## It is illegal to post this copyrighted PDF on any website. Neighborhood Vulnerability and Disability in First Episode of Psychosis: A Multilevel Study

Ana Izquierdo, PhD<sup>a,b,c</sup>; María Cabello, PhD<sup>a,b,c,\*</sup>, Itziar Leal, PhD<sup>a,b,c</sup>; Iosune Torio, PhD<sup>a</sup>; José L. M. Madrigal, PhD<sup>b,d</sup>; Karina S. MacDowell, PhD<sup>b,d</sup>; Roberto Rodriguez-Jimenez, PhD<sup>b,e,f</sup>; David Rentero, MD<sup>b,e</sup>; Ángela Ibáñez, PhD<sup>b,g</sup>; Miriam Ayora, MD<sup>b,h</sup>; Covadonga M. Díaz-Caneja, PhD<sup>b,h</sup>; Renzo Abregú-Crespo, MSc<sup>b,h,i</sup>; Blanca Mellor-Marsá, PhD<sup>j</sup>; Marina Díaz-Marsá, PhD<sup>b,j</sup>; Norberto Malpica, PhD<sup>k</sup>; María-Fé Bravo-Ortiz, PhD<sup>b,c,l,m</sup>; Enrique Baca-García, PhD<sup>b,c,n,o,p,q,r,s</sup>; Celso Arango, PhD<sup>b,h</sup>; Jose Luis Ayuso-Mateos, PhD<sup>a,b,c</sup>; and the AGES-CM Group<sup>t</sup>

### ABSTRACT

**Objective:** Neighborhood socioeconomic status seems to be related to functioning in patients with first episode of psychosis (FEP). The present study aimed to assess if neighborhood vulnerability and risk of social exclusion could predict functional outcomes in people with FEP after controlling for other key variables identified in previous literature.

**Methods:** A total of 137 patients with FEP (*DSM-IV-TR* criteria) and 90 controls comprised the study sample from February 2013 to May 2019. Functioning was assessed with the WHO Disability Assessment Schedule. Neighborhood vulnerability was measured using a multidimensional socioeconomic deprivation index; data for the index were collected by the Madrid City Council and based on the participant's home address. Multilevel mixed-effects regression analyses were conducted to estimate the effects of neighborhood vulnerability on functioning.

**Results:** Our results show that FEP patients could be more vulnerable to the effects of neighborhood-level characteristics than healthy controls (B = 1,570.173; z = 3.91; P < .001). In addition, our findings suggest that higher neighborhood vulnerability is related to greater functional disability in people with FEP, after controlling for other relevant confounders (B = 1,230.332; z = 2.59; P = .010).

**Conclusions:** These results highlight the importance of incorporating contextual factors into assessment of patients with FEP, since psychosocial difficulties observed in these patients could be partially related to the quality of neighborhood social-related resources.

J Clin Psychiatry 2023;84(2):22m14401

*To cite:* Izquierdo A, Cabello M, Leal I, et al. Neighborhood vulnerability and disability in first episode of psychosis: a multilevel study. *J Clin Psychiatry*. 2023;84(2):22m14401.

*To share:* https://doi.org/10.4088/JCP.22m14401 © 2023 Physicians Postgraduate Press, Inc.

<sup>a</sup>Instituto de Investigación Sanitaria del Hospital Universitario de La Princesa, IIS Princesa, Madrid, Spain

<sup>b</sup>Instituto de Salud Carlos III, Centro de Investigación Biomédica en Red de Salud Mental, CIBERSAM, Madrid, Spain

<sup>c</sup>Department of Psychiatry, Universidad Autónoma de Madrid, Madrid, Spain <sup>d</sup>Department of Pharmacology and Toxicology, Faculty of Medicine, Universidad Complutense de Madrid, IIS Imas12, IUIN, Madrid, Spain

<sup>e</sup>Department of Psychiatry, Instituto de Investigación Sanitaria Hospital 12 de Octubre (Imas12), Madrid, Spain

<sup>f</sup>Department of Legal Medicine, Psychiatry and Pathology, Universidad Complutense de Madrid (UCM), Madrid, Spain

<sup>g</sup>Department of Psychiatry, Hospital Universitario Ramón y Cajal, IRYCIS, Universidad de Alcalá, Madrid, Spain <sup>h</sup>Department of Child and Adolescent Psychiatry, Institute of Psychiatry and Mental Health, Hospital General Universitario Gregorio Marañón, IiSGM, School of Medicine, Universidad Complutense, Madrid, Spain

<sup>i</sup>Facultad de Psicología, Universidad Nacional de Educación a Distancia (UNED), Madrid, Spain

<sup>j</sup>Institute of Psychiatry and Mental Health, Hospital Clínico San Carlos, Instituto de Investigación Sanitaria Del Hospital Clínico San Carlos (IdISSC), School of Medicine, Universidad Complutense, Madrid, Spain

<sup>k</sup>Laboratorio de Análisis de Imagen Médica y Biometría (LAIMBIO), Universidad Rey Juan Carlos, Madrid, Spain

<sup>1</sup>Psychiatry, Clinical Psychology and Mental Health Department, Hospital Universitario La Paz, Madrid, Spain

<sup>m</sup>Instituto de Investigación Hospital Universitario La Paz, IdiPaz, Madrid, Spain <sup>n</sup>Department of Psychiatry, University Hospital Jimenez Diaz Foundation, Madrid, Spain

