interpersonal behaviour	.309	.154	.045	[1.007 , 1.843]
Prosocial activities	.074	.047	.116	[.982 , 1.180]
Recreation	-.050	.059	.396	[.848 , 1.067]
Independence-performance	-.044	.039	.261	[.887 , 1.033]
Independence-competence	-.027	.051	.599	[.882 , 1.075]
Employment/occupation	-.089	.075	.236	[.790 , 1.060]
Age	.044	.019	.018	[1.008 , 1.084]

Figure 1. Distribution of deaths.

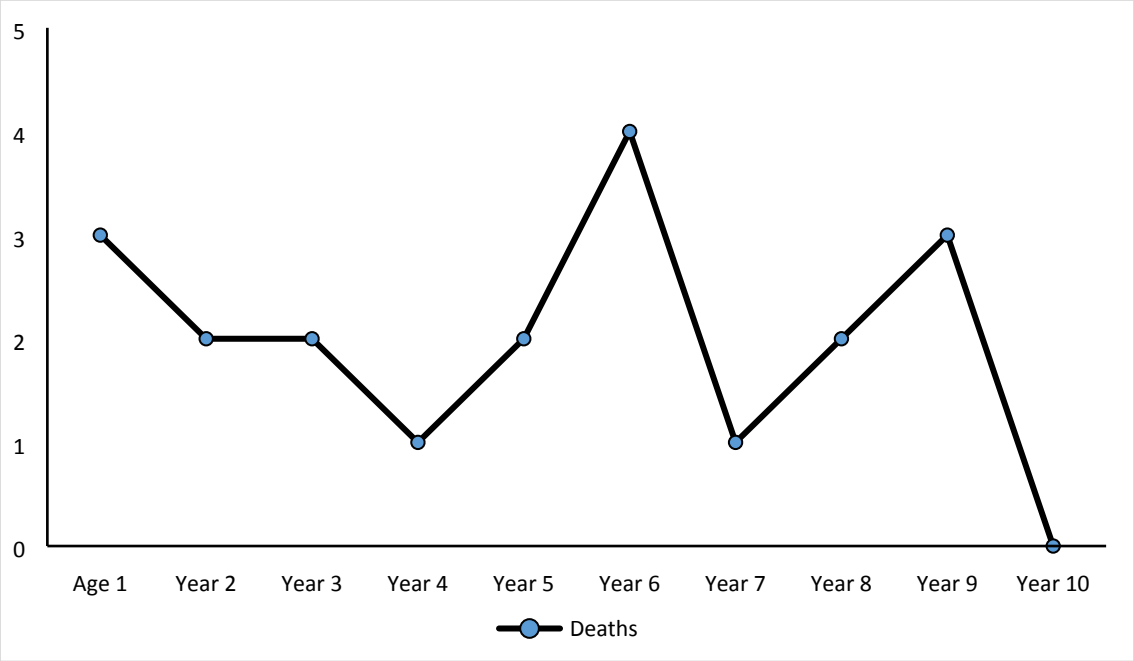

Figure 2. Distribution of deaths between low-medium-high social functioning.