Social contacts, friends and satisfaction with friendships in patients with psychotic, mood and neurotic disorders 1 year after hospitalisation: data from five European countries

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Abstract

Background People with severe mental illness often struggle with social relationships, but differences among diagnostic groups are unclear. We assessed and compared

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objective and subjective social relationship indicators among patients with psychotic, mood and neurotic disorders one year after hospitalisation in five European countries (Belgium, Germany, Italy, Poland and United Kingdom).

Methods The number of social contacts, including family members and friends during the previous week (Social Network Schedule), and satisfaction with the number and quality of friendships (Manchester Short Assessment of Quality of Life Quality) were assessed by face-to-face interview. Linear regression models were used to analyse associations with diagnostic groups.

Results Participants (n = 2155) reported on average 2.79 ± 2.37 social contacts overall in the previous week, among whom, a mean of 1.65 ± 1.83 (59.2 ± 38.7%) were friends. Satisfaction with friendships was moderate (mean 4.62, SD 1.77). In the univariable model, patients with psychotic disorders reported having less social contact with friends than those with either mood (p < 0.05) or neurotic disorders (p < 0.001), but this difference disappeared when adjusting for socioeconomic and clinical variables (β = -0.106, 95% CI -0.273 to 0.061, p = 0.215). Satisfaction with friendships was similar across diagnostic groups in both univariable (β = -0.066, 95% CI - 0.222 to 0.090, p = 0.408) and multivariable models (β = 0.067, 95% CI - 0.096 to 0.229, p = 0.421). The two indicators showed a weak correlation in the total sample (total social contacts, r_s = 0.266; p < 0.001; friends, r_s = 0.326, p < 0.001).

Conclusion While objective and subjective social relationship indicators appear to be weakly correlated concepts, there is no variation in either indicator across diagnostic groups when confounders are taken into account among patients with severe mental illness. Interventions specifically targeting social relationships are needed, but they do not necessitate diagnosis-specific adaptations.

Keywords Social contacts, Social relationships, Quality of life, Friends, Europe

Introduction

Social relationships exert significant influence on both physical and mental wellbeing in the general population [1]. Evidence indicates that social isolation may have comparable effects on morbidity and mortality to well-established risk factors, including hypertension, obesity and smoking [2, 3] and that itself can be a predictor of coronary and cerebrovascular disease [4] and chronic pain [5]. With respect to mental health, social relationships may act directly to foster morale and self-esteem, and indirectly by resilience against trauma conferring [6]. Difficulties with social relationships in turn negatively influence the subjective quality of life [7, 8], and contribute to poor long-term prognosis in people with mental disorders [9].

Social relationships can be evaluated by means of objective indicators, e.g., size and composition of one's social network, the number of social contacts; and subjective indicators, e.g., satisfaction with relationships and perceptions of loneliness [10]. Studies have shown that people with any form of mental illness have fewer social contacts and a poorer subjective satisfaction with their relationships compared with people without mental illness [7, 11, 12]. In general populations, these two indicators of social relationships may be independent of one another, such that individuals can experience dissatisfaction with their social relationships despite objective evidence of extensive social contact and support [11, 13].

Among people with mental illness the relationship between these two social relationship indicators remains less well understood [14]. The majority of existing research on social

relationships has focused on people with psychotic disorders [15], showing impaired social interaction even during pre-morbid stages [15, 16]. Eventually social relationships become restricted to family members or mental health professionals during the course of the illness [12]. Social relationships among people with mood disorders are also negatively affected [17]. However, evidence is scarce and there may be an assumption that social relationships could be affected less extensively relative to those in people with psychosis [7, 18, 19]. Even less is known about the nature of the characteristics of social relationships among people with neurotic disorders [17, 20]. Within the realm of social relationships, friendships are taking an increasingly important role in contemporary society as more people live alone away from family members [12]. Yet, data about the quantity and frequency of actual social contact with friends, as well as the perceived quality of friendship among people with mental illness are even less known [12].

Only one previous small study has conducted comparative assessment of both subjective and objective social relationship indicators in participants with different psychiatric diagnoses [18]. Findings indicated that people with psychotic disorders had lower odds of reporting loneliness relative to those with mood disorders despite having fewer social contacts. This study was, however, carried out in a limited urban area, had a small sample size (n = 100), did not address friendship as a sub-group of the overall social contacts and did not include people with neurotic disorders.