°Department of Psychiatry, University Hospital Rey Juan Carlos, Mostoles, Spain

PDepartment of Psychiatry, General Hospital of Villalba, Madrid, Spain <sup>q</sup>Department of Psychiatry, University Hospital Infanta Elena, Valdemoro, Spain

<sup>r</sup>Universidad Católica del Maule, Talca, Chile

<sup>s</sup>Department of Psychiatry, Centre Hospitalier Universitaire de Nîmes, France <sup>t</sup>AGES-CM Group: Juan C. Leza, PhD<sup>b.d</sup>; Ana Ortiz-Tallo, MSc<sup>a,b,c</sup>; Aggie Nuñez-Doyle, MSc<sup>e</sup>; Olga Jiménez-Rodríguez, MSc<sup>e</sup>; Jerónimo Saiz-Ruiz, PhD<sup>b.g</sup>; Enriqueta Ochoa, PhD<sup>g</sup>; Vito Cavone, MD<sup>h</sup>; Héctor de Diego, MD<sup>h</sup>; Pablo Mola, MSc<sup>l</sup> Patricia Gómez-Merino, MD<sup>j</sup>; Ainoa Muñoz-Sanjose, PhD<sup>L</sup><sup>m</sup>; Paz Vidal-Villegas, MSc<sup>m</sup>; Lucía Albarracin-García, MSc<sup>h</sup>; and Raquel Álvarez-García, PhD<sup>o</sup> *\*Corresponding author:* María Cabello, PhD, Department of Psychiatry, Universidad Autónoma de Madrid, c/ Arzobispo Morcillo, 4, 28029 Madrid, Spain (maria.cabello@uam.es).

There is growing global evidence that mental disorders in populations are strongly socially determined.<sup>1</sup> The World Health Organization defines the social determinants of health as the conditions in which people are born, grow, live, work, and age.<sup>2</sup> It is known that social determinants in the following 5 key areas have a significant influence on mental health: demographic, economic, neighborhood, environmental events, and social and cultural domains.<sup>1</sup>

The relationship between psychosis and socioeconomic disadvantage has been identified across diverse cultural, social, and demographic contexts.<sup>3</sup> Neighborhood deprivation has been related to the duration of untreated psychosis,<sup>4,5</sup> mental health service utilization,<sup>6</sup> and positive, negative, and depressive symptom severity,<sup>7–11</sup> as well as social isolation.<sup>10,12</sup> In addition, higher rates of psychosis in deprived neighborhoods have been repeatedly reported in systematic reviews and cross-sectional studies worldwide (eg, United Kingdom<sup>13–15</sup>; France<sup>14,16</sup>; The Netherlands, Italy,

It is illegal to post this copyrighted PDF on any website. Inger duration of untreated psychosis, and higher levels

### **Clinical Points**

- Functioning is a complex phenomenon, and wider neighborhood-level characteristics could be important determinants of functioning among individuals with a first episode of psychosis (FEP).
- Psychosocial difficulties observed among FEP patients could be partially related to neighborhood-level characteristics.

Spain, and Brazil<sup>14</sup>; Israel and Sweden<sup>16</sup>; and Australia<sup>17</sup>). However, the direction of the association between the variables remains to be elucidated,<sup>16-20</sup> and while some authors have proposed that neighborhood-level deprivation could trigger higher rates of psychosis (social causation model), others contend that people with psychotic disorders could be more likely to drift into more deprived areas (social selection/drift model).<sup>16,17</sup> Therefore, the links between socioeconomic deprivation and risk for psychosis seem to be complex, partly due to the fact that neighborhood socioeconomic deprivation is a multidimensional construct<sup>21</sup> that can be used as a marker of contextual characteristics and processes (eg, stigma, social norms, or social capital), including the availability of public services and environmental resources.<sup>22</sup>

Although the mechanisms underlying these associations are poorly understood,<sup>11,17</sup> a wide array of possibilities have been proposed. One of the most accepted theories, based on the vulnerability stress model, affirms that individuals living in disadvantaged neighborhoods can experience more life stressors (eg, unemployment,<sup>17,23</sup> financial strain,<sup>24</sup> poorer housing conditions or stigmatized reputation of the area,<sup>6</sup> and security problems, among others) and fewer resources to deal with them or sources of support (eg, lack of educational opportunities,<sup>25,26</sup> barriers to housing and services,<sup>27,28</sup> or low social support $t^{29-31}$ ), whereupon the vulnerability of these people would increase.<sup>1,10,26,32,33</sup> On the basis of these results, some authors have argued that neighborhoods constitute constellations of environmental risk factors,<sup>1</sup> to which psychotic patients seem to be particularly sensitive,<sup>34</sup> and many of which remain as relevant risk factors for mental health even after controlling for individual-level determinants.10,13,15,21,35

Taking a neighborhood-level perspective could be especially relevant in the study of psychosocial difficulties, since the functioning of a person in a given functional domain could be described as the result of a complex interaction between the health condition and environmental and personal factors.<sup>36-38</sup> Most of the previous literature reporting the role of neighborhood-level variables in psychotic patients has mainly focused on the prevalence or incidence of disease rather than on the daily functioning problems that these people could experience.<sup>16,39,40</sup> In this respect, the identification of outcome predictors for disability in psychotic spectrum disorders has been more challenging than originally thought,<sup>41</sup> since both the clinical presentation and the course are very heterogeneous.<sup>42,43</sup> Among them, we can highlight the role of lower premorbid functioning,

of psychopathology, particularly negative symptoms.44-48 However, other clinical and sociodemographic factors, such as deficits in neurocognition and social cognition, 43,45,49-51 substance use problems,43 male sex,52,53 younger age at onset,<sup>44</sup> lower educational attainment,<sup>53</sup> unemployment,<sup>54</sup> lower socioeconomic status,<sup>41,43</sup> and being single,<sup>55</sup> have been recognized.