The current study aims to assess objective and subjective social relationship indicators in a large

multi-country sample of patients with different types of mental illness who had been hospitalised at least one year prior to recruitment, hence reflective of overall illness severity. The research question is: Are there differences between patients with different psychiatric diagnoses, namely psychotic, mood and neurotic disorders in the number of social contacts, including family members and friends, outside their immediate settings (i.e., home, work or healthcare) and their subjective satisfaction with social relationships, specifically with respect to friendships?

Methods

Study design and setting

The current study is part of the larger parent study "Comparing policy framework, structure, effectiveness and cost effectiveness of functional and integrated systems of mental health care (COFI) study" (trial registration: ISRCTN40256812). In summary, COFI was a natural experimental study evaluating clinical outcomes of two different approaches to the interface between in-patient and out-patient care across five European countries (Belgium, Germany, Italy, Poland and UK) in a total of 57 representative hospitals. Participants were recruited on admission and followed-up for 1 year as detailed in the main paper published elsewhere [21]. The current study is cross-sectional and conducted on a sub-set of randomly selected participants, stratified by diagnostic group and on whether they had had previous episodes of hospitalisation prior to recruitment or not. Faceto-face quantitative interviews specific to this study were completed between 12 and 14 months after initial recruitment into the main study.

Participants

Patients were eligible for inclusion at baseline at their index hospitalisation if they met the following criteria: (i) a formal ICD-10 [22] diagnosis of psychotic disorders (F20–29), mood [affective] disorders (F30–39) or neurotic/somatoform disorders (F40–49); (ii) 18 years of age or older; (iii) hospitalised in a general adult psychiatric in-patient ward; (iv) sufficient command of the language in the host country to undertake research interviews; (v) capacity to provide informed consent to participation. Patients were excluded if they had: (i) an organic brain disorder or (ii) severe cognitive impairment preventing them from completing the assessments.

In total, 7302 participants with diagnoses of psychotic, mood or neurotic disorders were included in the baseline analysis of the original study [21], of whom 6369 (87.2%) were analysed 1 year after the index hospitalisation. Of these, 2989 (46.9%) were subsequently randomly selected to participate in this study, with 2155 (72.1%) completing the interview and yielding usable data for further analysis.

Measures

Social relationship indicators

Objective indicators of social relationships were measured by an ad hoc structured interview adapted from the Social Network Schedule [23]. Participants were asked to list the initials of social contacts they had outside their immediate home, work or healthcare setting within the week preceding the assessment, and to self-define the type of relationship they have with this contact, i.e., family member, friend or other. Superficial contacts, e.g., casual conversation at a shop, on public transport, etc. were excluded. Researchers conducting these interviews were instructed to assist participants with their responses when ambiguity arose regarding the definition of social contacts and/or the type of relationship.

As the social network of people with mental illness often becomes restricted to their clinicians or to family members living intimately within their household as the illness progresses [12], we specifically aimed to capture the extent of social interaction outside of these contexts. Therefore, social contacts outside these environments are likely to be more reflective of the actual social activity of individuals with mental illness, whereas the number of people they work with, live with or are treated by, may not be determined by social activity per se.

We then computed separate variables for: (i) the total number of social contacts (family, friends or significant other contacts); (ii) social contact with

family members; (iii) social contact with friends, per week for each participant. For our main analysis, we focused on social contact with friends to mirror the subjective social relationship indicator below with respect to friendship. Supplementary analyses were also conducted with the total number of social contacts to facilitate comparison with other studies.

To measure subjective indicators, we used a single item from the Manchester Short Assessment of Quality of Life (MANSA) [24] as a measure for the subjective quality of social relationships, asking participants: "how satisfied are you with the number and quality of your friendships?". The MANSA is administered as a structured interview with each subjective item measured on a Likert scale rated from 1 to 7, anchored on the following responses, respectively: "could not be worse", "displeased", "mostly dissatisfied", "mixed", "mostly satisfied", "pleased" and "could not be better".

Sociodemographic and clinical variables

Fixed sociodemographic characteristics were collected at baseline directly from participants, namely: gender, age, migration status and level of education. Follow-up data obtained from medical records, telephone or face-to-face assessments were used for unfixed characteristics, namely: employment, receipt of social benefits, homelessness, civil status and living arrangements.

Clinical variables were collected by self-report or from medical records and/or discharge letters as appropriate, including: psychiatric diagnosis upon discharge, legal status of baseline admission (voluntary vs. involuntary), whether or not the patient had been admitted to hospital prior to the index hospitalisation, psychiatric co-morbidity and severity of psychiatric symptoms on admission as determined by the treating psychiatrist using the Clinical Global Impression Scale (CGI) [25].

Statistical analysis

Data analysis was conducted using Stata v14.0 for Windows (StataCorp, 2016). We provided descriptive statistics (mean, median and standard deviation) for sociodemographic and clinical variables of the total sample and sub-samples classified by diagnostic group. To compare variables between groups, we used Chi-square tests for dichotomous variables and Kruskal– Wallis tests for continuous variables given the non-parametric distribution of the data.

Social relationship indicators were treated as continuous variables. Their association across diagnostic groups were initially evaluated by Kruskal–Wallis tests, with post hoc Dunn's pairwise comparisons if indicated. Correlations between the two social relationship indicators were analysed by means of Spearman rank-order correlation tests.

In further analyses, we used linear regression to explore associations between social relationship indicators as dependent variables and diagnostic groups dichotomised as psychotic vs. nonpsychotic disorders as independent variables. This diagnostic split was based on the basis of: (i) statistical considerations from post hoc tests, and (ii) the notion that mood and neurotic (nonpsychotic) disorders share common underlying psychological constructs [26]. Given the predicted differences in delivery of healthcare between countries and that variation in social relationship indicators between countries arising from sociocultural differences was not a focus of the current study, we adjusted these analyses for each country as dichotomous variables. The validity of linear regression modelling of nonparametric dependent variables in the presence of large sample sizes has been confirmed previously [27].

We then used linear regression to explore sociodemographic or associations between clinical variables (independent variables) with social relationship indicators (dependent variables) in the total sample, also adjusting for country effect. We set a lower threshold of significance at an alpha level of 10% to consider these independent variables as potential confounders. These were then carried forward to a further final multiple linear regression model to assess the variation of social relationship indicators across people with psychotic vs. nonpsychotic disorders.

Finally, an interaction term between any variable showing a significant association with social relationship indicators in the final multivariable model and diagnostic groups (psychotic vs. nonpsychotic disorders) was fitted. This was to determine whether the association between different patient characteristics and social relationship indicators was similar across diagnostic groups or not. This model adjusted for all other significant correlates and each country as dichotomous variables. Interactions were considered significant if they reached statistical significance at an alpha level of 1% to account for multiple testing.

All analyses were two-sided and significance in all other instances was set at an alpha level of 5%.

Variable	Diagnosis	Total sample				
	Psychotic disorders	Mood disorders	Neurotic disorders	(n = 2155)		
	(F20-29)	(F30-39)	(F40-49)			
	(n = 773)	(n = 1010)	(n = 372)			
Gender, female, $n (\%)^{**}$	283 (36.1)	564 (55.8)	205 (55.1)	1052 (48.8)		
Age, (years)**						
Mean (SD)	39.3 (12.1)	43.3 (12.2)	38.8 (12.5)	41.1 (12.4)		
Median	38.0	45.0	40.5	42.0		
Civil status, married/co-						
habiting, $n (\%)^{**}$	137 (17.7)	351 (34.8)	124 (33.3)	612 (28.4)		
Accommodation,						
homeless, $n (\%)^*$	21 (2.7)	11 (1.1)	6 (1.6)	38 (1.8)		
Living situation,						
living alone, $n (\%)^*$	278 (36.0)	329 (32.6)	112 (30.1)	719 (33.4)		
Paid employment, yes, $n (\%)^{**}$	144 (18.6)	312 (31.0)	169 (45.4)	625 (29.0)		
Educational status, tertiary /						
further education, $n (\%)^{**}$	315 (41.0)	498 (49.5)	153 (41.2)	966 (45.0)		
Receiving state benefits,						
yes, <i>n</i> (%)	503 (65.2)	472 (46.7)	124 (33.3)	1099 (51.0)		
Country, $n (\%)^{**}$						
UK	295 (38.2)	355 (35.2)	75 (20.2)	725 (33.6)		
Germany	94 (12.2)	220 (21.2)	56 (15.1)	370 (17.2)		
Italy	136 (17.6)	162 (16.0)	72 (19.4)	370 (17.2)		
Poland	172 (22.3)	143 (14.2)	109 (29.3)	424 (19.7)		
Belgium	76 (9.8)	130 (12.9)	60 (16.1)	266 (12.3)		
Migrant, yes, $n (\%)^*$	111 (14.4)	120 (11.9)	27 (7.3)	258 (12.0)		
First admission, yes, $n (\%)^{**}$	182 (23.5)	380 (37.6)	210 (56.5)	772 (35.8)		
Voluntary admission,						
yes, <i>n</i> (%)**	551 (71.3)	831 (82.3)	338 (90.9)	1720 (79.8)		
Psychiatric comorbidity,						
yes, <i>n</i> (%)**	216 (27.9)	305 (30.2)	160 (43.0)	681 (31.6)		
Clinical Global Impression						
Score, mean (SD)**	4.4 (1.3)	4.3 (1.4)	3.8 (1.2)	4.3 (1.4)		
Length of stay,						
days, mean (SD)**	42.1 (46.2)	35.6 (35.1)	27.2 (32.4)	36.5 (39.4)		