A previous study<sup>56</sup> found that lower neighborhood household income was associated not only with lower functioning in patients with first episode of psychosis (FEP) but also with an increased duration of their difficulties with functioning. The present article proposes to take a further step forward in the study of the relationship between a multidimensional neighborhood-level disadvantage and functioning in FEP by considering not only neighborhood household income but also other neighborhood-level characteristics capable of assessing socioeconomic vulnerability and risk of social exclusion (ie, unemployment rate, household indebtedness, or demand for social services).

Based on prior research, we hypothesized that (1) the association between neighborhood vulnerability and functioning will differ between patients with FEP and healthy controls and (2) greater neighborhood vulnerability will be related to lower functioning in patients with FEP, even after controlling for other outcome predictors that have been identified in previous literature.

### **METHODS**

### **Study Sample**

All study subjects were participants in an observational study of patients with first episode of psychosis (AGES-CM) carried out at the outpatient clinic and inpatient unit at the 7 largest university hospitals in the Region of Madrid, Spain. The study protocol was approved by the appropriate institutional ethics committee at each center. A total of 137 patients and 90 controls provided informed consent and participated in the study from February 2013 to May 2019. The patients had to meet the following criteria to be included in this study: (a) age between 7 and 40 years and (b) experiencing their first episode of psychosis (per DSM-IV-TR criteria<sup>57</sup>) with a total lifetime duration of positive psychotic symptoms lower than 24 months. Exclusion criteria were (*a*) meeting diagnostic criteria for other current Axis I mental disorders (except substance use disorder), (b) meeting DSM-IV-TR criteria for intellectual disability, (c) history of neurodevelopmental disorders or head injury with loss of consciousness, and (d) pregnancy. The inclusion criteria for controls were (a) age between 7 and 40 years and (b) written informed consent. Exclusion criteria were (a) meeting diagnostic criteria for a current Axis I mental disorder; (b) meeting diagnostic criteria for intellectual disability, history of neurodevelopmental disorders, or head injury with loss of consciousness; (c) having a personal history or a first- or second-degree family history of a psychotic disorder; and (*d*) pregnancy.

#### Neighborhood Vulnerability in First-Episode Psychosis

It is illegal to post this copyrighted PDF on any website. Measures

**Sociodemographic variables.** Sociodemographic information was collected from participants and medical records. It included age (years), sex, marital status (single, steady partner, or divorced), level of education (elementary, secondary, or university), and occupational status (unemployed, employed, student, or pensioned). Furthermore, parental socioeconomic status (SES) was assessed following the Hollingshead-Redlich Index of Social Position.<sup>58</sup>

**Functioning.** Functioning was assessed with the WHO Disability Assessment Schedule (WHODAS 2.0).<sup>59</sup> This instrument captures functioning difficulties experienced by the respondent within the last 30 days in 6 domains of life: cognition, mobility, self-care, getting along with others, life activities, and participation. The 12 items were assessed using a 5-point Likert scale (from 0 = "no disability" to 5 = "extreme disability"). A summary score was calculated following the guideline suggested by Üstün.<sup>60</sup> In our sample, the Cronbach a coefficient was 0.908.

Premorbid functioning was measured following the Spanish version of the gold standard Cannon-Spoor's Premorbid Adjustment Scale (PAS).<sup>61</sup> This scale was designed to evaluate the level of functioning in 5 areas (sociability and withdrawal, peer relationships, academic performance, adaptation to school, and socio-sexual adjustment), including 5 developmental age periods: childhood (up to 11 years), early adolescence (12-15 years), late adolescence (16-18 years), and adulthood (>19 years).<sup>61</sup> It is composed of 26 items, assessed on a 6-point Likert scale (from 0 = "normal adjustment" to 6 = "severe impairment"). The average scores for each life stage, ranging from 0.0 to 1.0, were computed following the guidelines suggested by Cannon-Spoor et al.<sup>62</sup> The higher the score, the lower the level of premorbid adjustment. In the present study, internal consistency, measured by Cronbach a, was 0.653 for childhood, 0.735 for early adolescence, and 0.747 for late adolescence.

*Neighborhood vulnerability.* The home address at the first contact with psychiatric services was established as the patient's neighborhood of residence. Information about 49 postal codes was collected, in which a mean of 55,645.16 persons live. This information was used to obtain the neighborhood vulnerability, collected by the Madrid City Council (Spain) in 2020 (data available at https://datos. madrid.es/portal/site/egob).