 Table 1 Sociodemographic and clinical characteristics of the sample

*Difference between groups p < 0.05; **difference between groups p < 0.001

Results

Sample characteristics

The sociodemographic and clinical characteristics of these participants according to diagnostic group are reported in Table 1. As expected, people with psychotic disorders were more likely than those with either mood or neurotic disorders to have more unfavourable sociodemographic and clinical characteristics. Specifically, they were more likely to be single, homeless, living alone, unemployed, less educated, receiving state benefits, migrant, previously admitted to hospital, admitted involuntarily and to stay longer in hospital.

Social relationship indicators: descriptive statistics

Participants in the total sample reported a mean of 2.79 (SD 2.37, range 0–10, median 2.0) social

contacts overall in the previous week (see Supplementary note 1).

The mean number of social contacts defined as friends was 1.65 (SD 1.83, range 0–10, median 1.0), making up a mean of 59.2% (SD 38.7, median 62.5%) of the total number of social contacts. A mean of 1.14 (SD 1.52) social contacts were family members (range 0–10, median 1.0; 38.2% SD 31.6 of total social contacts).

In the sub-samples, the mean number of (SD, median) social contacts defined as friends were as follows: psychotic disorders 1.47 (1.76, 1.0), mood disorders 1.69 (1.80, 1.0) and neurotic

disorders 1.92 (2.01, 2.0). Figure 1 provides a breakdown of self-reported social contact with friends in the previous week according to diagnostic group.

In the total sample, the mean score of subjective satisfaction with friendships as determined by the item from the MANSA was 4.62 (SD 1.77, median 4.0). In the sub-samples, mean (SD, median) scores were as follows: psychotic disorders 4.55 (1.77, 4.0), mood disorders 4.67 (1.77, 4.0) and neurotic disorders 4.63 (1.78, 4.0).

Fig. 1 Number of self-reported social contacts defined as "friends" according to diagnostic group



Objective indicators: unadjusted and adjusted models

The result of a Kruskal–Wallis test comparing the three diagnostic groups showed a significant difference in the reported social contact with friends (Kruskal–Wallis $\chi^2 = 16.9$, df = 2, p < 0.001). Post hoc Dunn's pairwise comparison tests revealed a difference between participants with psychotic disorders relative to those with either mood (p = 0.002) or neurotic disorders

(p < 0.001), but there was no difference between participants in the latter two groups (p = 0.912).