The vulnerability index is the result of an Analytic Hierarchy Process, a standard method for multicriteria decision making.<sup>63</sup> It is composed of the following variables: (1) proportion of immigrants, (2) life expectancy at birth, (3) percentage of people without studies or with primary studies, (4) average net annual household income, (5) unemployment rate, (6) unemployment rate for those aged 45 and over, (7) unemployment rate of people without benefit, (8) rateable value of the property, (9) dependency rates, (10) number of families who receive the minimum vital income, (11) Home Help Services rate, (12) tele-assistance rate, and (13) number

of inhabitants. Once the indicators have been chosen and the weighting scheme established, the vulnerability index is calculated for each neighborhood.<sup>64</sup> Values range between 0.0054 and 0.0119 (mean = 0.0078; SD = 0.0017). The higher the value, the greater the neighborhood vulnerability.

*Clinical measures.* The assessments were conducted by trained psychiatrists or psychologists, who established the diagnosis according to the Structured Clinical Interview for *DSM-IV* Axis I Disorders (SCID-I)<sup>65</sup> or the Kiddie Schedule for Affective Disorders and Schizophrenia (K-SADS-PL), Spanish version,<sup>66</sup> as appropriate for their age.

Duration of untreated psychosis, defined as the time from the first positive psychotic symptoms to the initiation of adequate antipsychotic treatment, was recorded in weeks.

Symptom severity was assessed with the Positive and Negative Syndrome Scale (PANSS),<sup>67</sup> Spanish version.<sup>68</sup> It is composed of 30 items, assessed on a 7-point Likert scale (from 1 = "absent" to 7 = "extreme"). Following the 5-factor model proposed by Wallwork et al,<sup>69</sup> we calculated the scores for the Positive, Negative, Disorganized, Excited, and Depressed dimensions. This model has been previously validated and replicated in Spanish patients with schizophrenia.<sup>70</sup> Its internal consistency, measured by Cronbach a, was 0.831 for the Positive factor, 0.921 for Negative factor, 0.687 for Disorganized factor.

#### **Statistical Analysis**

Frequency analysis and mean and SD statistics were applied to describe the characteristics of the sample. Neighborhood vulnerability groups were divided according to the mean of our sample (0.0080). Normality of WHODAS scores was tested using Shapiro-Wilk *W* test. As our data were non-normally distributed, we have carried out our analysis using  $\chi^2$  test and Mann-Whitney *U* tests to examine possible differences between groups. With the purpose of establishing the effect size, Cramer *V* and eta-squared were calculated, respectively.

After that, 2 analysis strategies were employed using multilevel modeling to estimate the effects of neighborhood vulnerability on functioning. Multilevel models are used when cases belong to known groups and sample units are selected both from the individual level and from the group level.<sup>71</sup> Thereby, they are characterized as containing both fixed and random effects. The fixed effects are analogous to standard regression coefficients and are estimated directly, whereas the random effects are summarized in terms of their estimated variances and covariances.<sup>72</sup>

First, we carried out a mixed-effects regression with the purpose of determining if patients were more sensitive to the effects of neighborhood vulnerability. Thereby, general functioning predictors (such as sex, educational level, or premorbid functioning) were selected as fixed effects, whereas random effects were specified by the clustering variable ID (ie, postal code). In addition, we included an interaction among neighborhood vulnerability and type of participant, in order to assess the extent to which the relation

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Table 1 (continued).									
		Comp	arisons across pat	ients and controls		Comp	varisons across both patient groups		
Variable	Study sample (n = 227)	Controls $(n = 90)$	Patients (n = 137)	X <sup>2</sup> /U (P)	Cramer V/ŋ <sup>2</sup>	Patients living in less vulnerable neighborhoods (n = 74)	Patients living in more vulnerable neighborhoods (n=63)	X <sup>2</sup> /U (P)	Cramer S
Maintaining a friendship	1.66 (1.08)	1.16 (0.53)	1.99 (1.22)	39.112 (< .001)	.416	1.86 (1.16)	2.15 (1.29)	3.527 (.474)	
Work/school	1.82 (1.25)	1.09 (0.38)	2.32 (1.39)	59.435 (<.001)	.519	2.11 (1.24)	2.56 (1.53)	18.088 (.001)	372
How much did these	2.14 (1.27)	1.31 (0.72)	2.68 (1.26)	70.111 (<.001)	.557	2.54 (1.21)	2.85 (1.30)	3.618 (.460)	<b>g</b>
difficulties interfere?									6
How many days?	10.46 (12.48)	2.98 (7.17)	15.48 (12.79)	-7.681 (<.001)	.261	13.99 (12.77)	17.26 (12.68)	1.430 (.153)	:
Days unable to carry out usual	4.08 (8.48)	0.20 (1.11)	6.68 (10.14)	-6.611 (<.001)	.193	4.78 (9.01)	8.95 (11.01)	2.477 (.013)	.045
activities									C
Days reducing usual activities	6.20 (10.21)	0.69 (3.41)	9.93 (11.52)	-7.426 (<.001)	.224	7.43 (10.38)	12.89 (12.15)	2.755 (.006)	.055
PANSS, mean (SD)	51.36 (22.78)	63.17 (22.25)	33.38 (4.43)	-11.665 (<.001)	.602	62.58 (21.79)	63.86 (22.93)	0.400 (.689)	0
Positive factor	1.72 (1.08)	1.00 (0.02)	2.19 (1.17)	-9.775 (<.001)	.422	2.17 (1.24)	2.22 (1.08)	0.513 (.608)	:
Negative factor	1.99 (1.14)	1.09 (0.25)	2.58 (1.12)	-11.377 (<.001)	.572	2.62 (1.10)	2.53 (1.16)	-0.608 (.543)	:
Disorganized factor	1.73 (0.96)	1.15 (0.34)	2.11 (1.05)	-8.464 (< .001)	.316	1.99 (0.92)	2.25 (1.17)	1.08 (.280)	51
Excited factor	1.31 (0.65)	1.04 (0.15)	1.48 (0.79)	-6.807 (<.001)	.205	1.49 (0.79)	1.47 (0.78)	0.284 (.777)	:
Depressed factor	1.85 (1.07)	1.22 (0.44)	2.27 (1.15)	-8.465 (<.001)	.317	2.36 (1.16)	2.17 (1.14)	-1.044 (.297)	:
Abbreviations: DUP = duration of u	ntreated psychosis,	NOS = not otherwi	ise specified, PANS	S = Positive and Neg	Jative Syndi	rome Scale, PAS = Premorbid Adjus	tment Scale, WHODAS = World Health	Organization Dis	bility
Assessment Schedule.									S
									C