In a linear regression analysis adjusted only for country effect, people with psychotic disorders had significantly less social contact with friends than those with non-psychotic disorders ($\beta = -0.234, 95\%$ CI -0.392 to -0.075, p < 0.05; adjusted R² = 0.05). There was, however, no significant difference between the two groups with respect to the ratio of friends/family

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Variable	Number of social contacts (friends) ^a							Subjective satisfaction with friendships ^b								
	Univariable model ^c			Multivariable model ^d				Univari	iable model ^c			Multivariable model ^d			-	
	β 95% CI		p	β	β 95% CI		_ <i>φ</i> β	β	95% CI		Þ	β	95% CI		- ⊅	
		Lower bound	Upper bound		·	Lower bound	Upper bound			Lower bound	Uppe r boun d			Lower bound	Upper bound	_ 1
Diagnosis, F20–29 ^e	-0.234	-0.392	-0.75	0.004	-0.106	-0.273	0.061	0.215	-0.066	-0.222	0.900	0.408	0.066	-0.096	0.229	0.422
Gender, female	-0.294	-0.818	0.122	0.703					0.032	-0.117	0.182	0.670				
Age	-0.001	-0.003	0.001	0.158					0.002	-0.001	0.003	0.813				
Married/cohabiting	-0.193	-0.361	-0.252	0.024	-0.320	-0.490	-0.149	< 0.001	0.185	0.198	0.351	0.028	0.122	-0.047	0.290	0.157
Homeless	-0.409	-0.653	-0.166	0.001	-0.305	-0.149	-0.490	< 0.001	0.159	-0.081	0.399	0.193				
Paid employment	0.345	0.177	0.513	< 0.001	0.149	-0.033	0.332	0.109	0.468	0.303	0.633	< 0.001	0.384	0.203	0.562	< 0.001
Receiving benefits	-0.446	-0.605	-0.288	< 0.001	-0.320	-0.498	-0.143	< 0.001	-0.318	-0.474	-0.162	< 0.001	-0.162	-0.335	0.011	0.067
Tertiary/further education	0.384	0.229	0.540	< 0.001	0.307	0.148	0.464	< 0.001	0.025	-0.129	0.178	0.745				
Migrant	-0.208	-0.444	0.029	0.085	-0.228	-0.463	0.006	0.057	-0.007	-0.226	0.239	0.953				
First admission	0.213	0.054	0.371	0.009	0.049	-0.118	0.216	0.564	0.212	0.055	0.368	0.008	0.093	-0.072	0.258	0.270
Voluntary admission	-0.072	-0.279	0.136	0.500					-0.130	-0.335	0.074	0.211				
Length of stay	-0.124	-0.280	0.033	0.121					0.002	-0.152	0.156	0.980				
Severity of symptoms (CGI)	-0.068	-0.130	-0.005	0.033	-0.051	-0.114	0.216	0.564	-0.025	-0.086	0.036	0.423				

CGI Clinical Global Impression Scale, CI confidence interval, F20-29 psychotic disorders

^a Self-reported social contacts defined as "friends" in previous week outside home, work or clinical environment

^b Subjective satisfaction with quality and number of friendships according to corresponding item on MANSA

^c Adjusted for the effect of each country as a dichotomous variable

^d Adjusted for variables significant at alpha level of 10% in model 1 and the effect of each country as a dichotomous variable

^e Reference group, non-psychotic disorders

members ($\beta = -0.329$, 95% CI - 0.789 to 0.031, p = 0.083; adjusted R² = 0.02).

As shown in Table 2, a number of sociodemographic and clinical variables (being married, accommodation, employment, receipt of benefits, education, migration status, first admission and CGI) were all significantly associated with the number of social contacts defined as friends at an alpha level of 10% and were entered into a final multivariable model, additionally adjusted for country effect. Variations in the number of social contacts defined as friends across diagnostic groups no longer remained statistically significant $(\beta = -0.106, 95\% \text{ CI} - 0.273 \text{ to } 0.061, \beta = 0.215;$ adjusted $R^2 = 0.08$). Tests to determine whether the data met the assumption of collinearity indicated that multicollinearity was not a concern (mean VIF 1.11). There were no significant interaction effects of significant variables with diagnostic groups in predicting the number of social contacts defined as friends.

Repeating these analyses with the total number of social contacts as a variable revealed a similar pattern of results (see supplementary Table S2).

Subjective indicators: unadjusted and adjusted models

There was no statistically significant difference between the three diagnostic groups with respect to the scores of the reported satisfaction with the number and quality of friendships (Kruskal-Wallis $\chi^2 = 2.90$, df = 2, p = 0.235). Comparing psychotic vs. non-psychotic disorders, the results of the linear regression analysis adjusted for country effect were likewise not significant $(\beta = -0.066, 95\% \text{ CI} - 0.222 \text{ to } 0.090, p = 0.408;$ adjusted $R^2 = 0.02$). In a final multiple linear regression model, additionally adjusted for significant confounders (marital status, employment, state benefits and first admission), the results remained unchanged ($\beta = 0.067, 95\%$ CI - 0.096 to 0.229, p = 0.421; adjusted $R^2 = 0.04$).