Petween neighborhood vulnerability and functioning could be moderated by the participant group (patient or healthy control).

Second, with the aim of examining if neighborhood vulnerability predicts patients' functioning after controlling for the effects of other variables, another mixed-effects regression model was estimated only in participants with FEP. In this case, fixed effects were composed of widely acknowledged predictors of functioning in people with FEP (eg, duration of untreated psychosis, symptom severity, sex, age at onset, or marital status), while postal code was selected as a random effect. In both cases, confidence intervals were obtained, and robust standard errors techniques were employed.

Sensitivity analyses were performed in order to control the possible influence of recent house moves.

Descriptive analyses were carried out using SPSS software, version 25,<sup>73</sup> whereas multilevel models were conducted with STATA, version 15.<sup>74</sup>

### RESULTS

A total of 137 patients and 90 controls comprised our study sample. Patients showed a higher likelihood of being unemployed  $(\chi^2_2 = 29.232; P < .001)$ ; having lower premorbid functioning in childhood (U = -3.719: P < .001), early adolescence (U = -2.408: P = .016), and late adolescence (U = -4.678: P < .001); higher levels of disability (U = -9.155: P < .001); and higher symptom severity (U = -11.665; P < .001) than controls. When comparing the two patient groups based on neighborhood vulnerability, those living in more vulnerable neighborhoods were less likely to be single  $(\chi^2_2 = 7.551; P = .023)$  and had lower educational level  $(\chi^2_2 = 11.061;$ P=.011) and greater disability (U=-2.221; P=.026), particularly in cognitive functioning ( $\chi^2_4 = 10.093$ ; *P*=.039), mobility ( $\chi^2_4 = 13.823$ ; P = .003), household responsibilities ( $\chi^2_4 = 10.718$ ; P = .030), being emotionally affected ( $\chi^2_4$  = 10.997; *P* = .027), and work performance  $(\chi^2_4 = 18.088; P = .001)$ . Moreover, this patient subgroup reported a mean of 8.95 days unable to carry out their usual activities (U=2.477; P=.013), which had to be reduced by almost half of the days in the preceding month (U=2.755; P=.006) (Table 1).

In relation to our first hypothesis, we found a significant group × neighborhood vulnerability interaction. In patients, neighborhood vulnerability was significantly associated with functioning (B = 1,570.173; z = 3.91; P < .001 [95% CI, 782.54 to 2,357.79]), even after controlling for other individual predictors of functioning, such as sex, occupational status, educational level, marital status, premorbid functioning, or parental socioeconomic status. However, we did not find a significant effect of neighborhood vulnerability in the control group (Table 2). The functioning of controls seems to remain stable regardless of neighborhood vulnerability, whereas in patients, functioning problems increase as neighborhood vulnerability rises (Figure 1).

Conversely, if we focus exclusively on patients, our results showed that greater neighborhood vulnerability was related to higher disability (B = 1,230.332; z = 2.59; P = .010 [95% CI, 297.96 to 2,162.69]), after accounting for the effects of additional key clinical variables identified in previous literature (Table 3). We also found that lower functioning was significantly associated with shorter duration of untreated psychosis (B = -0.043; z = -2.02; P = .044 [95% CI, -0.085 to -0.001]), being female (B = 3.879; z = 2.50;

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# Table 2. First Mixed-Effect Regression: Variables Related to Functioning

	Fixe	ed Effects					
		Robust					
		standard			95% Confidence		
Variables	Coefficient	error	Ζ	Р	interval		
Type of subject (patient)	-3.91	3.05	-1.28	.201	-9.90 to 2.07		
Neighborhood vulnerability	90.30	162.13	0.56	.578	-227.47 to 408.08		
Type of subject × neighborhood vulnerability	1570.17	401.85	3.91	<.001	782.54 to 2357.79		
Sex (male)	-1.73	0.92	-1.88	.060	-3.54 to 0.07		
Occupational status							
Unemployed	-0.51	0.95	-0.54	.590	-2.39 to 1.35		
Student	1.19	1.18	1.00	.315	-1.13 to 3.51		
Level of education							
Secondary school	0.74	1.86	0.40	.691	-2.91 to 4.39		
University	1.27	2.08	0.54	.588	-2.95 to 5.21		
Others	-2.99	2.60	-1.15	.291	-1.13 to 3.80		
Marital status							
Steady partner	1.33	1.26	1.06	.291	-1.13 to 3.80		
Divorced	3.63	2.21	1.64	.100	-0.70 to 7.97		
Parental SES	0.021	0.026	0.08	.399	-0.02 to 0.07		
Age	0.035	0.087	0.41	.685	-0.13 to 0.20		
PAS							
Childhood	12.23	3.12	3.92	<.001	6.12 to 18.35		
Early adolescence	-1.29	2.92	-0.44	.685	-7.02 to 4.44		
Late adolescence	4.39	2.64	1.66	.096	–0.78 to 9.57		
	Ranc	dom Effects					
			Rok	oust	95% Confidence		
Variables	Estimate		standard error		interval		
Postal code	0.8	35	1.30		0.04 to 17.18		
Residual	34.5	51	5.48		25.27 to 47.13		
Abbreviations: PAS - Premarbid Adjustment Scale SES - socioeconomic status							