Correlation between social relationship indicators

Results of the Spearman correlation indicated a significant, weak positive association between the self-reported social contact with friends and subjective satisfaction with friendships in the total sample: $r_s = 0.326$, p < 0.001. These associations were similar in each individual diagnostic group: psychotic disorders, $r_s = 0.262$, p < 0.001; mood disorders, $r_s = 0.360$, p < 0.001; neurotic disorders, $r_s = 0.347$, p < 0.001.

Correlation analysis of the number of total social contacts with satisfaction with friendships revealed a similar pattern of results in both the total sample ($r_s = 0.266$; p < 0.001) and individual diagnostic groups (see results in Supplementary note 2).

Discussion

Main findings

In a large sample of participants recruited from five different European countries with mental illness meriting hospitalisation, we found a similar number of social contacts, whether family members or friends, between three major diagnostic groups, when taking into account potential variations in clinical practices between different countries as well as socioeconomic and clinical confounders. The average number of weekly meaningful social contacts across all participants was less than three, although there was a wide variation in the number of reported contacts (SD 2.37). The extent of satisfaction with the number and quality of friendships similarly did not vary across diagnostic groups. In other words, there is no quantifiable difference between diagnostic groups on how social relationships are actually experienced or perceived. However, subjective and objective social relationship indicators appear to be diverse constructs. In addition, we found that nearly 40% of these social contacts are made up of family members, rather than friends across all participant groups. The average score on the MANSA item suggested at most a moderate subjective perception of the number and quality of friendships (mean: 4.62 indicative of "mixed" to "mostly satisfied"; SD 1.77; median 4.0 indicative of "mixed"). Finally, our findings also indicate that some sociodemographic variables appear to be the most important factors in the association with social relationships rather than diagnostic groups or clinical severity at the time of hospitalisation.

Strengths and limitations

This is hitherto the largest study simultaneously comparing social relationship indicators from both objective and subjective perspectives across different psychiatric diagnoses. All participants had required psychiatric hospitalisation in the previous year, a reflection of the severity of their mental illness irrespective of their underlying diagnosis, allowing comparisons between a group of participants experiencing a similar range of psychiatric morbidity. The large number of participants thus provided a rare opportunity to capitalise on sufficient statistical power, to insert number of patient characteristics in а multivariable models and to additionally include people with neurotic disorders, who have seldom been included in this type of study before. Two recent systematic reviews indicate that previous studies quantifying objective social relationship indicators (social networks) have collectively assessed 1184 participants with psychosis [12] and 873 with chronic mood disorders [17]. Our study alone has a much larger size than all previous studies combined.

Participants were recruited from countries with heterogeneous underpinning environments, but benefiting from consistent methodologies across all participating sites. Selection of participants for follow-up assessment adopted а robust procedure, permitting the identification of a clinically representative sub-sample. Interviews were conducted face-to-face by trained researchers external to their clinical team, reducing the likelihood of social desirability bias in the responses.

The study, however, has a number of limitations:

(a) Assessment of subjective social relationship indicators was based on a single item from the MANSA, which is intended to measure subjective quality of life in general rather than satisfaction with social relationships in its own right. A deeper understanding of the subjective notion of the wider construct of quality of life and loneliness could have been obtained from in-depth qualitative assessments. However, such understanding was beyond the scope of the current study, which instead aimed to lay the foundations for future deeper investigations of these social experiences among people with mental illness.

(b) The evaluation of social contacts relied on self-reported data, potentially affected by recall bias and influenced by the subjective understanding of the definition of "social contact". Yet, we attempted to mitigate this by providing clear instruction to researchers on how to define a social contact, i.e., someone they met and had a conversation with and not just a greeting, and those that did not take place in casual settings such as public transport. The notion of "friends" was also based on self-definition despite the complex conceptualisation of friends and variation in understanding between individuals, its although this has been a consistent theme in studies on friendship [12, 28].

(c) Our definition of social contacts does not include contacts at home, work or services, as our main focus laid on social activity outside of these settings as social contacts in these contexts can be influenced by variables which are external to the individual [29]. This narrower definition needs to be considered when comparing our results with those of other studies.

(d) We used broad diagnostic groups according to ICD-10 categories rather than individual diagnoses. It is possible that there may be subtle differences in patterns of social interaction between specific diagnoses, although these differences were not the focus of our research question.

(e) The UK sample size was twice as large as that from other countries, although linear regression models were all adjusted for country as a potential confounder. Consequently, this meant that an exploration of potential variations in social relationships across countries was beyond the scope of the current study. (f) Participants in this study had all been recruited from inpatient settings, indicating a set of sociodemographic and clinical characteristics that may differ from those who may never require hospitalisation. Our findings may therefore not be generalisable to all people with the studied groups of mental illness, but may instead be specific to those whose illness has been sufficiently severe to merit hospital admission.

(g) We did not collect data related to any therapeutic interventions. If any of them were to directly or indirectly target social relationships and were unique to certain hospitals or participants, they might have influenced the outcomes of social relationship indicators and their correlates.

(h) Our study did not include participants from the general population, hence quantitative comparisons between people with mental illness and those without could not be made. However, a large body of research has already consistently confirmed the restricted social relationships of people with mental illness, especially with respect to psychotic disorders [15]. The aims of our study were novel in that they compare social relationships among diagnostic groups, and additionally focus on relationships with friends-an aspect of social relationships that has been seldom explored before. Such knowledge would be crucial in future development of interventions aimed at improving social interactions in people with mental illness.

Interpretation of findings and comparison with the literature

The small number of social contacts reported by participants in our sample is in line with the large body of evidence highlighting the negative impact of severe mental illness in general on social interaction [8, 15, 18, 19]. People with psychotic disorders have been assumed over the years to have fewer social contacts than those with nonpsychotic disorders [7, 18, 19] despite limited comparative research [17]. Our findings, however, point towards similar social deficits across different psychiatric diagnoses among those whose illness has warranted hospitalisation, at least in terms of their overall social contacts, and contact with friends.

Previous research among people with psychotic disorders has also highlighted the significant role of family members, as opposed to friends, in providing social interaction, particularly as the illness progresses [15]. Our findings indicate not only that nearly 40% of social contacts constitute family members, but that this phenomenon also extends to people with the more severe forms of non-psychotic illness. Our sensitivity analyses using the total number of social contacts as a variable did not change substantially compared to analyses limited to social contact with friends. These findings thus indicate that the already limited social contact with friends is not compensated for by additional social contact with family members outside their household.

While intentionally left inexplicit, our focus on subjective and objective components of social relationships also dovetails with the construct of social capital-the complex set of cohesive forces inherent to the population, allowing collective action and integration for mutual benefit [32]. The structural and cognitive components of social capital also map onto objective and subjective indicators respectively as operationalised in this study. The inverse association between both structural and cognitive social capital and risk of onset of non-psychotic disorders has been highlighted in a recent systematic review [33], in line with our findings identifying restricted social relationships among people with mental illness overall.

The number of total social contacts among all participants in our study is even lower than figures reported elsewhere for people psychotic illness, including studies evaluating comparable time-frames (Bengsson-Tops et al. [8]: 14.7 in one week; Dozier et al. [30]: 16.3 in 2 weeks). Our definition of social contacts, excluding home, work or healthcare contacts, might have influenced these divergent findings. We believe this was required to avoid biases related to different size of households and to the number of people that the patients meet for clinical purposes, but our choice carries this limitation when comparing with similar studies. The specific geographical location is also not likely to have influenced our results given that all regression models were adjusted for country.

A study among community-dwelling people with schizophrenia in Scandinavia showed higher levels of social integration among those who were less symptomatic and had greater levels of social functioning [31]. Participants in our study all had severe psychiatric symptoms meriting recent hospitalisation, which might have exerted an even more negative impact on social relationships overall. Our figures, however, do mirror those from a smaller comparative study by our group, identifying an average of nearly 2 weekly social contacts among participants with psychotic or mood disorders, nearly half of whom had been hospitalised in the previous year [18]. However, this study found a different pattern of subjective social relationships from those in the current study, reporting lower odds of loneliness among people with psychotic disorders relative to those with mood disorders [18]. The large sample size in our study allowed adjustment for more confounding factors, such that the subjective and objective social relationship indicators were ultimately not different across diagnostic groups in the adjusted models.