*P*=.012 [95% CI, 0.841 to 6.916]), having a partner (B=7.029; *z*=2.41; *P*=.016 [95% CI, 1.303 to 12.756]), lower childhood premorbid functioning (B=20.594; *z*=2.68; *P*=.007 [95% CI, 5.506 to 35.681]), and greater severity of positive symptoms (B=2.375; *z*=3.28; *P*=.001 [95% CI, 0.956 to 3.794]) and excitement symptoms (B=3.378; *z*=2.55; *P*=.011 [95% CI, 0.777 to 5.979]).

Our patients had been living in the stated addresses for a mean of 8.95 years, and only 22.6% of them had moved to another house in the last 2 years. However, the influence of neighborhood vulnerability on functioning emerged even after considering if participants had recently moved (B = 1,653.57;  $\beta$  = 0.308;  $t_{2,99}$  = 3.073; *P* = .003).

### DISCUSSION

Social determinants of health have gained remarkable attention due to their role in perpetuating health inequity within and across countries.<sup>32</sup> In this way, it has been recognized that in a given place there may occur a variety of conditions, produced by cascades of social processes across multiple levels, which has led some researchers to consider place as a reservoir of risk or resilience.<sup>20</sup> In this context, neighborhood socioeconomic disadvantage has been related to lower functioning in patients with psychosis.<sup>56</sup> The present study aimed to enhance the knowledge on social determinants of functioning in FEP and to ascertain if neighborhood vulnerability could be associated with higher disability, even after controlling for

Figure 1. Interaction Among Neighborhood Vulnerability and Disability According to the Type of Participant



other outcome predictors that have been identified in previous literature.

Our results seem to indicate that in patients, but not in healthy controls, there is a significant association between neighborhood vulnerability and functioning level. This idea was previously defended by van Os et al,<sup>34</sup> who noted that vulnerable subgroups, such as psychotic patients, are more sensitive to a particular environmental risk factor. These findings are in line with the vulnerability-stress model.<sup>75</sup> Although it is now thought that people with mental health problems could be more susceptible to higher stress levels,<sup>76</sup> the reasons remain unknown.<sup>77</sup>

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It is illegal to post thus convertence of the second Mixed-Effect Regression: Variables Related to Functioning in **FEP Patients** 

Fixed Effects								
		Robust standard			95% Confidence			
Variables	Coefficient	error	Ζ	Р	interval			
Age at onset	0.03	0.15	0.22	.823	-0.26 to 0.33			
DUP (weeks)	-0.04	0.02	-2.02	.044	-0.08 to -0.00			
Sex (female)	3.87	1.54	2.50	.012	0.84 to 6.91			
Occupational status								
Unemployed	-2.70	1.43	-1.89	.058	-5.51 to 0.09			
Student	-2.56	2.50	-1.02	.307	-7.47 to 2.34			
Level of education								
Secondary school	0.24	2.50	0.10	.923	-4.66 to 5.14			
University	-0.92	2.45	-0.38	.707	-5.73 to 3.88			
Marital status								
Steady partner	7.02	2.92	2.41	.016	1.30 to 12.75			
Divorced	4.52	3.54	1.28	.202	-2.42 to 11.48			
Parental SES	0.08	0.42	1.91	.056	-0.00 to 0.16			
PAS								
Childhood	20.59	7.69	2.68	.007	5.50 to 35.68			
Early adolescence	-3.71	5.41	-0.69	.493	-14.32 to 6.90			
Late adolescence	-2.55	5.25	-0.49	.627	-12.84 to 7.74			
Neighborhood vulnerability PANSS	1230.33	475.70	2.59	.010	297.96 to 2162.69			
Positive factor	2.37	0.72	3.28	.001	0.95 to 3.79			
Negative factor	1.98	1.02	1.94	.052	-0.01 to 3.99			
Disorganized factor	-0.74	1.47	-0.51	.613	-3.64 to 2.14			
Excited factor	3.37	1.32	2.55	.011	0.77 to 5.97			
Depressed factor	-0.55	0.71	-0.78	.435	-1.95 to 0.84			
	Rano	dom Effects						
				ust	95% Confidence			
Variables	Estim	Estimate		d error	interval			
Postal code	1.9	6	1.30		4.35 to 8.82			
Residual	31.5	31.57		16	22.49 to 44.39			
Abbreviations: DUD duration of untreasted neurobasis DANICE Desitive and Negative Sundrame								

duration of untreated psychosis, PANSS Scale, PAS = Premorbid Adjustment Scale, SES = socioeconomic status.