Our correlation analysis only showed a weak association between objective and subjective indicators, indicating that these are distinct concepts and that therefore there is value in routinely measuring both indicators in psychiatric populations. This finding has also been highlighted previously from data from the Adult Psychiatric Morbidity Survey in England [10] comparing people with mental illness relative to the general population, although the majority of people with mental illness here had been managed in primary care. Traditional approaches, such as increased social integration, aimed at reducing loneliness and low satisfaction with relationships, may therefore only have a very limited effect on these subjective indicators at best.

Previous smaller studies have found a significant inverse relationship between the severity of psychiatric symptoms and social relationships in terms of both the quantity of social contacts [8, 30] and related satisfaction [8]. In our study, CGI on admission, involuntary admission and length of stay, all potential proxies for illness severity at the time of hospitalisations, were not associated

with social relationship indicators in the adjusted model, in contrast with sociodemographic characteristics such as marital status, homelessness, education and employment. The positive association between being married and larger social networks in people with psychotic illness [12], as well as the significant beneficial role of employment, including sheltered work, in providing greater satisfaction with social domains of subjective quality of life [34] have been highlighted previously, mirroring our findings regarding satisfaction with friendships.

Implications

Our findings indicate that people with severe psychotic, mood and neurotic disorders have similar experiences in terms of the quantity of overall social contacts, including friends, as well the associated perceived satisfaction. as Policymakers and clinicians, in their consideration of the social context of patients and potential interventions addressing social relationships, may therefore benefit from conceptualising mental illness in general as a core contributor to social disability, rather than focusing on the specific underlying diagnosis of patients. Addressing specific patient deficits, such as unemployment and homelessness, are also likely to improve the quantity of social contacts.

In this context, researchers should also devote appropriate attention to social isolation in all of these three diagnostic groups and further develop and test appropriate interventions that improve the social life of people with severe mental illness. In general, the evidence for such social interventions remains limited, albeit encouraging as identified by recent systematic reviews evaluating social interventions for people with psychotic disorders [20], depression [35] and chronic depression [17]. These interventions, however, are often unstandardised and not offered as part of routine care across all services. Of these, a pragmatic randomised trial in Italy is particularly promising, highlighting the benefit of adding interventions that activate social contacts of people with schizophrenia within routine clinical settings, with a long-lasting effect on overall prognosis [19].

To our knowledge, no interventions specifically targeting interaction with friends among people with mental illness (as opposed to befriending) have been evaluated to date. However, a large study investigating friendship in people with psychosis demonstrated a positive correlation between negative symptoms and not having a close friend or meeting a friend in the preceding week [36]. Among people with depression requiring hospitalisation, evidence suggests that those perceiving high levels of emotional support from friends at baseline are more likely to make a better recovery [37]. Nevertheless, people developing chronic depression are likely to struggle securing friendships in the long run due to limited social skills [37]. These common themes across psychotic and non-psychotic disorders therefore further point towards the notion evidenced by our findings, that similar types of social interventions may have transdiagnostic benefits with enhancing friendships and improving outcomes.

Conclusion

Our results indicate that people with mental illness meriting acute hospitalisation appear to share similar numbers of social contacts in terms of family members, friends or significant others, as well as comparable satisfaction with their friendships irrespective of their underlying diagnosis. Assumptions have been made previously that social relationships may be more seriously impaired among those with psychotic disorders, but our findings indicate that those with severe forms of mood or neurotic disorders may be comparably affected. Objective and subjective indicators of social relationships, however, appear to be only weakly correlated with one another. Sociodemographic variables may, on the other hand, be more important correlates of social interaction, rather than diagnosis or clinical severity. Policymakers and those developing future interventions addressing social relationships in mental health services should therefore be mindful that such interventions are likely to be beneficial to people across different diagnoses without requiring diagnosis-specific adaptations. Importantly, such interventions also need to focus on social factors at an individual patient-level.

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Conflict of interest The authors declare that they have no conflict of interest.

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