Likewise, we found that neighborhood vulnerability was associated with functioning problems in people with FEP, even after controlling for other relevant individual outcome predictors, including premorbid functioning, the duration of untreated psychosis, and clinical severity. These results underline the idea that a functional limitation is multidimensional and arises from the interplay between a person and his/her physical, social, and attitudinal context.<sup>38,78</sup> This idea supports that the difficulties often observed in patients with psychotic spectrum disorders go far beyond their health condition and are also substantially influenced by other critical determinants of health (such as poverty, unemployment, and lack of social support) that are very disabling on their own and are too often complicating their clinical prognosis.<sup>79</sup>

On the other hand, our analysis showed that those patients who live in more vulnerable neighborhoods had lower functioning, and these difficulties where particularly noticeable in concentration, walking a long distance, household responsibilities, being emotionally affected by their health condition, and work performance. First, the differences found in concentration difficulties could be related to the lack of educational opportunities often present in those who live in less advantaged neighborhoods.<sup>26</sup> Vargas et al<sup>25</sup> argued that lack of needed educational, cognitive, economic, or health resources could lead to neural

understimulation in certain key functions, which could negatively impact neurodevelopment. Thus, the exposure to deprivation would have marked effects on complex cognitive task performance, such as language, executive functions, and memory.<sup>80,81</sup> Second, the mobility difficulties could be explained by the fact that deprived neighborhoods tend to have higher population density and collective dwellings, greater deterioration and less maintenance of public space, and reduced equipment,<sup>82</sup> constituting a barrier to walk around. Third, difficulties in daily life activities have been previously identified in psychotic spectrum patients with lower socioeconomic status.<sup>56,78</sup> A possible explanation could be related to their housing conditions (ie, quality of the housing, housing overcrowding, or residential type),<sup>6</sup> which, combined with the impact of the disease and their lack of coping resources (eg, barriers to cleaning services), could lead these patients to a poorer performance. Fourth, the possible shortcomings identified in work performance could be related to both their cognitive difficulties<sup>83</sup> and their working conditions. There is a growing body of knowledge about the links between socioeconomic inequalities and physical (eg, physical effort, ergonomics and safety) and psychosocial job characteristics (such as job demands, or stability).<sup>84,85</sup> Finally, the differences found in their emotional affectation could be explained by the lower social support that those who live in more vulnerable

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neighborhoods used to experience.<sup>20,29–31</sup> It is known that a psychotic episode may increase feelings of alienation and isolation, since youth who have experienced a recent onset reported losing contact with friends and feeling different from others.<sup>86</sup> However, living in disadvantage makes it more difficult for patients to develop social relationships, but also to try to counteract those limitations.<sup>87</sup>

Our study has some limitations that should be considered. First, all of the participants inhabited the city of Madrid (Spain), so these results could not be generalized to other areas. Second, our findings are based on a cross-sectional design, which prevents us from drawing cause-effect conclusions or throwing light on the debate about the direction of the association between neighborhood deprivation and psychosis (social model versus selectivity model). Third, although no significant differences have been found regarding parental SES between postal codes, not everyone who lives in the same postal code has the same socioeconomic level, so a certain bias cannot be ruled out. Fourth, some variables were self-reported. Fifth, notwithstanding that the 2020 vulnerability index contains information from 2013 to 2020, some subvariables might not coincide with the years when participants lived in their neighborhoods. Despite this, our work provides advantages over previous studies: (1) our study has a multicentric and relatively large sample of patients with FEP, addressed from a transdiagnostic perspective; (2) we used a multidimensional socioeconomic deprivation index; and (3) the focus was on the relationship between socioeconomic conditions and disability rather than on the disease (ie, incidence, prevalence, or severity of disorder). Our results underline the importance of neighborhood social-related resources in functioning of people with FEP. At the same time, they support the complexity identified in the relationship between socioeconomic disadvantage and health outcomes,<sup>1,3,11</sup> highlighting the importance of developing local contextual solutions rather than imposing universal ones.<sup>1</sup> Future research may greatly benefit from incorporating contextual factors into assessment, risk models, and preventive and intervention strategies<sup>88</sup>; expanding the concept of mental illness from the individual level to public health<sup>35,89</sup>; and advocating for policy change.<sup>3</sup> Furthermore, it is now known that the negative health effects of living in a disparate society are not restricted to those who occupy the lowest ranks but are experienced by all members of that society, eroding social capital and leaving individuals more vulnerable to psychosocial stressors.<sup>32</sup> Thus, whether neighborhood socioeconomic inequalities could be related to higher disability in FEP should also be explored.

In summary, psychosocial difficulties observed in patients with FEP could be partially related to neighborhood-level characteristics. In this regard, previous literature has pointed to the need for strengthening protective factors, such as creating living conditions and environments that provide FEP patients coping skills to manage stress and face the adversities that may appear.<sup>83,90</sup>

### submitted: January 19, 2022; accepted October 26, 2022. Published online: March 13, 2023.

Author contributions: Dr Izquierdo: investigation, conceptualization, data curation, formal analysis, writing-original draft; Dr Cabello: supervision, writing—review and editing; Dr Leal: resources, writing—review and editing; Dr Torio: investigation, resources, writing-review and editing; Dr Madrigal: investigation, resources, writing-review; Dr MacDowell: investigation, resources, writing-review; Dr Rodriguez-Jimenez: investigation, resources, funding acquisition, writing-review and editing; Dr Rentero: investigation, resources, writing-review; Dr Ibáñez: investigation, resources, funding acquisition, writing-review and editing; Dr Ayora: project administration, investigation, resources, data curation, writing-review and editing; Dr Díaz-Caneja: project administration, funding acquisition, investigation, resources, data curation, writing-review and editing; Mr Abregú-Crespo: investigation, resources, writing-review and editing; Dr Mellor-Marsá: investigation, resources, writing-review and editing; Dr Díaz-Marsá: investigation, resources, funding acquisition, writing-review; Dr Malpica: investigation, resources, funding acquisition, writing-review; Dr Bravo-Ortiz: investigation, resources, funding acquisition, writing-review; Dr Baca-García: investigation, resources, funding acquisition, writing-review; Dr Arango: project administration, funding acquisition, investigation, resources, data curation, writing—review; Dr Ayuso-Mateos: funding acquisition, investigation, resources, supervision, writing-review and editing.

Relevant financial relationships: Dr Rodriguez-Jimenez has been a consultant for, spoken in activities of, or received grants from Instituto de Salud Carlos III, Fondo de Investigación Sanitaria (FIS), Centro de Investigación Biomédica en Red de Salud Mental (CIBERSAM), Madrid Regional Government (S2010/ BMD-2422 AGES; S2017/BMD-3740), Janssen-Cilag, Lundbeck, Otsuka, Pfizer, Ferrer, Juste, Takeda, Exeltis, Casen-Recordati, and Angelini. Dr Ibáñez received grants or research support from or served as speaker or advisor for Spanish Ministry of Science, Innovation and Universities, (Instituto de Salud Carlos III), CIBERSAM, Madrid Regional Government, Janssen-Cilag, Lundbeck, and Otsuka. Dr Saiz-Ruiz has been a speaker for and on the advisory boards of Adamed, Lundbeck, Servier, Medtronic, Casen Recordati, Neurofarmagen, Otsuka, Indivior, Lilly, Schwabe, Janssen, and Pfizer, outside the submitted work. Dr Díaz-Caneja has received grant support from Instituto de Salud Carlos III, Spanish Ministry of Science, and Innovation (PI17/00481, PI20/00721, JR19/00024) and has received honoraria or travel support from Exeltis, Sanofi, Otsuka, and Janssen outside the submitted work. Dr Arango has been a consultant to or has received honoraria or grants from Acadia, Abbott, AMGEN, Angelini, AstraZeneca, Bristol-Myers Squibb, Caja Navarra, CIBERSAM, Fundación Alicia Koplowitz, Forum, Instituto de Salud Carlos III, Gedeon Richter, Janssen-Cilag, Lundbeck, Merck, Medscape, Ministerio de Ciencia e Innovación, Ministerio de Sanidad, Ministerio de Economía y Competitividad, Mutua Madrileña, Otsuka, Pfizer, Roche, Servier, Shire, Schering Plough, Sumitomo Dainippon Pharma, Sunovion, and Takeda. The other authors report no relevant financial relationships.

Funding/support: This work was supported by the Madrid Regional Government (R&D activities in Biomedicine (grant number S2017/BMD-3740 -AGES-CM 2-CM)) and Structural Funds of the European Union. Dr Izquierdo's work is supported by the PFIS predoctoral program (FI17/00138) from the Instituto de Salud Carlos III (Spain), co-funded by the European Union (ERDF/ ESF, "A Way to Make Europe"/"Investing in Your Future") and the Biomedical Research Foundation of La Princesa University Hospital. Dr Rodriguez-Jimenez was supported by the Instituto de Salud Carlos III (grant PI19/00766; Fondo de Investigaciones Sanitarias/FEDER) and by the Madrid Regional Government (S2017/BMD-3740). Dr Ibáñez acknowledges support by the Madrid Regional Government and European Union Structural Funds (R&D Activities in Biomedicine S2017/BMD3740: AGES-CM 2-CM), support by CIBERSAM and by the Spanish Ministry of Science, Innovation and Universities, Instituto de Salud Carlos III co-financed by ERDF Funds from the European Commission, "A Way of Making Europe" (PI16/00834 and PI19/01295). Dr Bravo-Ortiz has received grant support from the Madrid Regional Government (S2017/BMD-3740 (AGES-CM 2-CM), PEJD-2018-PRE/SAL-9039, PEJD-2017-AI/SAL-5716), the Instituto de Salud Carlos III, Spanish Ministry of Science, and Innovation (PI17/00768, PI20/01113, COV20/00988), Fondo de Investigaciones Sanitarias/ FEDER), and the European Development Regional Fund "A Way to Achieve Europe" (ERDF). Dr Díaz-Caneja has received grant support from Instituto de Salud Carlos III, Spanish Ministry of Science, and Innovation (PI17/00481, PI20/00721, JR19/00024). Dr Arango was supported by the Spanish Ministry of Science and Innovation. Instituto de Salud Carlos III, co-financed by ERDF Funds from the European Commission, "A Way of Making Europe," CIBERSAM, European Union Seventh Framework Program, European Union H2020, Fundación Familia Alonso, and Fundación Alicia Koplowitz. The other authors and group members report no relevant financial relationships. Role of the sponsor: The authors declare that the support received and described above did not influence the work reported in this article. Acknowledgments: The authors thank the AGES-CM research team, who helped with the data collection, and all of the participants in the study.

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